www.fragilityfracturenetwork.org

8th FFN GLOBAL CONGRESS 2019

Final Programme

Oxford, UK
28–30 August 2019

FFN
Fragility Fracture Network

Best care across the world

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FRAGILITY FRACTURE NETWORK

What is FFN?

FFN is an international non-profit network organisation based in Switzerland. Its purpose is connect up all the activists across the world who are working to ensure that people suffering from fragility fractures get high quality, cost-effective care.

Our Mission Statement

To promote globally the optimal multidisciplinary management of the patient with a fragility fracture, including secondary prevention.

To achieve this, we have defined three broad aims:

- To disseminate globally the best multi-disciplinary practice in preventing and managing fragility fractures
- To promote research aimed at better treatments of osteoporosis, sarcopenia and fracture
- To drive policy change that will raise fragility fractures higher up the healthcare agenda in all countries

Our Philosophy

The starting point for FFN thinking is the patient who presents to the health service, having sustained a fragility fracture. The first priority is to respond to this acute situation by treating both the fracture and any comorbidities (of which there may be many in an elderly population) and restoring the patient to the maximum achievable functional capacity. The second priority is to prevent the next fragility fracture, by treating osteoporosis and the tendency to fall.

This perspective makes the FFN uniquely appealing to orthopaedic surgeons, compared to other international organisations in the field of osteoporosis and fragility fractures, and they form the largest professional group within our membership. However, good care cannot be given properly without the participation of experts from other fields. Multidisciplinary co-management is at the heart of our philosophy.

The ageing population presents us with an epidemiological emergency in terms of the predicted incidence of fractures, particularly hip fractures. This emergency is at its most acute in the emerging economies. We are therefore working hard to extend the Network, to assist the professional champions who are rising to the challenge in those areas.

Membership of the FFN is open to individual professionals in any field relevant to fragility fractures. Details may be found at our website.

For further information about FFN, please contact

FFN – Fragility Fracture Network
Central Office
Schaffhauserstrasse 550
8052 Zurich, Switzerland
T: +41 44 894287
F: +41 44 894201
ff-network@mci-group.com
www.fragilityfracturenetwork.org

FFN
Fragility Fracture Network

NOTES

WELCOMING ADDRESS

Dear Colleagues,
Dear Ladies and Gentlemen,

FFN invites you to join the 8th FFN Global Congress 2019 in Oxford, UK from 28–30 August. The annual meeting is an international congress addressing the full pathway of care for fragility fracture patients. The FFN Global Congress consists of invited talks from international experts, plenary discussions, interactive update sessions and free papers. The congress provides a unique platform to learn about new technical developments, state-of-the-art interventions. International research and to interact with leading clinicians, researchers and other professional health workers and stake holders.

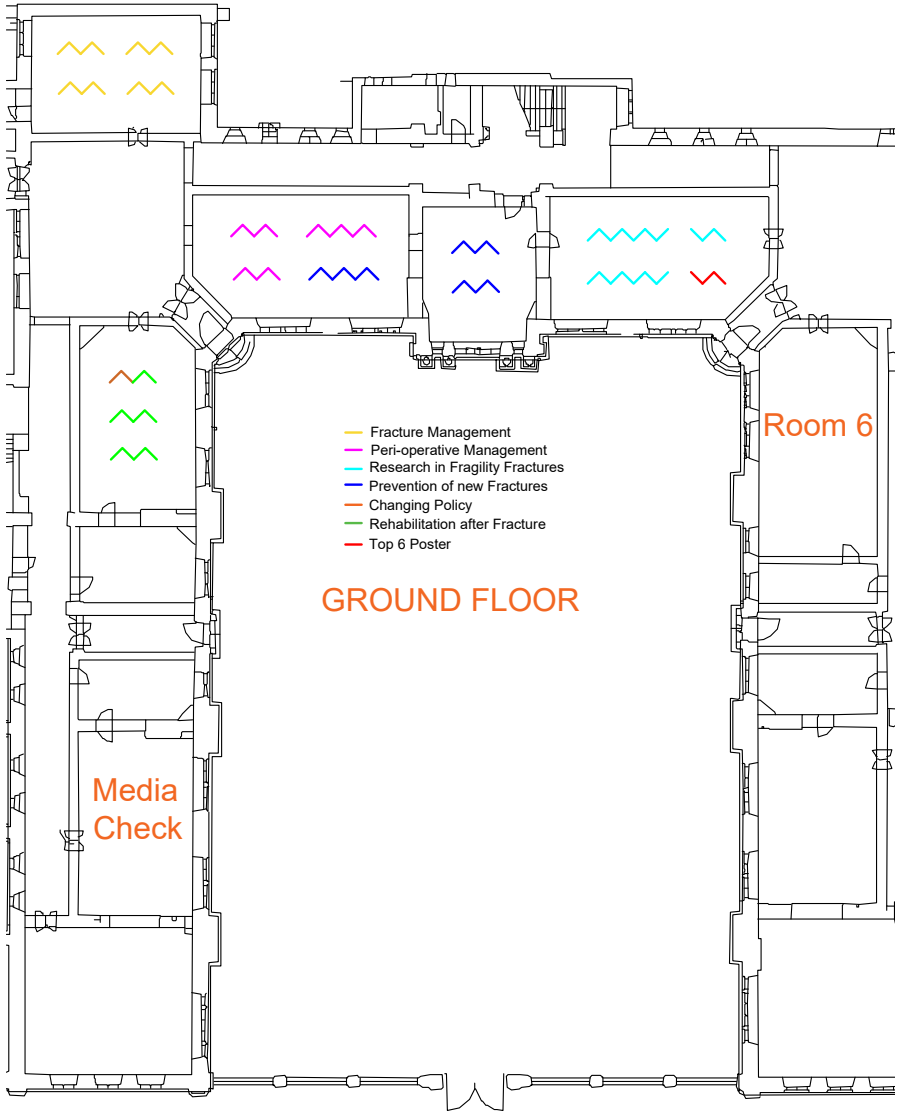
With the support of the FFN Regionalisation Committee, national Fragility Fracture Networks are being set-up across the world to enable high-quality multidisciplinary care for all patients with fragility fracture. Therefore, this year's motto is "Best Care across the World".

We are looking forward to welcoming you in Oxford in August 2019

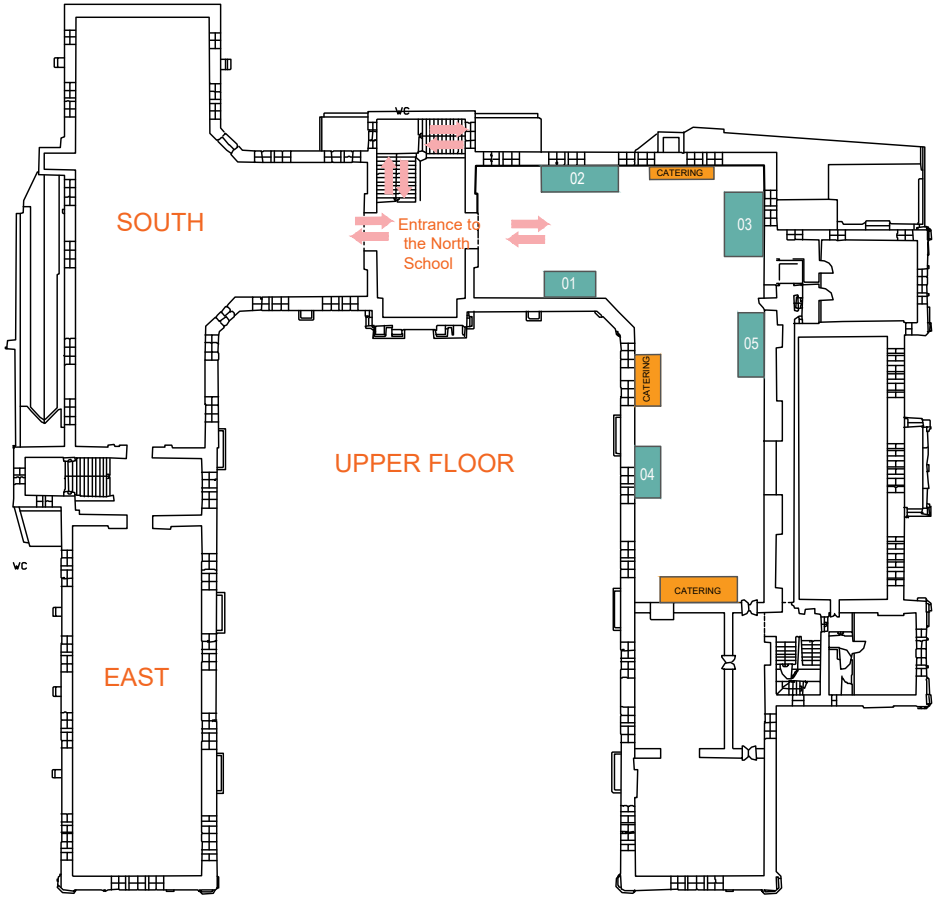
Xavier Griffin
Congress Chair

Matthew Costa
President of the Fragility Fracture Network (FFN)

GENERAL INFORMATION



Room 7–11 | Poster Exhibition



North School | Exhibition & Catering

The organisers of the 8th FFN Global Congress 2019 gratefully acknowledge the support of the following companies:

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AMGEN	DePuy Synthes	Royal College of Physicians
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FFN Exhibitors

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Company Name	No.
AMGEN	5
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Numerically

Company Name	No.
Royal College of Physicians	1
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DePuy Synthes	4
AMGEN	5

Exhibition Hours

Wednesday, 28 August 2019	8.00–18.15
Thursday, 29 August 2019	8.00–18.30
Friday, 30 August 2019	9.00–11.15

Scientific Organisation

FFN – Fragility Fracture Network
Central Office
Schaffhauserstr. 550
8052 Zurich, Switzerland

Congress Chair

Xavier Griffin, United Kingdom

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Legal Organiser (PCO)

MCI Deutschland GmbH
MCI | Germany – Berlin
Amira Hussein
Markgrafenstr. 56
10117 Berlin
T: +49 30 20459323
F: +49 30 2045950
ffn-congress@mci-group.com

Sponsoring

T: +49 30 20459330
ffn-sponsoring@mci-group.com

Certificate of Attendance

All registered attendees, whether they register in advance or on-site, will receive a certificate of attendance, 2 weeks after the congress by e-mail.

Congress Homepage

www.fragilityfracturenetwork.org

Congress Language

The official congress language will be English. All PowerPoint presentations have to be prepared in English only. There will be no simultaneous translations.

Internet/WiFi

Free wireless internet is available throughout the congress venue.

Network: ExamSchoolsWifi
Password: 7581highst

Liability Disclaimer

The organisers cannot be held liable for any hindrance or disruption of congress proceedings arising from political, social or economic events or any other unforeseen incidents beyond their control. The organisers will accept no liability for any personal injuries sustained or for loss or damage to property belonging to congress participants, either during or as a result of the congress or during all tours and events. Registration of a participant entails acceptance of these conditions.

Lost and Found

For lost and found items, please refer to the registration counter.

Lunch/Catering

Lunch during the Congress is not included in the Registration fee. You are able to pre-order lunch within the registration.

Name Badge

For identification purposes, badges have to be worn during all congress activities. Admission to the congress will not be allowed without badge identification.

Payment On-site

Please note that paying the registration fee on site is possible in Euro € only.

Poster Exhibition

The Poster Exhibition is located on the ground floor in room 7-11. Posters shall be prepared in size DIN A0 (841×1189mm), portrait format, in paper, in English. Posters should be mounted on Wednesday, 28 August 2019, 09:30 latest and will remain accessible to all attendees until Friday, 30 August 2019, 12:00.

Plenary Poster Presentation/Poster Walk

The presentation of the Top 6 Posters takes place on Thursday, 29 August 2019 from 17.30 to 18.00 (Room South School) and is followed by a poster walk (18.00–19.00).

Registration

Registration Desk

The registration desk is located on the Ground Floor at the reception. Registration is only valid if the complete payment of the congress fee as well as of other services booked has been made. Registration on-site is possible during the entire congress within the opening hours of the registration desk. Only credit cards and cash payment will be accepted on-site.

Opening Hours

Tuesday, 27 August 2019	18.00–20.00
Wednesday, 28 August 2019	7.00–18.00
Thursday, 29 August 2019	7.30–18.00
Friday, 30 August 2019	7.30–12.30

Registration Fees On-site

Participant	483,50€
Nurse*/AHP*	325 €
Student*	242 €

**An appropriate proof of status must be presented to be entitled to the reduced registration fee.*

Speaker's Presentation Center

The media check is located on the Ground floor in room 14. Speakers are asked to hand in their presentation at least 2 hours before the session. All rooms are equipped for PowerPoint presentation.

Wednesday, 28 August 2019	7.00–18.00
Thursday, 29 August 2019	7.30–18.00
Friday, 30 August 2019	7.30–12.30

Photography

Please note that photos will be made during the congress and published on social media channels and the FFN website.

In case you do not agree, kindly inform MCI at the registration desk.

	SOUTH SCHOOL	EAST SCHOOL	ROOM 6
8.00–9.35	**PLENARY SESSION I** Welcome and Opening Plenary: FFN Best Care Across the World		
	Coffee Break and Posters		
10.00–11.30	**WORKSHOP 1** FFN Regionalisation update	**WORKSHOP 2** Optimizing Acute Care of Vertebral Fragility Fracture	**WORKSHOP 3** Slowing the Slippery Slope from Sarcopaenia to Frailty
	Break		
11.45–12.50	**FREE PAPERS SESSION 1** Fracture Management	**FREE PAPERS SESSION 2** Peri-operative Management	**FREE PAPERS SESSION 3** Research in Fragility Fractures
13.00–14.00	Lunch Break and Poster	**LUNCH SYMPOSIUM** with UCB	Lunch Break and Poster
14.15–15.45	**WORKSHOP 4** Orthogeriatrics and FLS	**WORKSHOP 5** The Management of Ankle Fractures in Frail Older People – Can we do better?	**WORKSHOP 6** Scaling up Quality Improvement for Patients with a Hip Fracture
	Break		
16.00–17.00		**AFTERNOON COFFEE SYMPOSIUM** with Zimmer Biomet	
17.15–18.15	**SYMPOSIUM 1** Forum with FFN UK	**SYMPOSIUM 2** Forum with Physiotherapy Societies	**SYMPOSIUM 3** Orthogeriatric Programs and implementation challenges
19.00–22.00	**NETWORKING DINNER** Drinks Reception at the Bodleian Library (19:00-19:30) Dinner at the Balliol College (19:30-22:00)		

8.00–9.35 PLENARY SESSION I

Room: South School

Welcome and Opening Plenary: FFN Best Care Across the World
Chairs: Matthew Costa, Xavier Griffin

8.00–8.10 Welcome to Oxford and to the FFN Global Congress
Matthew Costa, Xavier Griffin, United Kingdom

8.10–8.25 FFN Communications Update
Paul Mitchell, New Zealand

8.25–8.40 FFN Regionalisation: where are we now?
David Marsh, United Kingdom

8.40–8.55 FFN Hip Fracture Audit Update:
The Growth of International Hip Fracture Audit
Colin Currie, United Kingdom

8.55–9.10 FFN Education update
Paolo Falaschi, Italy

9.10–9.25 FFN Scientific update
Jay Magaziner, United States

9.25–9.35 Discussion

9.35–10.00 COFFEE BREAK AND POSTERS

10.00–11.30 WORKSHOP 1

Room: South School

FFN Regionalisation Update: Essentials of Regionalisation
Chairs: David Marsh, Hannah Seymour

10.00–10.10 The Guide to Formation of National FFNs
Hannah Seymour, Australia

10.10–10.25 Birth and development of FFN-Brazil
Adriana Braga de Castro Machado, Brazil

10.25–10.40 Birth and development of FFN-Philippines
Irewin Tabu, Philippines

10.40–10.55 Birth and development of FFN-Norway
Annette Ranhoff, Norway

10.55–11.10 Birth and development of FFN-China
Manyi Wang, China

11.10–11.30 Audience Discussion

10.00–11.30 WORKSHOP 2

Room: East School

Optimizing Acute Care of Vertebral Fragility Fracture: An Update on the Role of Augmentation, Bracing and Physical Therapy
Chairs: Manuela Ferreira, Cathie Sherrington

10.00–10.20 Orthotics and taping in the management of vertebral fractures in people with osteoporosis: a systematic review
Victoria Goodwin, United Kingdom

10.20–10.40 Physiotherapy Rehabilitation for Osteoporotic Vertebral Fracture (PROVE): an adaptive design randomized controlled trial
Karen Barker, United Kingdom

10.40–11.00 Vertebral Fragility Fractures (VFF)-Who, when and how to operate
Opinder Sahota, United Kingdom

11.00–11.20 Percutaneous vertebroplasty for osteoporotic vertebral compression fracture
Khalid Salem, United Kingdom

11.20–11.30 Audience Discussion

10.00–11.30 WORKSHOP 3

Room 6

Slowing the Slippery Slope from Sarcopaenia to Frailty: The SIMPLE Approach to Managing Malnutrition in Hip Fracture
Chair: Jack Bell

10.00–10.05 Welcome
Paolo Falaschi, Italy

10.05–10.25 Multidimensional evaluation of frail subjects with sarcopenia
Silvia Migliaccio, Italy

10.25–10.45 Nutritional intervention in sarcopenia
Lorenzo Donini, Italy

10.45–11.05 A practical approach to nutritional support in hip fracture patients
Antony Johansen, United Kingdom

11.05–11.25 A systematised, interdisciplinary malnutrition program for impLementation and Evaluation – SIMPLE
Jack Bell, Australia

11.25–11.30 Audience Discussion

11.30–11.45 MOVE SESSIONS

11.45–12.50 FREE PAPER SESSION 1

Room: South School

Fracture Management
Chairs: Karsten Dreinhöfer, Takeshi Sawaguchi

11.45–11.53 Geographic variation in surgical care and outcome of hip fractures: an English cohort study using national hip fracture database (NHFD) data for 2017
Anjali Shah, United Kingdom

11.53–12.01 Total hip replacement for hip fracture: worth waiting for?
Julie R. M. Craig, United Kingdom

12.01–12.09 Radiographic malunion after ankle fractures in older adults: definitions and new thresholds derived from clinical outcome data from the ankle injury management (aim) trial
David J. Keene, United Kingdom

12.09–12.17 Could there be a different choice than internal fixation for undisplaced femoral neck fractures? A population-based study from Danish national registries
Bjarke Viberg, Denmark

12.17–12.25 Risk factors for revision within 1 year following osteosynthesis of a displaced femoral neck fracture
Anne Marie Nyholm, Denmark

12.25–12.33 The forgotten femoral fracture: femoral fractures, other than hip fractures, in the elderly
Julie R. M. Craig, United Kingdom

12.33–12.41 Understanding the lived experience of patients after vertebral fracture
Sonia Singh, Canada

12.41–12.49 Intramedullary nailing in unstable fracture patterns: does length matter?
Seth Michael Tarrant, Australia

11.45–12.50 FREE PAPER SESSION 2

Room: East School

Peri-operative Management

Chairs: Simon Mears, Dieu Donné Niesten

11.45–11.53 Peri-operative hypothermia in fracture neck of femur (NOF)
Neda Akhtar Hasan, United Kingdom

11.53–12.01 Safely reducing time to theatre in patients with neck of femur fractures taking direct oral anticoagulants: a prospective, matched-control observational study
Joe Lawson, United Kingdom

12.01–12.09 Crossing quartiles; a large district general's experience in improving hip fracture care
Christopher Anthony, United Kingdom

12.09–12.17 Effect of multidisciplinary treatment approach for geriatric hip fractures. – Japanese experience
Kenji Shigemoto, Japan

12.17–12.25 Low 30-days mortality after proximal femoral fracture in japan
Fumio Fukuda, Japan

12.25–12.33 Palliative care in hip fractures: too little too late?
Mahsa Sarrami, Australia

12.33–12.41 Hot on hypothermia: increasing awareness of peri-operative hypothermia
William Christian Quelch, United Kingdom

12.41–12.49 Qualitative study of relative/carer presence in the anaesthetic room for patients with dementia
Natasha Bahra, United Kingdom

11.45–12.50 FREE PAPER SESSION 3

Room 6

Research in Fragility Fractures

Chairs: Ellen Binder, Donato Agnusdei

11.45–11.53 Maximal isometric knee-extension strength measures indicating sarcopenia is associated with health-related outcomes and mortality in older patients with hip fracture
Signe Hulsbæk, Denmark

11.53–12.01 Mobility training for increasing mobility and functioning in older people with frailty: systematic review
Daniel Treacy, Australia

12.01–12.09 Nationwide trends and risk factors for reoperation due to infection after hip fracture surgery: a Danish cohort study
Kaja Kjørholt, Denmark

12.09–12.17 Surviving fragility fractures in advanced chronic kidney disease?
Boon Kang Aw Yong, United Kingdom

12.17–12.25 Validation of newly devised subtype classification for atypical femoral fracture
Yoto Oh, Japan

12.25–12.33 Effectiveness of information technology enabled patient education solutions in the recovery of older adults with fragility fractures: a systematic review and meta-analysis
Mellick Chehade, Australia

12.33–12.41 Hospital differences in death rates after hip fracture surgery in Denmark – a multilevel approach for evaluating variation in 30-day mortality after hip fracture in a population-based cohort study
Pia Kjær Kristensen, Denmark

12.41–12.49 Direct oral anti-coagulants in the prevention of venous thromboembolism following surgery for hip fracture in the elderly
En Lin Goh, United Kingdom

13.00–14.00 LUNCH BREAK AND POSTERS

13.00–14.00 SYMPOSIUM

Room: East School — **Lunch Symposium with UCB**

WANTED. ALL SKILLS ON THE CARE PATHWAY. The value of interprofessional collaboration
Moderator: Opinder Sahota

NEEDED. Improvements in the care pathway
Opinder Sahota & Julie Santy-Tomlinson, United Kingdom

VALUED. The role of interprofessional collaboration
Elizabeth Anderson, United Kingdom

STRENGTHENED. Working together towards the best care pathway
Elizabeth Anderson, Opinder Sahota & Julie Santy-Tomlinson, United Kingdom

Summary and Close
Opinder Sahota & Julie Santy-Tomlinson, United Kingdom

14.15–15.45 WORKSHOP 4

Room: South School — **Orthogeriatrics and FLS: Two-Sides of the same Coin**
Chairs: Paul Mitchell, Markus Seibel

Setting the Scene

14.15–14.23 An overview of systematic approaches
Paul Mitchell, New Zealand

14.23–14.33 Discussion 1: Systematic approaches

Hip Fracture Care

14.33–14.41 Best practice in hip fracture care: An orthopaedic perspective
Takeshi Sawaguchi, Japan

14.41–14.49 Best practice in hip fracture care: A geriatrician perspective
Jacqueline Close, Australia

14.49–15.04 Discussion 2: Best practice in hip fracture care

Fracture Liaison Services

15.04–15.12 Best practice in FLS: A nursing perspective
Jo Sayer, United Kingdom

15.12–15.20 Best practice in FLS: An endocrinology perspective
Markus Seibel, Australia

15.20–15.35 Discussion 3: Best practice in FLS

15.35–15.45 Orthogeriatric Services and Fracture Liaison Services are complementary

14.15–15.45 WORKSHOP 5

Room: East School — **The Management of Ankle Fractures in Frail Older People – Can we do better?**
Chairs: Xavier Griffin, Hannah Seymour

14.15–14.30 Why Geriatricians hate ankle fractures in older people
Hannah Seymour, Australia

14.30–14.40 What Geriatricians need to understand about Ankle Fractures – the Clinical Conundrum from an Orthopaedic Surgeon
Xavier Griffin, United Kingdom

14.40–14.50 Close Contact Casting – the answer?
David Keene, United Kingdom

14.50–15.00 ORIF or Hind Foot Nails – the answer?
Andy Riddick, United Kingdom

15.00–15.45 Debate and Audience Discussion

14.15–15.45 WORKSHOP 6

Room 6 — **Scaling up Quality Improvement for Patients with a Hip Fracture – HIP QIP**
Chair: Tim Chesser

14.15–14.20 Introduction
Tim Chesser, United Kingdom

14.20–14.35 How the collaborative worked: site selection & video
Mike Reed, United Kingdom

14.35–14.50 Project evaluation & Results
Antony Johansen, United Kingdom

14.50–15.30 **Debate: "How did we save 100 lives in HIPQIP?"**

Audience pre-vote

"It's the dietician assistants & the nutrition "*(Antony Johansen)* vs. "It's pain blocks, early surgery and early mobilisation" *(Dominic Inman/Jocelyn Hopkins)*

Audience Discussion

Closing Arguments & Final Vote

15.30–15.35 Why Scaling up worked, spreading the word into Networks and future plans for the NHFD
Dominic Inman, United Kingdom

15.35–15.45 Audience Discussion

15.45–16.00 MOVE SESSIONS

16.00–17.00 SYMPOSIUM

Room: East School

Afternoon Symposium with Zimmer Biomet

Rapid Recovery Fragility Fracture Hip Pathway
Moderator: René El Attal

16.00–16:15 What are the benefits?
René El Attal, Austria

16.15–16:30 Challenges in perioperative care: how to overcome hurdles
René El Attal, Austria

16.30–17:00 EPA Hip Fragility Benchmarking Study: first results
Kris Vanhaecht, Belgium

17.15–18.15 SYMPOSIUM 1

Room: South School

Forum with FFN UK
Chair: Matthew Costa

17.15–17.20 Background to FFN UK
Matthew Costa, United Kingdom

17.20–17.30 Why is a fragility fracture network important for patients?
Nick Welsh, United Kingdom

17.30–17.40 Acute care in the UK – how surgeons can help to improve outcomes
Andrew Gray, United Kingdom

17.40–17.50 Acute care in the UK – why we need joint orthogeriatric care
Antony Johansen, United Kingdom

17.50–18.00 What about rehabilitation?
Rebecca Kearney, United Kingdom

18.00–18.10 The Royal Osteoporosis Society charter for secondary fracture prevention
Alison Doyle, United Kingdom

18.10–18.15 Discussion

17.15–18.15 SYMPOSIUM 2

Room: East School

Forum with Physiotherapy Societies
Chairs: Sallie Lamb, Anja Dautel

17.15–17.20 Welcome and Introductions
Sallie Lamb, United Kingdom

17.20–17.35 Using Hip Fracture Audit Data to Improve Standards
Ruth Ten Hove, United Kingdom

17.35–17.50 Using Audit Data to improve Physiotherapy Outcomes
Michelle Fitzgerald, Ireland

17.50–18.05 Using physiotherapy measures for short-term follow-up
Morten Tange Kristensen, Denmark

18.05–18.15 Discussion

17.15–18.15 SYMPOSIUM 3

Room 6

Orthogeriatric Programs and Implementation Challenges
Chairs: Ellen Binder, Anette Hylen Ranhoff

17.15–17.20 Welcome and Introductions
Ellen Binder, United States

17.20–17.35 AGS CoCare: Ortho – US experience disseminating co-management
Daniel Mendelson, United States

17.35–17.50 Co-management – how and how long?
Cristina Alonso Bouzon, Spain

17.50–18.05 The Tronheim model of orthogeriatric care – does it translate into real-world practice?
Lars Gunnar Johnsen, Norway

18.05–18.15 Discussion

19.00–22.00 OTHERS

NETWORKING EVENING
Drinks Reception at the Bodleian Library
Dinner at the Balliol College

	SOUTH SCHOOL	EAST SCHOOL	ROOM 6
8.00–9.15	**PLENARY SESSION II** Acute Care		
	Coffee Break and Posters		
10.00–11.30	**WORKSHOP 7** FFN Education Update	**WORKSHOP 8** Measuring Recovery following Hip Fracture in Post-Acute Settings	**WORKSHOP 9** 80+: How Old is too Old?
	Break		
11.45–12.50	**FREE PAPERS SESSION 4** Fracture Prevention	**FREE PAPERS SESSION 5** Changing Policy	**FREE PAPERS SESSION 6** Rehabilitation after Fracture
13.00–14.00	Lunch Break and Poster	**LUNCH SYMPOSIUM** with AMGEN	Lunch Break and Poster
14.15–15.45	**WORKSHOP 10** Secondary Fracture Prevention Peer Mentoring Workshop	**WORKSHOP 11** The Patient, the Fall and the Hip Fracture	**WORKSHOP 12** Fragility Fracture and Qualitative Research
	Coffee Break and Posters		
16.15–17.15	**SYMPOSIUM 4** Joint with Bone Health Societies (ASBMR, IOF, ROS)	**SYMPOSIUM 5** Joint Symposium with Orthopaedic Societies (SICOT)	**SYMPOSIUM 6** Joint Symposium with Nursing Societies (ICON)
	Break		
17.30–18.00	**FREE PAPERS SESSION 7** Top 6 Poster Presentation		
18.00–19.00	**POSTER WALK** Drinks Reception		

8.00–9.15 PLENARY SESSION II

Room: South School

Acute Care

Chairs: Henrik Palm, Hannah Seymour

8.00–8.20 RBC transfusion: How low can you go?
Jeffrey Carson, United States

8.20–8.40 Is there a role for standards in hip fracture anaesthesia care?
Ian Moppet, United Kingdom

8.40–9.00 The National Hip Fracture Database: Setting the standards for hip fracture care in the UK
Anthony Johansen, United Kingdom

9.10–9.15 Audience Discussion

9.15–10.00 COFFEE BREAK AND POSTERS

10.00–11.30 WORKSHOP 7

Room: South School

FFN Education Update

Chairs: Paolo Falaschi, Karen Hertz

10.00–10.15 Educational projects in China
Minghui Yang, China

10.15–10.30 The importance of patient/caregiver educationl courses
Stefano Eleuteri, Italy

10.30–10.45 What will it take to provide effective multidisciplinary education for fragility fracture health professionals?
Julie Santy-Tomlinson, United Kingdom

10.45–11.00 Orthogeriatrics: A model of multidisciplinary approach to fragility fractures
Elias Panagiotopoulos, Greece

11.00–11.15 Orthogeriatrics: Educational Course
David Marsh, United Kingdom

11.15–11.30 Audience Discussion

10.00–11.30 WORKSHOP 8

Room: East School

Measuring Recovery following Hip Fracture in Post-Acute Settings: What are the best Measures?
Chairs: Lauren Beaupre, Morten Tange Kristensen

10.00–10.05 Welcome and Introductions
Lauren Beaupre, Canada

10.05–10.25 Outcome measures recommended for clinical and research use by the APTA Clinical Practice Guidelines: PT Management of Older Adults with Hip Fracture
Morten Tange Kristensen, Denmark

10.25–10.45 Optimization of the cross-sectional post-acute rehabilitation course after hip fracture surgery – which outcome measures are useful?
Lise Kronborg, Denmark

10.45–11.05 Mapping patients' expectations of recovery after hip fracture
Matthew Costa, United Kingdom

11.05–11.30 Audience Discussion

10.00–11.30 WORKSHOP 9

Room 6

80+: How Old is too Old? Management of the older Patient with Fragility Fracture
Chair: Joanna Sale

10.00–10.05 Introduction
Joanna Sale, Canada

10.05.–10.15 80+ in the context of an FLS: the patient perspective
Joanna Sale, Canada

10.15–10.30 Medication prescription and adherence in patients 80+
Alexandra Papaioannou, Canada

10.30–10.45 Frailty and FLS
Alexandra Papaioannou, Canada

10.45–11.05 Rehabilitation in Patients 80+
Rebecca Kearney, United Kingdom

11.05–11.25 Managing patients with dementia
Paul Mitchell, New Zealand

11.25–11.30 Audience Discussion

11.30–11.45 MOVE SESSIONS

11.45–12.50 FREE PAPER SESSION 4

Room: South School

Fracture Prevention
Chairs: Pernille Hermann, Robyn Speerin

11.45–11.53 Fracture liaison service (FLS) in the UK 2015-18: the royal osteoporosis society (ROS) support model for implementation, standards, quality improvement and financial benefit
Alison Doyle, United Kingdom

11.53–12.01 Reproductive factors and risk of hip fracture: a 10-year follow-up of almost 250,000 Chinese middle-aged adults
Ke Peng, Australia

12.01–12.09 Patient and public involvement: paper 1. The experience of a priority setting exercise for research into fragility fractures of the lower limb
Jenny Gould, United Kingdom

12.09–12.17 Similarities between fracture locations from the American orthopedic association own the bone initiative
Paul A. Anderson, United States

12.17–12.25 Patient and public involvement paper 2: experience of interviewing fragility fracture patients with memory loss and people who care for them.
Richard Grant, United Kingdom

12.25–12.33 Patient and service-level predictors of bone treatment recommendation post-fracture: results from the UK national fracture liaison service (FLS) database
Kassim Javaid, United Kingdom

12.33–12.41 The increasing problem of fragility fractures: data from the Nottingham fracture liaison service over 10 years
Dawn van Berkel, United Kingdom

12.41–12.49 Osloporosis: a study on fragility fractures and osteoporosis in Oslo
Ida Lund, Norway

11.45–12.50 FREE PAPER SESSION 5

Room: East School — **Changing Policy**
Chairs: Stefano Eleuteri, Maroun Rizkallah

11.45–11.53 The outcomes of hip fracture bundled care program: an early experience in a Singapore tertiary healthcare centre
Tjun Huat Chua Iva, Singapore

11.53–12.01 The impact of clinical audit for hip fractures in Ireland
Louise Brent, Ireland

12.01–12.09 Australian and New Zealand hip fracture registry: the first five years
Elizabeth Armstrong, Australia

12.09–12.17 Early hip fracture surgery reduces mortality by preventing complications
Boris Sobolev, Canada

12.17–12.25 Major trauma no longer a young man's disease- data from the major trauma audit Ireland
Louise Brent, Ireland

12.25–12.33 10 pence per patient: improving the hip fracture consenting process using consent form stickers.
Julie R. M. Craig, United Kingdom

12.33–12.41 Do we follow our own evidence based treatment algorithms?
Christina Frölich, Denmark

12.41–12.49 Use of frailty indices in ankle fracture management for the older person
Hannah Seymour, Australia

11.45–12.50 FREE PAPER SESSION 6

Room 6 — **Rehabilitation after fracture**
Chair: Opinder Sahota, Cathie Sherrington

11.45–11.53 Equity in rehabilitation interventions after hip fracture: a systematic review
Catherine Sackley, United Kingdom

11.53–12.01 Hip fracture outcomes in the frail older person, predictors of mortality and nursing home admission
Cliona Sandra Small, Ireland

12.01–12.09 Risk factors for new and persistent chronic opioid use after hip fracture surgery: a Danish nationwide cohort study from 2005 to 2016
Nina McKinnon Edwards, Denmark

12.09–12.17 Why can't i stand? A local 'hip sprint' quality improvement project of failure to mobilise on day 1 post hip fracture surgery.
Dawn van Berkel, United Kingdom

12.17–12.25 Restricted-weight bearing and hip fracture
Seth Michael Tarrant, Australia

12.25–12.33 Inter-rater reliability and internal consistency of the new mobility score, the short falls efficacy scale international and the mini mental state examination when used in patients after hip fracture.
Jan Arnholtz Overgaard, Denmark

12.33–12.41 Performance stability and interrater reliability of the 10-meter walking test and isometric knee-extension strength, and agreement of the verbal ranking scale when used in patients with hip fracture.
Jan Arnholtz Overgaard, Denmark

12.41–12.49 The effect of a novel multidisciplinary tele-rehabilitation intervention on older adults' function after hip fracture: a non-randomized controlled trial
Patrocinio Aariza-Vega, Spain

13.00–14.00 LUNCH BREAK AND POSTERS

13.00–14.00 SYMPOSIUM 3

Room: East School — **Lunch Symposium with AMGEN**

Improving osteoporosis care – a patient centric approach
Moderator: Karsten Dreinhöfer

13.00–13.20 Estimating the treatment gap in elderly women
Karsten Dreinhöfer, Germany

13.20–13.40 Strategies to overcome the treatment gap in osteoporosis
Martin Coyne, Ireland

14.15–15.45 WORKSHOP 10

Room: South School — **Secondary Fracture Prevention Peer Mentoring Workshop**
Chair: Robyn Speerin

14.15–14.30 Development of patient centred outcomes: KPIs for FLSs for the IOF
Kassim Javaid, United Kingdom

14.30–14.45 A successful business case for the development of a FLS
Christopher Needs, Australia

14.45–15.00 Identifying people with vertebral fractures in a tertiary hospital setting as part of a clinical pathway for their care
Lynn March, Australia

15.00–15.15 Care pathways for the multidisciplinary management of people with vertebral fragility fractures in primary and secondary care settings
Manuela Ferreira, Australia

15.15–15.45 Audience Discussion

14.15–15.45	**WORKSHOP 11**
Room: East school	**The Patient, the Fall and the Hip Fracture** *Chair: Antony Johansen*
14.15–14.30	Can we prevent falls among older people/people with cognitive impairment? *Jacqueline Close, Australia*
14.30–14.45	Can we prevent falls in hospital? *Inder Singh, Australia*
14.45–15.00	Can we learn from people who fall and break their hip in hospital? *Julie Whitney, United Kingdom*
15.00–15.15	Can we stop hip fracture patients coming back with another fall? *Helen Wilson, United Kingdom*
15.15–15.30	Can we prevent falls among older people living in the community? *Sallie Lamb, United Kingdom*
15.30–15.45:	Audience Discussion

14.15–15.45	**WORKSHOP 12**
Room 6	**Fragility Fracture and Qualitative Research: Not Everything can be Counted** *Chair: Cliff Shelton*
14.15–14.40	An overview of qualitative research techniques *Cliff Shelton, United Kingdom*
14.40–15.05	Analysis of qualitative data *Jane Cross, United Kingdom*
15.05–15.30	A framework to inform future practice *Liz Tutton, United Kingdom*
15.30–15.45	Audience Discussion

15.45–16.15	**COFFEE BREAK AND POSTERS**

16.15–17.15	**SYMPOSIUM 4**
Room: South School	**Joint with Bone Health Societies (ASBMR, IOF, ROS)** *Chair: Kassim Javaid*
16.15–16.20	Welcome and Introduction *Kassim Javaid, United Kingdom*
16.20–16.35	What is a vertebral fracture – current methods for identification *Nicky Peel, United Kingdom*
16.35–16.50	Optimal Management of vertebral and sacral fractures *Opinder Sahota, United Kingdom*
16.50–17.05	ASBMR Taskforce report on vertebral augmentation for painful vertebral fractures *Peter Ebeling, Australia*
17.05–17.15	IOF positions on vertebral fracture detection and management *Kassim Javaid, United Kingdom*

16.15–17.15	**SYMPOSIUM 5**
Room: East School	**Joint Symposium with Orthopaedic Societies (SICOT)** *Chairs: Dave Marsh, Jim Waddell*
16.15–16.35	Fragility fractures of the pelvis *Christiano Saliba, Brazil*
16.35–16.55	Fragility fractures of the acetabulum *Takeshi Sawaguchi, Japan*
16.55–17.15	Discussion

16.15–17.15	**SYMPOSIUM 6**
Room 6	**Joint Symposium with Nursing Societies (ICON)** *Chairs: Louise Brent, Anita Meehan*
16.15–16.25	Overview of ICON nursing indicator audit for hip fracture *Ann Maher, United States*
16.25–16.40	Delirium *Anita Meehan, United States*
16.40–16.55	Secondary prevention *Andrea Marques, Portugal*
16.55–17.10	Malnutrition *Heather Mahoney, United Kingdom*
17.10–17.15	Questions and Answers

17.15–17.30 MOVE SESSIONS

17.30–18.00 FREE PAPER SESSION 7

Room: South School

Top 6 Best Poster Presentations
Chairs: Louise Brent, Paul Mitchell

17.30–17.35 A team approach to hip fracture care
Susan van der Kamp, Ireland

17.35–17.40 Variation in the quality of hip fracture care by day and time of presentation: a nationwide prospective cohort study from the national hip fracture database for England, wales and Northern Ireland
Anjali Shah, United Kingdom

17.40–17.45 Anticoagulation does not increase morbidity or mortality in patients undergoing acute operative hip fracture management
Matt D'Arcy, New Zealand

17.45–17.50 Timed-up-and-go time is a predictor of hip fracture independent from bone mineral density and vitamin d in community dwelling old Icelandic adults
Sigrun Sunna Skuladottir, Iceland

17.50–17.55 Effects of a multi-component cognitive behavioral intervention for the treatment of fear of falling after hip fracture (fit-hip): a cluster randomized controlled trial
Maaike Nicoline Scheffers-Barnhoorn, The Netherlands

17.55–18.00 Post-surgery infection and subsequent mortality among hip fracture patients: different methods for dealing with time-varying confounding in a Danish population based cohort study, 2004-2016
Alma Pedersen, Denmark

18.00–19.00 OTHERS

Drinks Reception and Poster Walk

NOTES

	SOUTH SCHOOL	EAST SCHOOL	ROOM 6
8.00–9.00	**GENERAL ASSEMBLY**		
9.15–10.30	**PLENARY SESSION III** Rehabilitation		
	Coffee Break and Posters		
11.15–12.15	**FREE PAPERS SESSION 8** Top 6 Oral Presentation		
	Break		
12.30–14.00	**PLENARY SESSION IV** Secondary Prevention FFN Global Congress 2020		
14.00	**OFFICIAL CLOSE OF THE ANNUAL MEETING**		

08.00–09.00 OTHERS

Room: South School — **General Assembly**

09.15–10.30 PLENARY SESSION III

Room: South School — **Rehabilitation**
Chairs: Lauren Beaupre, Önder Aydingöz

9.15–9.35 Evidence Update: Exercise post hip fracture
Cathie Sherrington, Australia

9.35–9.55 A randomised controlled trial of the sliding hip screw versus X-Bolt Dynamic Plating System for the fixation of trochanteric fractures of the hip
Xavier Griffin, United Kingdom

9.55–10.15 Preliminary Results of Comparative effectiveness of fragility fracture integrated rehabilitation management for elderly individuals after hip fracture surgery: a multicenter randomized controlled trial
Jae-Young Lim, Republic of Korea

10.15–10.30 Discussion

10.30–11.15 COFFEE BREAK AND POSTERS

11.15–12.15 FREE PAPER SESSION 8

Room: South School — **Top 6 Best Oral Presentations**
Chairs: Matthew Costa, Xavier Griffin

11.15–11.25 Improving the quality of hip fracture care – how do we sustain the effect of quality improvement projects?
Robert Wakeman, United Kingdom

11.25–11.35 Best practice standards for hip fracture care: time to reflect?
Tara Coughlan, Ireland

11.35–11.45 When should we start keeping people 'nil by mouth' before hip fracture surgery?
Thayapary Sivagnanam, United Kingdom

11.45–11.55 Using artificial intelligence technology to improve case finding for vertebral fractures in the fracture liaison service (FLS) setting
Sarah Connacher, United Kingdom

11.55–12.05 1-year risk of nursing home admission after hip fracture surgery
Liv Riisager Wahlsten, Denmark

12.05–12.15 Cost-effectiveness of a provincial fracture liaison service in Ontario, Canada
Joanna Sale, Canada

12.15–12.30 BREAK

12.30–14.00 PLENARY SESSION IV

Room: South School

Secondary Prevention
Chairs: Kristina Akesson, Jay Magaziner

12.30-12.50 Osteoporosis Screening: Identifying the high risk patient for secondary fracture prevention
Jane Cauley, United States

12.50–13.10 Sarcopenia: The Next Frontier in Fall and Secondary Fracture Prevention
Cyrus Cooper, United Kingdom

13.10-13:30 The role of frailty in fall and fracture prevention
Jaqueline Close, Australia

13.30–13.45 Discussion

13.45–13.50 Handover of Presidency
Matthew Costa and Jay Magaziner, United States

13.50–14.00 FFN Global Congress 2020: What to expect in Toronto
Jay Magaziner, United States

Oral Presentations

Top 6 Oral Presentations

Poster Presentations

Top 6 Poster Presentations

Oral Presentation

Wednesday, 28 August 2019

FREE PAPER SESSION 1

OP 1-1

Geographic variation in surgical care and outcome of hip fractures: an english cohort study using national hip fracture database (nhfd) data for 2017

*Shah A. [*1], Inman D. [2,3], Cooper C. [1,4], Fagan E. [3], Johansen A. [3,5], Judge A. [1,6]*

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, [2]Department of Orthopaedics, Northumbria Healthcare NHS Foundation Trust, Northumberland, [3]Care Quality Improvement Department, Royal College of Physicians, London, [4]MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, [5]Trauma Unit, University Hospital of Wales, Cardiff, [6]National Institute for Health Research Bristol Biomedical Research Centre , University of Bristol, Bristol, United Kingdom

Introduction: Treating patients with hip fractures in the UK costs more than £1 billion a year. The establishment of a National Hip Fracture Database (NHFD) and the definition of best practice by NHS England were intended to reduce unexplained variation in treatment and outcomes for these patients. The purpose of this study was to describe the geographic variation in operations undertaken following hip fracture admission and their association with 30-day mortality during 2017 in England.

Methods: A prospective cohort study was undertaken using data from a national clinical registry (the NHFD), which captures >97% of patients aged ≥60 treated with hip fractures in England. The NHFD was linked to Hospital Episode Statistics (HES) so that all patients could be tracked across subsequent re-admissions to hospital. We explored geographic variations in the types of operation undertaken following admission for three types of hip fracture (intracapsular, intertrochanteric and subtrochanteric) and their association with 30-day mortality using logistic regression models adjusted for demographic factors.

Results: NHFD recorded data for 64,211 patients who underwent operative treatment for hip fracture in England during 2017. Most had an intracapsular fracture (59%) or intertrochanteric fracture (35%). There was little geographic variation in outcome for patients with intracapsular fracture. The percentage of these who received a total hip replacement (THR) varied enormously in different hospitals with a range of 1.7 - 33.0%. No consistent pattern was observed between this percentage of patients who received a THR and 30-day mortality in individual hospitals. THR was unsurprisingly associated with significantly better 30-day mortality for intracapsular fractures (adjusted odds ratio [aOR]: 0.62, 95%CI: 0.44-0.87). In terms of access to surgery, THR patients were younger (median age 74 vs 84 years), had a lower Charlson co-morbidity index (55% = 0 vs 26%) and were more affluent (45% within quintiles 1 or 2 of the Index of Multiple Deprivation vs 37%) than patients receiving a hemiarthroplasty or other surgery. We did find significant geographic variation for intertrochanteric fractures where the East of England region had poorer 30-day mortality (aOR: 1.36, 95% CI: 1.09-1.70) and the North East had significantly lower mortality (aOR: 0.66, 95%CI: 0.48-0.91).

Conclusion: Despite considerable unexplained variation by hospital in percentage of patients receiving a THR, and the better outcomes expected with this operation we found no consistent pattern of geographic variation for patients with intracapsular hip fractures. However, significant geographic variation in 30-day mortality was observed for patients with intertrochanteric hip fractures, with higher mortality in the East of England, and lower mortality in the North East. The extent to which this reflects variation in approaches to medical assessment, anaesthesia and other aspects of hip fracture warrants further investigation using NHFD and HES data.

OP 1-2

Total hip replacement for hip fracture: worth waiting for?

*Craig J. R. M. [*1], McDonald S. [1], Barr R. J. [1]*

[1]Trauma & orthopaedic department, Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Total hip replacement (THR) for hip fracture is increasingly common under the National Institute for Health and Clinical Excellence (NICE) guidelines for displaced intracapsular fractures. However, some units may struggle to offer surgery by a suitably-experienced surgeon within 36 hours of admission (i.e. day of admission or the following day). The objective was to assess the effect of surgical waiting time on outcomes after THR for hip fracture.

Methods: A Fracture Outcomes Research Database search identified all inpatients undergoing THR for displaced intracapsular hip fractures in Northern Ireland's regional trauma centre from January 2011 to October 2017. Patients with pathological fractures, admission over a week post-injury, or inadequate follow-up, were excluded. Analysis by 2x2 contingency tables was performed for waiting times by 12-hour or 24-hour groupings.

Results: All operations prior to October 2016 had adequate follow-up. 262 cases were included, 257 surviving to 1 year.

Pre-injury, 97% could walk without assistance, 91% required no walking aids, and 94% achieved a full Barthel (functional) score. Mortality at 1 year (1.9% overall, 3.3% among ASA 3 patients) was statistically unrelated to time to theatre.

Among patients surviving 1 year, 91% maintained or improved their mobility (less assistance, or similar assistance but fewer aids). Reduced mobility was statistically unrelated to time to theatre. Surgery more than 24 hours after admission was associated with reduced function at 1 year (p=0.049). However, after excluding patients delayed due to being unfit for surgery, no association between waiting time and functional loss was identified.

Conclusion: Under the NICE guidance, THR for hip fracture provides good survival and maintenance of mobility and function, even if delayed beyond 36 hours from admission. Delays beyond 36 hours, such as to facilitate surgical expertise, may be justifiable as this does not appear detrimental to outcomes in these patients.

OP 1-3

Radiographic malunion after ankle fractures in older adults: definitions and new thresholds derived from clinical outcome data from the ankle injury management (aim) trial

*Keene D. J.[*1], Knight R. [2], Dutton S. [2], Handley R. [3], Willett K. [1]*

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, [2]Centre for Statistics in Medicine, University of Oxford, [3]Oxford Trauma Unit, Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom

Introduction: The rationale for exacting anatomic reconstruction of ankle fractures is to improve outcomes by reducing complications from malunion; however, current definitions of malunion lack confirmatory clinical evidence.

Methods: Participants were Ankle Injury Management (AIM) trial participants who were aged 60 years and over with unstable ankle fractures. Radiographic and clinical definitions of malunion were compared. Linear regressions were used to explore the relationship between pre-defined radiographic malunion (talar tilt >2°, talar subluxation >2mm, or tibiofibular clear space >5mm, and for posterior malleolus malunion >5% articular surface and articular step >2mm) at 6 months and changes in function measured with the Olerud and Molander Ankle Score (OMAS) at 3 years. Piecewise linear models were used to investigate new radiographic thresholds which better explain symptom impact on ankle function.

Results: 422 participants provided radiographic and long-term follow-up data. Previously described measures of radiographic malunion and surgeon opinion of clinically significant malunion were shown to be related but with important differences. The usual malunion thresholds for talar tilt and tibiofibular clear space were shown to be conservative, and new thresholds which better explain function were identified (talar tilt >2.4° and tibiofibular clear space >6mm). Based on this new

definition the presence of radiographic malunion has an impact on function which is both statistically and clinically significant (-8.9 points on the OMAS scale; 95 % CI -13.97 to -3.97). In subsequent analysis, radiographic malunion of a posterior malleolar fracture was also shown to have a statistically significant impact on OMAS change scores (-12.5 points; 95 % CI -23.5 to -1.5) but no new threshold was identified.

Conclusion: These results provide clinical evidence which support the previously accepted definitions, whilst suggesting they may be conservative with a greater tolerance in older patients.

OP 1-4

Could there be a different choice than internal fixation for undisplaced femoral neck fractures? A population-based study from danish national registries

*Viberg B. [*1], Frøslev T. [2], Overgaard S. [3], Pedersen A. B. [2]*

[1]Department of Orthopaedic Surgery and Traumatology, Kolding Hospital - part of Hospital Lillebaelt, Kolding, [2]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, [3]Orthopaedic Research Unit, Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense, Denmark

Introduction: The treatment of choice for patients with an undisplaced femoral neck fracture (FNF) is in most guidelines internal fixation (IF). However, recent randomized controlled trials (RCTs) have demonstrated that IF treatment is associated with a higher reoperation frequency (20-24 %) compared to hemiarthroplasty (5-7 %). Hemiarthroplasty patients had higher mobilization score which is well known to be associated with lower mortality. The RCTs had too low number of patients to investigate mortality and the external validity is questionable. In our study, we assume that there is no difference in undisplaced and displaced FNF patients except the degree of displacement itself. We therefore compared IF treatment for undisplaced FNF with arthroplasty treatment for displaced FNF in relation to risk of mortality and reoperation in patients' ≥70 years old.

Methods: This is a population-based cohort study on patients with a FNF operated during 2005–2015 (both years included) and reported to the Danish Multidisciplinary Hip Fracture Registry. Data on medication, comorbidities and reoperations were retrieved from the National Prescription Database and Danish National Patient register.

Outcome was reoperation and mortality up to 5 years postoperatively. Using Cox regression, we calculated hazard ratios (HR) with 95 % confidence intervals for reoperation (adjusted for age, sex, Charlson Comorbidity Index, Body mass index, NSAIDs, glucocorticoids, antidepressants and statins) and mortality (further adjusting for reoperation). We compared IF, defined as screw fixation or sliding hip screw with arthroplasty, including hemiarthroplasty and total hip arthroplasty. Reoperation was defined as any open procedure: deep infection, change of implant, open reduction, or operation due to a new (i.e. periprosthetic) fracture but simple removal of IF implant was not defined as a reoperation.

Results: Among 29,597 FNF patients, 10,337 were treated with IF whereas 19,260 received arthroplasty (16,437 hemi and 2829 total). Compared to arthroplasty patients, IF patients were slightly younger, had a higher comorbidity level, and were more frequently male. The 1-year mortality was 28.8 % for IF and 27.8 % for arthroplasty patients (29.0 % for hemi and 20.6 % for total). Compared to IF group, the arthroplasty group was associated with adjusted HR for mortality of 1.26 (1.17;1.37) after 30 days, 1.00 (0.96;1.05) after 1 year, and 0.98 (0.95;1.01) after 5 years postoperatively.

The cumulative incidence of reoperations within 5 years was 12.6 % for IF and 10.7 % for arthroplasty patients. Compared with IF group, the arthroplasty was associated with adjusted HR for reoperations of 0.83 (0.76;0.90) within 1 year, 0.79 (0.74;0.86) within 2 years, and 0.84 (0.79;0.90) within 5 years postoperatively.

Conclusion: Arthroplasty had an associated higher mortality risk within 30 days but no difference after 1-5 years. There was an associated higher risk of reoperation within 1-5 years for IF.

OP 1-5

Risk factors for revision within 1 year following osteosynthesis of a displaced femoral neck fracture

*Nyholm A. M. [*1], Palm H. [2], Sandholdt H. [3], Troelsen A. [1], Gromov K. [1]*

[1]Clinical Orthopaedic Research Hvidovre, Department of Orthopaedics, Copenhagen University Hospital Hvidovre, Hvidovre, [2]Department of Orthopaedics, Copenhagen University Hospital Bispebjerg, Copenhagen NV, [3]Clinical Research Centre, Copenhagen University Hospital Hvidovre, Hvidovre, Denmark

Introduction: Displaced femoral neck fractures present a challenge. Two treatment modalities exist: Either retain the femoral head and perform osteosynthesis, or replace it with an arthroplasty. With osteosynthesis the surgical trauma is small and the natural anatomy of the joint is preserved, with no need for further revision due to wear of components. However, the failure rates following osteosynthesis have been reported as high as 40 %, indicating that primary arthroplasty may be preferable in some cases due to lower revision rate. So far the decision between osteosynthesis and arthroplasty is in many cases based primarily on the age of the patients.

The objectives of this study was a) To evaluate risk of revision within 1 year after osteosynthesis of displaced femoral neck fractures, and b) To investigate how age, gender, degree of displacement and bone quality are associated with this risk, in effort to further help guide the choice of treatment of these fractures.

Methods: All surgeries of a femoral neck fracture with parallel implants and available x-rays were collected from the Danish Fracture Database. Data included age, gender, ASA score and surgical delay. X-rays were analysed for initial displacement, quality of reduction, protrusion of implants in the joint and angulation of implants to the femoral shaft. The bone quality was estimated using Cortical Thickness Index. Nondisplaced fractures with posterior tilt <20° were excluded. Data on revision (to re-osteosynthesis, arthroplasty or femoral head removal) and vitality was collected from the Civil Registrational System. Data was analysed by adjusted cox-regression analysis.

Results: 654 cases were included. Mean age was 69 years and 385 (59 %) were female. 356 (54 %) were Garden II type fracture with posterior tilt >20° or Garden III type fracture, and 298 (46 %) were Garden IV type fracture. 182 (28 %) had surgery within 12h, 507 (78 %) within 24h and 584 (89 %) within 36h. In 245 (38 %) cases the fracture was sufficiently reduced, while the fracture was still displaced or with >10° posterior tilt in 409 (62 %). Protrusion of an implant into the joint was present in 18 cases. 124 (19 %) cases were revised and 117 (18 %) died within 1 year. Female gender (HR 1.75, CI 1.15 - 2.63), surgical delay between 12-24h vs <12h (HR 1.66, CI 1.05 - 2.63), Garden 4 type fracture (HR 3.05, CI 1.99 - 4.67), insufficient reduction (HR 1.70, CI 1.06 - 2.50) and protrusion of an implant (HR 2.37, CI 1.03 - 5.45) were associated with significant increased risk of revision. No association between reoperation and age, Cortical Thickness Index or the angulation of implants was found.

Conclusion: These findings indicate that risk of revision is linked mainly to displacement and reduction of the fracture, with no apparent effect of age or the quality of the bone estimated by Cortical Thickness Index. This argues for rethinking the indication for osteosynthesis, and to include the younger patients as potential candidates for primary arthroplasty.

OP 1-6

The forgotten femoral fracture: femoral fractures, other than hip fractures, in the elderly

*Craig J. R. M. [*1], Murphy L. [1], Moffatt R. [1], McDonald S. [1], Diamond O. [1]*

[1]Trauma & orthopaedic department, Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Fragility fractures can affect any area of the femur.

Femoral fractures other than hip fractures often fail to benefit from the databases, governance, and funding structures applicable to hip fractures.

The objective was to review the demographics and treatment of femoral fractures other than hip fractures.

Methods: A Fracture Outcomes Research Database search identified all inpatients aged over 60 treated in Northern Ireland's regional trauma centre from 2000 to 2018 with femoral fractures other than hip fractures. Hip fractures, pathological fractures, periprosthetic fractures, and non-operatively managed single trochanteric fractures were excluded. Fracture level was determined by ICD-10 codes and injury descriptors.

Results: 1438 procedures in 1320 patients were identified (mean 70.5 injuries per year). 105 patients had more than 1 operation, including 20 patients with contralateral femoral fracture. The mean age was 79 years. 74 % of cases were in women. 54 % of patients had an ASA (American Society of Anaesthesiologists) grade of 3 or more. 72 % were low energy injuries, and a further 4 % were spontaneous. 12.5 % of patients lived in nursing, residential or sheltered accommodation pre-injury. 11% involved the proximal femur (of which 72% received intramedullary nailing). 63 % involved the femoral shaft (of which 61% received intramedullary nailing). 26 % involved the distal femur (of which 44 % received internal fixation +/- cabling, or dynamic plating devices). 24 % of patients received surgery within 36 hours of admission. Over 60 % waited for over 48 hours.

Conclusion: Elderly patients with femoral fractures other than hip fractures often have significant co-morbidities, low energy injuries, and often require surgery. Many wait more than 2 days for surgery, but these waiting times are not scrutinised under the criteria applied to hip fractures. Although not currently included in national hip fracture data collection or governance structures, these patients present similar challenges to hip fracture patients.

OP 1-7

Understanding the lived experience of patients after vertebral fracture

Singh S. [*1,2], *Rekhi G.* [2], *Bulycz C.* [1], *Sidhu A.* [1]

[1]*Fraser Health Authority,* [2]*University of British Columbia, White Rock, Canada*

Introduction: Clinical low trauma vertebral fracture is the most common type of osteoporosis related fracture. These fractures have a profound impact on patients leading to severe pain, disability and marked deterioration in quality of life. Guidelines for best practice management after vertebral fracture, are not well defined and in some cases conflicting. This qualitative study explores the lived experience of patients after vertebral fracture and will help to define gaps in care and directions for future research to improve the patient journey to recovery.

Methods: Qualitative in-depth interviews with patients who had sustained a clinical low trauma vertebral fracture in the past two years. All patients were recruited from an osteoporosis clinic at Peace Arch Hospital, located in White Rock, British Columbia, Canada. A descriptive phenomenology approach was used in developing the semi-structured interview guide and in the thematic data interpretation. All interviews were audiotaped, transcribed and N-Vivo software used to assist with thematic analysis and synthesis of results. A sample size of 12-14 patient interviews was anticipated to lead to data saturation.

Results: 8 patients have participated in the study to date. All participants were female with an average age of 70.9 years (SD 9.3). Key themes emerged from our preliminary analysis: 1) Delayed diagnosis of an acute vertebral fracture was common and greatly distressing and frustrating to participants. Participants reported that health providers seemed dismissive of their pain, underestimated the severity of the pain, and seemed unaware of the possibility of a vertebral fracture. Many patients made multiple visits to health providers before the diagnosis was made and felt they had to struggle to get properly diagnosed. One participant reported being told her symptoms were related to "loneliness". Another reported that paramedics were hesitant to take her to hospital because "nothing was wrong". 2) Feelings of isolation and depression were common as the pain and disability persisted and repeat visits to the Emergency Department or doctor's office did not lead to significant resolution in their symptoms or provide them with the support they were looking for 3) There was confusion around when it was safe to return to physical activity, what types of exercise they could do and what was the cause of their fracture. No information was provided around osteoporosis or future fracture prevention prior to their visit to the osteoporosis clinic.

Conclusion: Management of patients with vertebral fracture is sub-optimal and improved guidelines around diagnosis, pain management, appropriate physical activity and future fracture prevention are needed. There is a need for heightened awareness by health providers of the significant impact of vertebral fractures on patients' quality of life and the need for an active treatment and management plan in collaboration with patients throughout the recovery period.

OP 1-8

Intramedullary nailing in unstable fracture patterns: does length matter?

Tarrant S. M. [*1], *Graan D.* [1], *Kim R.* [1], *Balogh Z.* [1,2]

[1]*Department of Trauma, John Hunter Hospital,* [2]*Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia*

Introduction: The intertrochanteric fracture pattern is increasingly fixed with intramedullary nailing. Failure rates have been quoted up to 10 % and controversy exists whether long or short nails devices should be used for unstable fracture patterns.

Methods: A prospectively collected geriatric hip fracture database was queried at a level one tertiary trauma centre. Patients who had an intramedullary nail between January 2012 and December 2017 were identified. Fracture pattern was characterised by AO classification. Demographic and perioperative data was collected. Nail type and technical factors and were examined on radiographs. Failure was identified by representation of the patient to a hospital within the state with non-union, screw cut-out, implant breakage or peri-implant fracture. Mortality was calculated from the Department of Births, Deaths and Marriages and the Australia New Zealand Hip Fracture Registry (ANZHFR).

Results: During the study period 2,438 hip fracture patients were admitted. Intramedullary fixation was used in 1,210 (49.6 %) patients. Exclusions were in 85 patients who had another nail besides Gamma 3, non-fragility fracture, bisphosphonate fracture, pathological fractures and fractures below the subtrochanteric region. Failure requiring revision surgery occurred in 22 (2.0 %) patients. Within this cohort, 456 were the unstable AO 31A2.2 and 2.3 fracture pattern. The median length of nail survivorship was 556 (Q1-Q3: 111-1085) days. 311 patients were deceased by 2019 (68 %). Short nails were used 339 (74 %) and long nails in 117 (26 %). The prevalence of failure in the unstable group was 2.4 % (n=11) at a median post-operative time of 413 days (Q1-Q3: 111-672). This included 2 screw cut-outs, 3non-unions and 6 peri-implant fracture. Ten short nails (2.9 %) and 1 long nail (0.8 %) failed. There was no different in age (years, SD- fail: 81.9 (±4.1) vs non-fail: 86.0 (±8.6), p<0.250), sex (female; n, %: 8 (72 %) vs 84 (64 %), p=0.329) or ASA status (mean, SD: 3.1 (±0.5) vs 3.3 (±0.6), p=0.300). Technical factors were not a risk for failure. Tip apex distance (19.8 (18.5-23.7) vs 18.0 (14.6-21.4), p=0.088), proximal nail engagement (9 (82 %) vs 368 (83 %), p=0.926), lateral overhang (11 (100 %) vs 364 (82 %), p=0.121), Cleveland index 5 or 8 (10 (91 %) vs 413 (93 %), p=0.810) and varus reduction (0 (0 %) vs 26 (6.7 %), p=0.377) did not show any difference between groups. Competing risk regression analysis was used to examine nail length and failure demonstrating no difference (Subhazard Ratio: 0.28 95 % CI: 0.04 – 2.25, p=0.235).

Conclusion: Our institution demonstrated a low overall failure rate. There was no difference in failure between short and long nails, but potential for type 2 error exists. With low failure rates, the value of registries to collect meaningful data regarding fracture pattern to help surgical decision making should be explored.

FREE PAPER SESSION 2

OP 2-1

Peri-operative hypothermia in fracture neck of femur (nof).

*Hasan N. A. *[1], Lam C. W. G. [1], Wensley K. [1], Deen S. [1], Chatterjee A. [1]*

[1]Ortho-geriatrics, Royal Berkshire Hospital, Reading, United Kingdom

Introduction: Recent literature has highlighted the importance of avoiding hypothermia in patients undergoing surgery for NOF throughout the pre, intra and post-operative periods. Hypothermia, (temperature <36°C) has been associated with increased risk of periprosthetic infections, bleeding, myocardial infarction, pain and prolonged hospital stay.

NICE CG65 recommends that hypothermic NOF patients should be actively warmed to >36°C before induction and maintained >36°C throughout their intra and post-operative course. Temperature should be recorded every 30 minutes intra-operatively and every 15 minutes in recovery. To evaluate the incidence of inadvertent hypothermia and it's complications in patients undergoing surgery for NOF at the Royal Berkshire NHS Foundation Trust (RBFT).

Methods: 232 NOF patients admitted to RBFT between July 2017 and January 2018 were identified from the National Hip Fracture Database. Data was collected on a proforma from patients' paper and electronic notes, with results inputted into an excel document online. Data included demographics, type of surgery, anaesthetic route and agents used, and co-morbidities. Temperature records immediately before the leaving the ward, intraoperatively, in recovery, and up to 24 hours postoperatively were recorded. Peri-prosthetic wound infections and bleeding incidence was also recorded.

Results: 70 % (163) were females and the average age was 83 years (61-99). Most patients were induced using general anaesthesia (202) and the commonest methods of fixation were uncemented hemiarthroplasty (82) and internal fixation (55). Only 37 % of patients had a single temperature recorded intraoperatively. Furthermore, single temperature readings were common in recovery. 9 patients were hypothermic in recovery post operatively, with a falling trend in temperatures down to 34.8°C as the lowest reading. Only 3 patients were hypothermic in the postoperative phase, with the lowest temperature being 35.5°C. Temperatures of <36.5°C occurred in 61 patients in recovery and in 43 patients postoperatively. 4 patients had periprosthetic infections, 2 of which had postoperative temperatures of 35.8°C and 36.2°C. 45 patients exhibited peri-operative bleeding requiring transfusions. Of those 45, 2 were hypothermic during recovery. Interestingly, 22 of them had temperatures of <36.5°C in recovery.

Conclusion: Discussions were held in the Trauma, Anaesthetic and Hip fracture governance meetings to improve the recording of intraoperative recording whilst continuing with the intraoperative warming procedures. Staff working on Trauma wards and the Hip Fracture Unit were made aware of the importance of maintaining temperature >36 degrees in the preoperative and postoperative period. Further PDSA (Plan See Do Act) has been commenced to improve the clinical practice to prevent hypothermia in NOF surgery.

OP 2-2

Safely reducing time to theatre in patients with neck of femur fractures taking direct oral anticoagulants: a prospective, matched-control observational study

*Mayor A. S. E. [1], Lawson J. *[2], Brooke B. T. [2]*

[1]Anaesthesia and Critical Care, [2]Trauma and Orthopaedics, Calderdale and Huddersfield NHS Foundation Trust, Leeds, United Kingdom

Introduction: Evidence demonstrates that delays to surgical management of neck of femur (#NOF) fractures leads to increased length of stay (LOS), morbidity and mortality. Recent literature has established that patients taking direct oral anticoagulants (DOACs) frequently have their surgery delayed by greater than the National Hip Fracture Database recommended 36 hours, and therefore suffer from these complications. We have proven this delay to surgery to be unnecessary by introducing a novel protocol supporting anaesthesia (regional or general) and surgery 24 hours after last DOAC dose. This was shown to be safe with regards to rates of blood transfusion, wound leakage, vertebral canal haematoma (VCH) and LOS compared to non-anticoagulated matched controls.

Methods: In June 2017 Calderdale & Huddersfield NHS Foundation Trust introduced a protocol based on the passage of 2 elimination half-lives (24 hours) and/or drug reversal before anaesthesia and neck of femur surgery for patients receiving Factor Xa and direct thrombin inhibitors. For 18 months all patients with a #NOF taking a DOAC and requiring surgical management were prospectively audited and compared to matched non-anticoagulated controls of the same age (within 5 years), ASA grade and having the same surgical procedure by same grade of surgeon. Data collected included peri-operative blood transfusion rates, wound leakage, LOS and incidence of VCH. Patients in both the DOAC and control groups were transfused via the same Trust #NOF transfusion protocol to eliminate any bias between the groups.

Results: The DOAC group had a reduced incidence of transfusion (38 %) compared to the control group (47 %). Wound leak complications were the same in both groups (15 %) and there was no difference in mean LOS (20.1 days in DOAC group vs 20.5 in control). There were no incidences of VCHs in either group.

Conclusion: This audit demonstrates the safety of anaesthesia and fractured neck of femur surgery at 24 hours post last DOAC dose ingestion. There was no increase in rates of blood transfusion, wound leakage or VCH between the DOAC group compared to the non-anticoagulated control group. Furthermore, expediting surgery in the DOAC group reduced LOS to the same as the non-anticoagulated control group. These results show that this protocol for surgery and anaesthesia is safe and has the capacity to reduce the morbidity and mortality associated with the increase in LOS that DOAC patients with femoral neck fractures currently suffer.

OP 2-3

Crossing quartiles; a large district general's experience in improving hip fracture care

*Anthony C. *[1], Malaj M. [2], O'Connor P. [2]*

[1]Trauma and Orthopaedics, [2]Anaesthesia, Mid Yorks NHS Foundation Trust, Wakefield, United Kingdom

Introduction: Hip fractures are a very common occurrence with over 60 thousand each year in England alone. Patients have high levels of morbidity and mortality. As such a national tariff has been introduced to incentivise best practice care. In 2017 our hospital, a large district general admitting 500 – 600 hip fractures a year, performed poorly. Only 51 % of admissions received surgery within 36 hours one of the key criteria. This left the trust ranked 152/160 hospitals in England. In 2017 hip fracture surgery was cancelled or rescheduled 126 times.

Methods: In response to this several changes were made in 2018 to the way hip fractures were assessed. Although there was previously an all day hip fracture list this was staffed by a different anesthetist everyday. An anesthetist of the week was introduced providing greater continuity and allowing earlier optimization of patients as they are normally now reviewed on admission for surgery the next day. The anesthetic team now attends the daily trauma meetings and steps have been taken to foster closer working with the orthogeriatric team.

Results: As a result of these changes over 85 % of hip fractures were operated on within 36 hours in 2018 with only 31 patients being rescheduled or cancelled. This placed the trust 20/159 in England for that year. Overall rates for meeting the best practice tariff improved from 44.9 % (132/160) to 81.6 % (18/159). In addition to this average length of stay improved from over 17 days to fewer than 12. We anticipate an improvement in our adjusted mortality figures when these are published.

Conclusion: These changes have dramatically improved our hip fracture service and may provide a template for other trusts to replicate.

OP 2-4

Effect of multidisciplinary treatment approach for geriatric hip fractures. -japanese experience-

*Shigemoto K. [*1], Sawaguchi T. [1], Goshima K. [1], Iwai S. [1], Fujita K. [1], Kataoka T. [1], Taninaka A. [1]*

[1]Orthopaedic Surgery and Joint Reconstructive Surgery, Toyama Municipal Hospital, Toyama, Japan

Introduction: We report the results of the multidisciplinary treatment approach for geriatric hip fractures and evaluate its effectiveness.

Methods: The multidisciplinary treatment approach has been applied in our hospital since 2014. Elderly patients who were admitted to the Orthopaedic department with fragility hip fractures were included in the integrated pathway. 770 hip fracture patients admitted with an acute hip fracture over a five-year period. We excluded 92 patients: all those aged < 65, those with pathological fractures, those undergoing conservative treatment, and those with multiple injury. Time to surgery, hospital stay length, postoperative complications, osteoporosis treatment, functional recovery, and in-hospital mortality, 90-day mortality, and 1-year mortality were evaluated. The medical costs were compared with those in other acute phase hospitals every year.

Results: The average days from patient admission to surgery were 1.6 days, those were about 3 days shorter than the annual national average. The average duration of hospital stay was 19.6 days, those were more than 14 days shorter than the annual national average. The most frequent complication was deep venous thrombosis (14.9 %), following was dysuria (14.3 %). In addition, as serious complications, pneumonia 3.4 %, heart failure 0.8 %, and pulmonary embolism 0.8 %, and the in-hospital mortality rate was 1.2 %. The rate of patients who had anti-osteoporosis pharmacotherapy at the time of admission was only 23 %, but the rate at discharge was 90 %, and the continuation rate of pharmacotherapy was 84 % at 1-year follow-up thanks to the fracture liaison service. At the time of their discharge from rehabilitation hospital, the proportion of patients who recovered to pre-injury functionality was increased from 35 % to 47 % after multidisciplinary treatment approach. The 90-day, 180-day and 1-year mortality rates were 2.4 %, 6.6 % and 12.9 % respectively. The total hospitalization medical cost per person for the multidisciplinary treatment was lower than other hospital costs every year.

Conclusion: We have organized multidisciplinary team for geriatric hip fracture, and this approach resulted in shorter time to surgery and hospital stay than national average. The multidisciplinary treatment has kept high rate of osteoporosis treatment at discharge and at follow-up, and better functional recovery. Furthermore, the total medical cost per person was less than national average. Multidisciplinary treatment approach for geriatric hip fractures is possible to conduct in Japan and was effective.

OP 2-5

Low 30-days mortality after proximal femoral fracture in japan

*Fukuda F. [*1]*

[1]Orthopaedic Surgery, Kitakyushu General Hospital, Kitakyushu, Japan

Introduction: The Japanese Orthopaedic Association (JOA) performed an annual nationwide survey of hip fractures. In the report from 2016, 100,401 hip fractures were registered, and it was divided into 48,893neck fractures and 51,153 trochanteric fractures. Patients were surgically treated in 94.8 %and non-surgically in 5.2 %. The mean duration of preoperative hospital stay was 4.2 days and the mean duration of hospitalization was 36.8 days, respectively. On the other hand, the time to surgery of our hospital was 2.1days (68 % were treated within 48 hours), and the length of hospital stay was 20.1 days, eventually 90 % of patients were transferred to the other hospitals for rehabilitation.

Methods: There are not specific geriatric doctor in most of Japan hospitals, and orthopedic doctors evaluates a physical status before operation by themselves, if necessary, we have to even consult to the physician.30-day mortality after hip fracture in Japan is lower than the other countries, resulting 1-3 % to 5-10 %, however the situations we face as above.

Results: Our hospital 30-day mortality was 1.6 %, death in hospital was 13 patients out of 777 cases which are age of 65 years or older between 2012 to 2016.

We also analyzed Diagnosis Procedure Combination: DPC in 2017, 32,747 patients with hip fracture at 650 hospitals using EVE® (Medical data visionInc., Tokyo, Japan). Patients were divided into the category, depend on time to surgery, such as early groupup to 2 days in 11,174 cases (34.5 %), delayed group longer than 2 days in 21,237 cases (65.5 %). As a result, early and delayed group of hospitalization period (day)was 23.1 and 27.0, cost per day($) was 508.7 and 493.1, total hospital charges($)was 11,751 and 13,126,and death in hospital was 114(1.0 %)and 222(1.0 %), respectively.

Conclusion: 30-day mortality after hip fracture in Japan is lower than the other countries, resulting 1-3 % to 5-10 %,

OP 2-6

Palliative care in hip fractures: too little too late?

*Sarrami M. [*1], Ridley W. [1,2], Zhang G. [1,2], Tarrant S. [3]*

[1]University of Newcastle, Newcastle, [2]University of New England, Armidale, [3]Orthopaedic department, John Hunter Hospital, Newcastle, Australia

Introduction: Hip fracture is an increasing burden for the global population. Wide clinical variation exists regarding surgical intervention. There is a paucity in the literature regarding the role of palliation in unpreventable hip fracture mortality. Moreover, high rates of operative intervention rates for hip fracture contribute to unnecessary economic burden.

Methods: A University affiliated Level 1 Trauma centre examined 1,344 hip fractures captured by the national registry between February 2015 to June 2018. Coding was acquired for hip fractures regarding change of care classifications to palliative care. Demographics including age, sex, and Charlson Comorbidity Index (CCI) were prospectively collected. Chart review was conducted regarding the events of admission that led to palliation.

Results: From hospital coding 35 patients had admission status changed to *"Palliative"* (n=32) or *"Transfer to Palliative Facility"* (n=1). There were 20 inpatient deaths, and 13 transfers to another facility. The mean age was 84.1 (± 6.6) years and 20 (61 %) were female. Mean age adjusted CCI was 7.8 (±2.7). Twelve patients (36 %) had cognitive impairment and 15 (45 %) were from a residential aged care facility. An operation was booked in 28 (85 %) of cases with 26 receiving an operative intervention. Serious adverse event (SAE) occurred in 7 cases pre-operatively. After surgery, medical decompensation leading to palliation occurred at a median of 1.7 (1.2-6.8) days post op, it was then a median of 2.7 (0.7 -11.9) days to the decision to palliate and a further 3.8 (1.7 – 12.7) days until death. The decision to palliate was made by orthogeriatrics in 48 % (n=16) of cases and orthopaedics in 30 % (n=10). Palliative care was involved in the following: 4 (12 %) patient consults, 2 (6 %) phone consults and 19 (58 %) end of life clinical nurse consultant consults.

Conclusion: Considering the high rates of operative intervention in patients that are palliated, the peri-operative input of a palliative care service appears under-utilised. This is in the context of the role of surgery as a palliative intervention being poorly quantified.

OP 2-7

Hot on hypothermia: increasing awareness of peri-operative hypothermia

*Quelch W. C. [*1], Khan S. [1], Ahmed A. [1], Hasan N. [1], Iyer S. [1], Chatterjee A. [1]*

[1]Royal Berkshire Hospital, Reading, United Kingdom

Introduction: Research has shown that even mild hypothermia can lead to increased post-operative complications in patients undergoing surgery for fractured neck of femur. These include peri-prosthetic infection, bleeding and transfusion requirement, increased hospital stay, myocardial infarctions and post-operative pain. A previous quality improvement project (QIP) 'Acute Bay in the Hip Fracture Unit' at Royal Berkshire Hospital identified 4 hypothermic patients out of 13. Only 37 % of patients had an intraoperative temperature recording. Our objectives were to improve the recording of intraoperative recording of temperature during surgery for fractured

neck of femurs and to determine the incidence of perioperative hypothermia. To raise awareness of perioperative complications relating to hypothermia among key groups of the multidisciplinary team.

Methods: The National Hip Fracture Database was used to identify the patients. 232 patients notes were audited to determine the recording of perioperative temperature, and the incidence of hypothermia peri- and post-operatively. Over the course of 5 months two "Plan Do Study Act" (PDSA) cycles were completed to implement changes in practice. Awareness was raised throughout the clinical team via teaching sessions, clinical governance meetings (Hip Fracture, T&O and Anaesthetic) and departmental teaching presentations. Posters were displayed around the wards to encourage the implementation of the current NICE guidelines. Data was input into Excel sheet and analysed.

Results: Baseline recording of intraoperative temperature was 37%. Following the interventions this steadily increased to 52% and 81% in the next PDSA cycles. Changes in clinical practice such as recording of temperature an hour before surgery, improved handover from Recovery staff and availability of warming devices on the ward has led to a decrease in the incidence of intraoperative hypothermia. The incidence of perioperative hypothermia was reduced from our initial baseline of 6.6% to 6% and then 0% in the final PDSA cycle.

Conclusion: This QIP has lead to significant and sustained improvements in both the monitoring and managing of perioperative hypothermia. Intraoperative temperature is now recorded 82% of the time. Reduction of perioperative hypothermia in Hip fracture patients should be a priority and can be achieved by a multidisciplinary approach.

OP 2-8

Qualitative study of relative/carer presence in the anaesthetic room for patients with dementia

Bahra N. [*1], *Alexander G.* [2], *Mulvaney E.* [3], *Storrie K.-A.* [4], *Noah A.* [1], *Moppett I.* [1]

[1]Anaesthesia and Critical care, University of Nottingham, [2]Anaesthesia, [3]Orthopaedics, [4]Theatre, Queen's Medical Centre, Nottingham, United Kingdom

Introduction: Dementia and confusion is common in patients with hip fracture. The process of anaesthetic induction can be a confusing and frightening experience, even in the absence of cognitive impairment.

Parental presence in the anaesthetic room is now routine for children and is of benefit for both child and parent.

In an attempt to individualise care for patients with cognitive impairment, Nottingham University Hospitals (NUH) trialled Carer2Theatre; a scheme exploring the impact of having a relative/carer present in the anaesthetic room for these vulnerable adults, with the aim of providing reassurance and a familiar face.

Objectives: To explore the experience and attitudes of relatives/carers and staff surrounding relatives/carers accompanying confused patients from the ward to the anaesthetic room.

Methods: A qualitative single centre study composed of interviews at Queens Medical Centre trauma and orthopaedic wards. Semi-structured interviews were conducted with 5 relatives/carers and 20 members of staff, with the outcome of collecting and analysing attitudes towards the scheme.

The data were analysed thematically, coding the data and accumulating the appropriate codes together to form themes.

Results: Benefits arising from the scheme included aspects such as improved communication, efficiency and the improved quality of care, all from accompaniment by a relative/carer in the anaesthetic room. Participants established the main goal of accompaniment was to provide reassurance to the patient, delivered by a trusted familiar face. Although the patient was recognised to be the primary beneficiary, the relative/carer was also reassured about the quality of care given to their relative. Most perceived drawbacks of the scheme stemmed from its novelty and practicalities of implementation. Carers highlighted the need for realistic information about what would happen in the anaesthetic room.

Conclusion: Carer2Theatre may improve the quality of care (perceived and actual) for some patients with dementia. As with paediatric patients this should be an option for carers to consider. We recommend wider adoption, though local practical issues need careful consideration.

FREE PAPER SESSION 3

OP 3-1

Maximal isometric knee-extension strength measures indicating sarcopenia is associated with health-related outcomes and mortality in older patients with hip fracture

Hulsbæk S. [*1], *Kronborg L.* [2], *Kristensen M. T.* [1,3]

[1]Physical Medicine and Rehabilitation Research – Copenhagen (PMR-C), Department of Physiotherapy, Copenhagen University Hospital, Amager-Hvidovre, Hvidovre, [2]University College Copenhagen, Copenhagen, [3]Department of Orthopaedic Surgery , Copenhagen University Hospital, Amager-Hvidovre, Hvidovre, Denmark

Introduction: Findings of a 2016 study by Menant et al, suggest that a simple lower limb strength measure indicating sarcopenia is equal to measures of muscle mass in predicting health-related outcomes in older people. It is unknown if similar associations are present in patients with hip fracture. We therefore aimed to examine if strength measures indicating sarcopenia provide similar associations with health-related outcomes and mortality after hip fracture.

Methods: 36 men and 114 women, mean (SD) age of 79.3 (7.6) years (68 femoral neck- and 82 with a trochanteric hip fracture), from three studies by Kristensen (2009) and Kronborg (2014,2017), of whom the majority (75%) had a high prefracture functional level, were studied. Using cut-points from Menant, being the lowest sex-specific quintile; < 23.64 kg for men and < 15.24 kg for women, we compared maximal isometric knee-extension strength (non-fractured limb) with outcomes of Cumulated Ambulation Score (CAS) for basic mobility, 10m gait speed, Timed Up and Go (TUG), and the Short Falls Efficacy Scale International for fear of falling, within a mean of 8.2 (2.8) days post-surgery. Correspondingly, association with 1-year mortality was examined in cox regression analysis, adjusted for age, sex, BMI, pre-fracture function, cognitive status, type of fracture, and health status.

Results: The average knee-extension strength was 26.3 (9.5) kg and 17.0 (6.9) kg, respectively, for men and women, of which 14 (39%) and 55 (48%) were classified as sarcopenic and associated with significantly ($p \leq 0.01$) worse outcome for all assessments. The fractured limb strength (%non-fractured) for femoral neck and trochanteric fractures were 69% and 45%, respectively, but the presence of sarcopenia was similar for the two fracture types. Patients with signs of sarcopenia used more days to achieve an independent CAS score (mean of 1.7 [95%CI 0.6-2.8] days) walked slower (mean of 0.21 [0.13-2.29] m/s), used longer time performing the TUG (mean of 11.1 [6.4-15.9] seconds), and expressed a greater fear of falling (3.5 [1.6-5.4] points) compared to those with knee-extension strength measures above the cut-points. These differences are larger than that considered a minimal clinical important difference. Overall 1-year mortality was 11.3% (1.3% if non-sarcopenic and 10% if sarcopenic), while adjusted hazard ratios for mortality was 7.1 (95%CI=1.5-33.0) for patients with signs of sarcopenia.

Conclusion: Our findings of lower limb strength indicating sarcopenia being associated with functional performances, fear of falling and mortality in patients with hip fracture corresponds to findings in older people without fracture. 75% of patients had a high pre-fracture functional level. Thus, the presence of sarcopenia in a consecutive series of patients with hip fracture will be markedly larger than reported in the present non-consecutive series. This underline the importance of new studies specifically focused at improving muscle strength of older patients with hip fracture.

OP 3-2

Mobility training for increasing mobility and functioning in older people with frailty: systematic review

Treacy D. [*1,2], *Sherrington C.* [1], *Cameron I.* [3], *Hassett L.* [1], *Schurr K.* [4], *Fairhall N.* [1]

[1]*Institute for Musculoskeletal Health, University of Sydney, Sydney,* [2]*Physiotherapy Department, Prince of Wales Hospital, Randwick,* [3]*John Walsh Centre for Rehabilitation Research, Kolling Institute, Northern Sydney Local Health District, St Leonards,* [4]*StrokeEd Collaboration, Regents Park, Australia*

Introduction: Frailty is a common geriatric syndrome, characterised by decline across multiple body systems, causing decreased reserve and increased vulnerability to adverse health outcomes. Reducing functional decline should be considered a key goal of intervention for frail older people. High rates of functional decline are evident in frail, community-dwelling older people, with an estimated 27% of frail older people experiencing concurrent disability. Interventions that slow functional decline in the frail population will impact upon morbidity and mortality. The aim of this systematic literature review was to determine if mobility training interventions are effective in increasing function and mobility within a frail population.

Methods: The Cochrane methodology for systematic reviews was followed. Eight databases (Cochrane Register of Controlled Trials, MEDLINE, EMBASE, AMED, PsycINFO, PEDro, Clinical Trials.gov, and the WHO trials portal) were systematically searched for randomised controlled trials from. Two independent reviewers screened titles, abstracts and full text of potential studies against eligibility criteria. Study quality was assessed using the Cochrane risk of bias tool. Overall quality of the evidence for the main analyses was assessed using the GRADE approach. All analyses were conducted using random effects models.

Results: 12 studies were identified that meet the eligibility criteria. In total, 1142 patients were enrolled (582 in the treatment group, 560 in control group). The average age of the participants was 82 years, and 73% of them were women. There was low to high quality evidence that mobility training improved both function (9 studies, SMD= 0.80; 95% CI 0.27 to 1.32) and mobility (12 studies, SMD= 0.47; 95% CI 0.27 to 0.68).

Conclusion: The results indicate that mobility training provided to a frail population is effective for improving function and mobility.

OP 3-3

Nationwide trends and risk factors for reoperation due to infection after hip fracture surgery: a danish cohort study

Kjørholt K. E. E. [*1], *Frøslev T.* [1], *Pedersen A. B.* [1]

[1]*Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark*

Introduction: Reoperation due to infection is a serious complication after hip fracture (HF) surgery and is associated with a 3-fold increased risk of mortality compared with patients without infection. Previous studies reported conflicting results regarding trend in risk of revision due to prosthetic joint infection after elective total hip arthroplasty. No previous studies evaluate changes in the risk of infection solely after HF surgery, and these patients have a higher risk profile due to comorbidity, fragility and acute surgery. We aimed to examine trends in the risk of reoperation due to infection following HF surgery in Denmark over a 12-year period, from 2005-2016. Furthermore, we aimed to identify risk factors associated with reoperation due to infection.

Methods: We designed a population-based cohort study using individual-level data from Danish nationwide registries. We calculated biannual cumulative incidences of reoperations with 95 % confidence intervals (CI) within 3 months and 1 year of surgery. We used the pseudo-observation method to calculate crude and adjusted cumulative risk ratios (RR) with 95 % CI, with the years 2005-2006 as the reference period. The RRs were adjusted by age, sex and comorbidity (Charlson Comorbidity index score low, medium and high). We calculated RRs for potential risk factors for reoperation due to infection.

Results: We identified 74,771 incident HF surgery patients ≥ 65 years old during 2005-2016. Within 3 months after surgery, the cumulative incidence of reoperation due to infection was 0.82 % in 2005-2006 and 0.72 % in 2015-2016, corresponding to an adjusted RR of 0.88 (0.66-1.18). The cumulative incidence within 1 year after surgery was 1.26 % in 2005-2006 decreasing to 1.02 % in 2015-2016 [adjusted RR= 0.80 (0.63-1.02)]. At 3 months of follow-up, the adjusted RR for reoperation due to infection was 2.27 (1.92-2.68) for total/hemi arthroplasty (vs osteosynthesis), 0.60 (0.50-0.71) for per/subtrochanter fractures (vs fracture of the femoral neck), and 1.22 (0.98-1.54) for high comorbidity level (vs low). RR for reoperation decreased with increasing age. Similar risk factors were identified at 1 year of follow-up.

Conclusion: The risk of reoperation due to infection within 3 months and 1 year of HF surgery has slightly decreased during 2005-2016. We observed that total/hemi arthroplasty, high comorbidity level, fracture of the femoral neck, and age between 65-74 were associated with higher risk of reoperation due to infection.

OP 3-4

Surviving fragility fractures in advanced chronic kidney disease?

Aw Yong B. K. [*1], *Nazanin S.* [1], *Tamara S.* [1], *Dawn V. B.* [1], *Terence O.* [1], *Opinder S.* [1]

[1]*Healthcare of Elderly, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom*

Introduction: Patients with advanced chronic kidney disease (CKD) can sustain hip fractures from either CKD-mineral bone disease (MBD) or co-existing osteoporosis which would require different approaches to reduce the risk of future fragility fractures. A cross-sectional analysis of bone health management for patients with CKD stage 4 (15-29mL/min/1.73m^2) and 5 (>15mL/min/1.73m^2) post-hip fracture was performed.

Methods: Relevant data on patient demographics, co-morbidities, admission details, fracture and bone health were collected for all patients admitted in 2015-2016 from the hospital electronic health records.

Results: 3% (47/1579) of patients had either CKD stage 4 (72%) or 5 (28%). The mean (SD) age was 83 (8.8) years, and 49% had ≥2 other co-morbidities. 32% (11/34) of CKD 4 and 92% (12/13) of CKD 5 patients were under ongoing specialist renal care. 70% (33/47) of patients were admitted under orthopaedic wards in the main campus with the remaining 11% (5/47), and 19% (9/47) admitted to renal and orthopaedic wards respectively in city campus. Raised serum alkaline phosphatase, phosphate and parathyroid hormone above local reference range were present in 28% (13/43), 22% (9/41) and 88% (35/40) of patients respectively. 94% (44/47 patients) proceeded to have surgery. Inpatient mortality was 11% (5/47 patients). All patients had an active bone health plan which varied on discharge. 86% (36/42) of patients were prescribed vitamin D supplements, of which 38% (16/42) were co-prescribed calcium supplements. Onward referrals for DEXA scan, subcutaneous denosumab, new renal appointment, and new osteoporosis clinic appointment were made for 7% (3/42), 24% (10/42), 9% (2/22), and 21% (9/42) of patients respectively. Survival post-hospital discharge was poor. At 1 year and 2 years respectively, only 47% (22/47) and 19% (9/47) of patients were still alive. Genders, age, CKD stage and additional co-morbidities were not linked to either 1 year or 2 years survival post-hospital discharge. Patients admitted to renal or orthopaedic wards in city campus (on-site renal service) had lower 1-year mortality than those admitted to orthopaedic wards in the main campus (23% vs 67%, p=0.01), but the numbers were small (22/33 vs 3/13). 68% (17/25 patients), who were already under the renal team care, attended renal clinic within 2 years following discharge but none were referred for any bone protection services. 11% (5/47) of patients attended osteoporosis clinic within 2 years following discharge, which 33% (3/9) referred and 6% (2/33) not referred attended. No clear diagnosis of CKD-MBD or osteoporosis were made during admission or on clinics. 13% (6/47

patients) were readmitted with fractures within 2 years.

Conclusion: Advanced CKD in patients with hip fractures is associated with poor survival with only one-in-five alive 2 years post-fracture. Hence, bone health intervention will need to take this into account. There should also be a consideration for advanced care planning for these patients.

OP 3-5

Validation of newly devised subtype classification for atypical femoral fracture

*Oh Y. [*1], Yamamoto K. [2], Hashimoto J. [3], Fujita K. [3], Yoshii T. [3], Fukushima K. [4], Kurosa Y. [4], Wakabayashi Y. [5], Kitagawa M. [2], Okawa A. [3]*

[1]Department of Orthopaedic and Trauma Research, [2]Department of Comprehensive Pathology, [3]Department of Orthopaedic and Spinal Surgery, Tokyo Medical and Dental University, Tokyo, [4]Department of Orthopaedic Surgery, Saku Central Hospital, Nagano, [5]Department of Orthopaedic Surgery, Yokohama City Minato Red Cross Hospital, Kanagawa, Japan

Introduction: Regarding the location of atypical femoral fracture (AFF) injury, it had been reported that subtrochanteric AFF was more likely in Southeast Asian populations and that mid-shaft AFF was more likely in North European populations. However, the Japanese Orthopaedic Association surveyed 230 AFFs in Japan and found that mid-shaft AFF was common in Japan, with rates of about 70%. Besides, relationships between AFF location and femoral bowing have been reported in several studies, especially from East Asian countries. The authors have studied stress fracture of the bowed femoral shaft (SBF) in elderly women since 1998, before the first report appeared of severely suppressed bone turnover (SSBT) and AFF, and previously suggested that AFF could be classified locationally into two types: fragility SBF in the mid-shaft and subtrochanteric AFF caused by SSBT. The present study was conducted to validate this novel concept for AFF.

Methods: A multicenter prospective study was conducted at 12 hospitals in Japan from August 2015 through March 2019. Thirty-two elderly women with AFF were enrolled and classified into two study groups according to the location of AFF injury: the mid-shaft AFF group (n = 16; age 80.4 ± 6.2 years) and the subtrochanteric AFF group (n = 16; age 73.9 ± 6.5 years). Mean age was significantly lower in the subtrochanteric AFF group ($p < 0.05$). Body mass index (BMI), exposure to specific drugs (bisphosphonates, denosumab, proton pump inhibitors, and glucocorticoids) which may cause SSBT, femoral morphology, bone density and bone metabolism makers were evaluated. Furthermore, histological analysis of the fracture site was performed.

Results: No significant difference was seen in BMI between the groups (p = 0.8801). Eight of the 16 patients in the mid-shaft AFF group and all 16 patients in the subtrochanteric AFF group had a history of prolonged (>3 years) exposure to specific drugs. Femoral bowing and neck-shaft angle was significantly greater in the mid-shaft AFF group ($p < 0.0001$). Bone density of the femoral neck was significantly lower in the mid-shaft AFF group ($p < 0.0001$). Bone absorption marker was significantly lower in the subtrochanteric AFF group ($p < 0.01$). Histologically, mid-shaft AFF showed endochondral ossification, whereas subtrochanteric AFF showed no cells, which was consistent with SSBT.

Conclusion: Newly devised subtype classification for AFF would be established, at least in a Japanese population. Biological activity in mid-shaft SBF tends to be not suppressed as in subtrochanteric AFF. We recommend to consider the pathology and treatment of AFF based on this subtype classification.

OP 3-6

Effectiveness of information technology enabled patient education solutions in the recovery of older adults with fragility fractures: a systematic review and meta-analysis

*Yadav L. [*1,2], Haldar A. [3], Chehade M. [1,2], Visvanathan R. [1,3], Gill T. [4]*

[1]Center for Research Excellence in Frailty and Healthy Ageing, The University of Adelaide, [2]Orthopaedics and Trauma, Royal Adelaide Hospital, [3]Aged and Extended Care, The Queen Elizabeth Hospital, [4]School of Medicine , The University of Adelaide, Adelaide, Australia

Introduction: With the advancement of modern information technologies, it is possible to engage, empower older people with fragility fractures along with their carers and integrate seamlessly services from acute hospital care to community rehabilitation. The objective of this review is to evaluate the effectiveness of models of care utilising information technology enabled patient education solutions in the recovery of older adults with fragility fractures.

Methods: Participants: People, aged 50 and above with a fragility or osteoporotic fracture within hospital, residential aged care or community dwellings. Intervention: Models of care using information technology enabled education solutions delivered through internet or non-internet forms of communications. Comparators: standard care. Primary outcome included prevention of secondary fractures, diagnosis and treatment of osteoporosis and its adherence, or any functional outcomes (e.g. mobility). Secondary outcomes include quality of life, health/ehealth literacy, knowledge, or perceived service satisfaction. This review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies. An intention to treat analysis was applied to those studies included in meta-analysis and odds ratio was calculated with random effects and I^2 statistic for determining heterogeneity. Findings from rest of the studies were narratively interpreted.

Results: Altogether, 15 studies were considered in the final stage for this systematic review. Out of these, 10 studies were randomized controlled trials and 5 were quasi experimental studies, published between the years 2003 to 2016. There was variation across intervention with use of technological solutions as part of complex intervention within different models of care. Five randomized controlled trials were included for meta-analysis covering 2873 participants. The outcomes were prevention of secondary fractures, measured as a proxy through bone mineral density test and adherence to osteoporosis medication at 6 months after discharge from the acute care. Findings from this meta-analysis suggest the intervention to be twice as effective when compared with the usual standard care (OR 2.13, 95% CI 1.30-3.48) and statistically significant (z=3.01, p=0.003), though the population sample considered in these studies were not homogeneous (I^2 =79, p=0.005). Narrative synthesis of the remaining studies included in this systematic review suggest improvement in secondary outcomes.

Conclusion: Findings from this review suggests that patient education is critical in the recovery of fragility fractures and information technology based solutions can be used to educate patients on different aspects of care. However, all these could work together if the appropriate technological solution works on the principle of motivation and reinforcement in a comfortable environment and facilitation by primary care setting and carers support

OP 3-7

Hospital differences in death rates after hip fracture surgery in Denmark – a multilevel approach for evaluating variation in 30-day mortality after hip fracture in a population-based cohort study

*Kristensen P. K. [*1,2], Merlo J. [3], Leckie G. [4], Ghith N. [3], Johnsen S. P. [5]*

[1]Clinical Epidemiology, Aarhus University, Aarhus, [2]Ortopedic Surgery, Regional Hospital Horsens, Horsens, Denmark, [3]Socialepidemiology, Lund University, Malmø, Sweden, [4]Centre for Multilevel Modelling, University of Bristol , Bristol , United Kingdom, [5]Clinical Medicine, Aalborg University, Aalborg, Denmark

Introduction: Thirty-day mortality is widely used when comparing hospital performance within

orthopedic procedures, as it is easily understood, clearly defined, universally resonant for both patients, clinicians and managers and considered to convey key elements of healthcare. However, concerns remain about the validity and reliability of monitoring mortality as a performance indicator, as they can be based on small hospital caseloads leading to uncertain hospital ranking and, thereby, unreliable performance evaluation. We, therefore, aimed to quantify the variation in 30-day across hospitals and to determine the amount of the total patient variation in 30-day mortality that was attributable to hospitals.

Methods: Patients aged 65 years with an incident hip fracture registered in the Danish Multidisciplinary Fracture Registry between 2007 to 2016 were identified (n= 60,004). We estimated unadjusted and adjusted risk of 30-day mortality in 32 hospitals. We performed multilevel analysis of individual heterogeneity and discriminatory accuracy with patients nested within hospitals. To improve the validity of the hospital comparisons, we adjusted for individual demographic, socioeconomic and clinical characteristics. We expressed hospital variance by the Median Odds Ratio (MOR) and the variance partition coefficient (VPC) to quantify the size of the hospital differences as the share of the total individual variance in the propensity of death.

Results: The overall 30-day mortality was 10 %. Patients with a high sociodemographic risk score, underweight patients, patients with high comorbidity, nursing home residences and patients with a subtrochanteric hip fracture presented higher 30-day mortality. The adjusted differences between hospital averages in 30-day mortality varied from 5 % to 9 % for the 32 hospitals, which correspond to a MOR of 1.18 (95 % CI: 1.12-1.25). However, the multilevel analysis revealed that the hospital as a general context effect was low, as the VPC value was below 1 %.

Conclusion: The 30-day mortality varied from 5 % to 9 % for the 32 hospitals. However, less than 1 % of the variation in adjusted patient mortality within 30 days operated between hospitals. To reduce 30-day mortality among hip fracture patients, we should focus on improving the care for the most vulnerable patients.

OP 3-8

Direct oral anti-coagulants in the prevention of venous thromboembolism following surgery for hip fracture in the elderly

Goh E. L. [*1,2], *Gurung P.* [2], *Kannan A.* [2], *Anand S.* [2]

[1]*Medical Sciences Division Office, University of Oxford,* [2]*Horton General Hospital, Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom*

Introduction: Direct oral anti-coagulants (DOACs) decrease the risk of venous thromboembolism (VTE) without increasing the risk of bleeding in elective lower limb orthopaedic surgery. However, the role of DOACs in preventing VTE following hip fracture surgery in the elderly remains unclear. This study aims to evaluate the efficacy and safety of DOACs in elderly patients undergoing surgery for hip fracture.

Methods: Single-centre, retrospective, matched cohort study of patients receiving either a DOAC or low molecular weight heparin (LMWH) for VTE prophylaxis following hip fracture surgery. Data obtained: patient demographics, co-morbidities, fracture classification, time to surgery, procedure performed and length of stay. Outcomes assessed: incidence of VTE, incidence of major haemorrhage and death within 30 days of surgery.

Results: A total of 108 patients (DOAC group = 54, LMWH group = 54) were included. The incidence of VTE was comparable between the DOAC and LMWH groups at 0 % and 7.4 % respectively (RR: 0.11, 95 % CI: 0.01 to 2.02, p= 0.14). Haemorrhage occurred in 7.4 % of patients in the DOAC group and 5.6 % of patients in the LMWH group (RR: 1.33, 95 % CI: 0.31 to 5.68, p= 0.70). Mortality from VTE was 0 % in the DOAC group and 1.9 % in the LMWH group (RR: 0.33, 95 % CI: 0.01 to 8.01, p = 0.49). Mortality from haemorrhage was 1.9 % in both the DOAC and LMWH groups (RR: 1.00, 95 % CI: 0.06 to 15.58, p = 0.99).

Conclusion: This study demonstrates comparable efficacy and safety of DOACs with LMWH in the prevention of VTE following surgery for hip fracture in the elderly. This can be achieved with careful patient selection. Future studies are required to identify patients who stand to benefit the most from treatment.

Thursday, 29 August 2019

FREE PAPER SESSION 4

OP 4-1

Fracture liaison service (fls) in the uk 2015-18: the royal osteoporosis society (ros) support model for implementation, standards, quality improvement and financial benefit

Carr W. [*1], *Doyle A.* [1]

[1]*Service Delivery Directorate, Royal Osteoporosis Society, Bath, United Kingdom*

Introduction: Absolute numbers of hip fractures are projected to double and in-patient costs to treble in the next 20 years. Studies show that 25 % of hip fractures could be prevented with identification, treatment and follow-up by an FLS. An FLS systematically identifies, treats and refers to appropriate services all patients aged over 50 years within a local population who have suffered a fragility fracture, with the aim of reducing their risk of subsequent fractures. FLS are cost effective by preventing secondary fractures, thereby reducing emergency admissions, bed days and associated costs. Since 2015 the ROS has led an innovative programme providing a 'top-down' (national influencing, policy agenda) and 'bottom-up' (operational health service delivery support) approach to developing FLS in the UK. The objective of this study was to provide an analysis of the implementation, since 2015, of FLS across the UK with service development support developed and provided by the Royal Osteoporosis Society.

Methods: The ROS developed FLS Clinical Standards (2015) that advocate a 'whole system' model. The charity also pioneered an FLS Implementation Toolkit (including a Benefits Calculator) to support sites to demonstrate clinical and cost-effectiveness to payors, from business case to post-implementation evaluation. A specialist ROS Service Development team with clinical and commissioning experience provides bespoke support to individual sites. Alongside this, the ROS Development Managers can establish a support structure around the service through patient education, including newly diagnosed sessions and peer support.

Results: 37 services have been commissioned or improved since 2015. Over 5 years, the new services are estimated to provide £65m benefit for the health and social care economy, preventing over 3200 hip fractures.

The new services represent FLS provision to 3.5 million people in the over-50 cohort– an increase of over 300 % since 2015 (865,590).

The total population coverage by FLS in the UK is currently estimated at 39,394,263.

- 25% (10,095,022) are covered by one of the new services established with ROS support since 2015.
- The ROS currently supports 187 sites across the UK.

Of these sites:

- 113 have received or are receiving peer support and/or commissioning assistance to improve quality
- 56 are developing new services

Conclusion: The ROS service development model of support is driving forward fracture prevention through development and improvement of FLS across the UK.

OP 4-2

Reproductive factors and risk of hip fracture: a 10-year follow-up of almost 250,000 chinese middle-aged adults

Peng K. [*1,2], *Yao P.* [3], *Yang L.* [3], *Kartsonaki C.* [3], *Bennett D.* [3], *Tian M.* [1,4], *Guo Y.* [5], *Bian Z.* [5], *Chen Y.* [3], *Chen Z.* [3], *Woodward M.* [6], *Ivers R.* [7], *Clarke R.* [3]

[1]*The George Institute for Global Health,* [2]*School of Public Health, The University of Sydney, Sydney, Australia,* [3]*University of Oxford, Oxford, United Kingdom,* [4]*The George Institute for Global Health at Peking University Health Science Center,* [5]*Chinese Academy of medical Sciences, Beijing, China,* [6]*The George Institute for Global Health, Oxford, United Kingdom,* [7]*University of New South Wales, Sydney, Australia*

Introduction: Women have higher absolute risks of fracture than men, which are believed to reflect

differences in oestrogen exposure, but evidence for the associations between reproductive factors and risk of hip fracture is limited. The aims of this study were to compare the associations of number of children with risk of hip fracture between men and women, and to investigate the independent contributions of age at menopause, time since menopause and total reproductive years with risk of incident hip fractures in women.

Methods: Between 2004 and 2008, the China Kadoorie Biobank (CKB) recruited 133,399 postmenopausal women and 110,296 men, aged 50 years or older. During 10-year follow-up, 2,068 participants (1,394 women and 674 men) had a hip fracture. Cox regression analysis was used to estimate sex-specific adjusted hazard ratios and 95%CIs for incident hip fracture by number of children in both sexes and by age at menopause, time since menopause and total reproductive years in women.

Results: Over 98% of all CKB participants reported that they had children. Women who had 2 or 3 children had the lowest risks of hip fracture compared with other groups. Compared to nulliparous women, the adjusted HRs for hip fracture were 0.89 (95% CI: 0.72, 1.10) for 1 child, 0.79 (0.70, 0.90) for 2 children, 0.79 (0.72, 0.87) for 3 children, 0.81 (0.72, 0.91) for 4 children, and 0.95 (0.83, 1.10) for those with 5 or more children. The associations between number of children and risk of hip fracture were broadly consistent in men of a similar age. Among postmenopausal women, the mean (SD) age at menopause was 48.8 (4.0) years. Compared to those women who reached menopause before 53 years of age, a delay of 6.5 years in reaching the menopause was associated with a 22% lower risk of hip fracture. Compared to women with reproductive years less than 36 years, a 7 years longer duration of reproductive years was associated with 17% lower risk of hip fracture. Women with 5 to 9, 10 to 14, 15 to 19, or ≥20 years since menopause compared to women <5 years since menopause also had higher risks of hip fracture.

Conclusion: The concordant effects of the number of children with risk of incident hip fracture between men and women, suggested that the lower risk of fracture in multiparous women is not due to any biological effects associated with differences in oestrogen exposure, but is more likely because of confounding by socioeconomic status or lifestyle factors. Women with younger age at menopause, a shorter duration of total reproductive years or longer time since menopause had higher risks of hip fracture.

OP 4-3

Patient and public involvement: paper 1. The experience of a priority setting exercise for research into fragility fractures of the lower limb

Gould J. *[1]

[1]*UK Musculoskeletal PPI group, Oxford Trauma University of Oxford, Oxford, United Kingdom*

Introduction: Jenny Gould, an experienced Patient and Public Involvement (PPI) partner, will share her experience of taking part in identifying key research questions for fragility fractures of the lower limb. The aim was to develop patient driven research priorities in fragility fractures of the lower limb and pelvis: a UK priority setting partnership with the James Lind Alliance (JLA). The JLA, a non-profit organisation, has a well-established process for bringing together patients, carers and clinicians to work on identifying research priorities for particular conditions. PPI is crucial in this process along with professionals, to ensure balance. PPI were also able to reach patients and carers through their connections with various support groups and societies.

Methods: Objective: To identify the ten most important research questions, for a range of stakeholder groups, for fragility fractures of the lower limb. The process started with a national survey to collect participants' thoughts and feelings about all aspects of care for lower limb fragility fractures that require further research. Participants could be patients, carers, their family, friends or multidisciplinary healthcare staff. These ideas were turned into research questions and a search of the literature was made to ensure they have not already been answered. A second national survey asked the same range of participants to rank the questions in order of importance. The top 25 questions were then taken to a consensus workshop where patients, carers and clinicians worked together to agree the top ten key questions for research. The benefit of this process was that it enabled all stakeholders to share their opinions and be involved in influencing research recommendations.

Results: The results identified that further research was required in: rehabilitation, effective interventions, information for patients; weight bearing; pain management; infection; treatment of confusion and delirium. There were some challenges - finding a range of participants was hard work and accessing frail older peoples' views time consuming. They often required help filling in the survey. However we completed the task, reaching a consensus on the top ten questions that truly reflected the views of clinicians, patients and carers, to go forward to funding bodies, and benefit patients of the future.

Conclusion: Overall this was a very positive and rewarding experience. It was truly collaborative, requiring real teamwork; all members equal, all opinions valued, both in the steering group and the final workshop. We were well supported by JLA personnel. In spite of the commitment required, work began immediately on a new JLA priority setting partnership, this time on fragility fractures of the upper limb.

OP 4-4

Similarities between fracture locations from the american orthopedic association own the bone initiative

Anderson P. A. *[1], *Tosi L.* [2]

[1]*Orthopedic Surgery and Rehabilitation, University of Wisconsin, Madison,* [2]*Orthopedic Surgery, Childrens National Hospital, Washington DC, United States*

Introduction: The American Orthopedic Association created the Own The Bone (OTB) quality improvement program to encourage orthopedic surgeons to assure patients receive osteoporotic care after fragility fracture. A registry was established in 2009 with enrolled patients having fractures of the axial and appendicular skeleton. Secondary treatment has been focused on hip fractures but we feel that all fragility fractures identify candidates who should have secondary fracture prevention. We hypothesized that patients with hip fractures compared to other locations had similar demography, bone mineral density (BMD), and prior treatment. The purpose of this study is to compare demographics, BMD, and prior treatment between different fracture locations.The purpose of this study is to compare demographics, BMD, and prior treatment between different fracture locations.

Methods: Own The Bone is a quality improvement program using de-identified data and therefore did not require IRB approval. Fractures locations studied were hip/pelvis, spine, upper extremity, and foot/ankle. Demographics, DXA T scores (hip and lumbar spine, one third radius), prior treatment, and prior fractures were compared between groups using ANOVA.

Results: The OTB database included 52,115 patients. Hip, spine, foot/ankle, and upper extremity occurred 53.5%, 12.1%, 7.6% and 1.9% respectively. Mean age was 75.6 and was significantly lower in foot/ankle at 67.7 yrs and older in hip fracture patients, 78.7 yrs. There is a 3:1 female to male ratio. Upper extremity and foot/ankle fractures were significantly greater in females. The mean lowest T score of all patients was -2.4. The T scores were significantly lower in the radius, hip, and spine; -2.2, -2.1 and-1.4 respectively. T scores were higher in foot/ankle than other groups. Spine fractures had lower T scores of the lumbar spine than other fracture sites. A history of prior fracture occurred in 35.2%, and was significantly greater in spine occurring 51.2 %. Anti-osteoporosis medication was prescribed prior to fracture in 20.2% of patients and was greater in spine compared to the other groups.

Conclusion: These results demonstrate small differences between fracture site and demographics, T-scores, prior history of fracture and prior use of medications. Spine patients were more likely to be treated previously and had lower spine t scores. Foot/ankle occurred in younger female patients and upper extremity in female patients. Although there is emphasis on hip fractures, other fracture sites represent similar patient populations (gender, age

and BMD) and thus all require secondary fracture prevention such as proposed by Own The Bone.

OP 4-5

Patient and public involvement paper 2: experience of interviewing fragility fracture patients with memory loss and people who care for them.

Grant R. *[1]

[1]UK Musculoskeletal PPI group, Oxford Trauma, Kadoorie Centre, NDORMS, University of Oxford, Oxford, United Kingdom

Introduction: Older people with fragility fractures frequently have memory loss. The SHARED[1] study was a service user led development of recommendations for health and social care services for patients with memory loss leaving UK hospitals. Principle Investigator [P.I.] Dr. Carole Mockford worked with a small team of lay co-researchers.

Objectives: To share experiences of a PPI member / co-researcher engaged in research with people after a fragility fracture and who have memory loss.

Methods: The co-researchers were trained for interviews with the patient and their carer (15 pairs). The interviews were conducted after discharge, at six and 12 weeks later, across two UK NHS Health Care Trusts. Discharge personnel (17) from three Health Care Trusts including the community were also interviewed. The conversational style interviews, with prepared prompt questions, were recorded and transcribed. Finally, two focus groups were held with the interviewed patients and their carers to discuss and rank 12 recommendations. Lay co-researchers informed all aspects of the research process from generating the research question, protocol development, interviews, analysis, initial recommendations, facilitating focus groups, development of the final recommendations and dissemination.

Results: The transition from acute care back into the community is especially stressful for people with memory loss and their carers. The three key recommendations were,

1. Have a mutually agreed written care plan, developed through working in partnership.
2. Assign a named person to coordinate care and be a constant point of contact.
3. Improve the quality of the home care provided with better communication, flexibility and trained staff.

Richard will share his experience of taking part in the study, the benefits and challenges of using lay co-researchers and the impact on the study. There were challenges at the beginning, including setting up funding and contractual issues across organisations. The co-researchers used skills from their different life experiences to add value to the research. They worked with and were supported by the P.I. In turn, the co-researchers were valued for their contribution to the quality of the research.

Conclusion: Challenges were balanced with the joy of working with others on a meaningful activity, learning research methods, facilitating the contribution of others in working on the recommendations, adding to the quality of the research and disseminating the findings at conferences in the UK.

[1]The Development of Service User led Recommendations for Health and Social Care Services on Leaving Hospital with Memory Loss or Dementia – the SHARED study. Health Expectations doi 10.1111/hex.12477. http://onlinelibrary.wiley.com/enhanced/doi/10.1111/hex.12477/

OP 4-6

Patient and service-level predictors of bone treatment recommendation post-fracture: results from the uk national fracture liaison service (fls) database

Hawley S. [1], Vasilakis N. [2], Wiles B. [2], Gregson C. [3], Gittoes N. [4], Clunie G. [5], Cockill C. [6], Price I. [2], Judge A. [3], Smith A. [2], Javaid M. K. *[7]

[1]Centre for Statistics in Medicine, NDORMS, University of Oxford, Oxford, [2]Royal College of Physicians, London, [3]University of Bristol, Bristol, [4]University Hospitals Birmingham, Birmingham, [5]British Society for Rheumatology, London, [6]Yeovil District Hospital NHS Foundation Trust, Bath, [7]University of Oxford, Oxford, United Kingdom

Introduction: We aimed to describe anti-osteoporosis treatment recommendations post-fracture and identify patient and organisational predictors of: decision to treat (including oral bisphosphonate, parenteral therapy or clinical/GP referral for consideration of treatment) versus decision not to treat; and oral bisphosphonate versus parenteral therapy recommendations.

Methods: Patients with fragility fracture diagnosed in England between 01/01/2017-31/12/2017 were identified from the Royal College of Physicians national FLS database. Patients diagnosed within centres achieving <50% case finding or with ≥50% unknown/missing treatment information were excluded. Descriptive statistics outlined treatment recommendations, with stratification by FLS. Patient and FLS-level factors (highest nurse band; nurse & administrator whole time equivalent per 1,000 admissions (</≥ median)) were identified by complete case analysis using multilevel multivariable logistic regression.

Results: Of 22,500 eligible patients (mean age 73 years; 77% female) from 15 FLS centres, 20% were recommended an oral bisphosphonate, 5% denosumab, 4% zoledronic acid, 20% were referred, <1% given a different recommendation, 31% were neither referred nor recommended treatment and 19% had unknown or missing treatment recommendation status. There was marked variation in these outcomes by FLS. Patient-level characteristics and odds ratios (OR [95% CI]) for appropriate treatment recommendation/referral were as follows: age ≥75 years (OR: 4.59 [4.18–5.03]); male gender (OR: 0.61 [0.55–0.67]); hip (OR: 3.02 [2.68–3.40]) or spine (OR: 3.96 [3.26–4.80]) fracture; smoking (OR: 1.55 [1.36–1.78]), living in a residential home (OR: 0.60 [0.49–0.78]), family history of hip fracture (OR: 2.04 [1.77–2.35]), previous fracture (OR: 1.46 [1.33–1.60]) and previous bone treatment (OR: 2.78 [2.36–3.29]). Adjustment for FLS-level factors (which were non-predictive) did not attenuate these associations. Predictors of parenteral (versus oral bisphosphonate) therapy were age ≥75 years (OR: 2.05 [91.75–2.40]), living in a residential home (OR: 1.87 [1.46–2.39]), hip (OR: 2.14 [1.83–2.50]) or spine (OR: 2.16 [1.68–2.78]) fracture, previous fracture (OR: 1.84 [1.59–2.14]) and previous bone treatment (OR: 2.78 [2.31–3.35]). At the FLS level, the number of full-time nurses per 1,000 admissions (above and below median of 0.46 whole time equivalents) was also predictive of parenteral therapy (OR: 6.50 [1.16–36.48]).

Conclusion: Multiple factors are associated with treatment recommendations made post-fracture, including greater intensity of nurse time. These results provide clinicians and service managers with insights towards standardising and improving services.

OP 4-7

The increasing problem of fragility fractures: data from the nottingham fracture liaison service over 10 years

Ong T. *[1], Hershkovich O. [1], van Berkel D. [1], Sahota O. [1]

[1]Queens Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: Epidemiological data and incidence of non-hip fractures are less well described compared to hip fractures. Accurate fracture demographics are important to identify the scale of the problem and future healthcare planning. We aim to describe incidence for non-hip and non-vertebral fractures using data from the Nottingham Fracture Liaison Service (FLS) over the course of 10 years.

Methods: The Nottingham FLS covers a local population of 800,000 and almost 1/3 are over the age of 50 years. Data of patients presenting to the service is routinely collected as part of a service registry. 10-year data from 2008-2017 was analysed. ICD-9 codes were used to classify the types of fracture. Age and gender-specific annual incidence per 10,000 population over 50 years was reported. Population figures were derived from the Office of National Statistics.

Results: 21,180 patients (74.6% female) with a mean age of 68.1 years presented to the FLS over this time. The average annual incidence of fragility fractures was 100/10,000 population over 50 years, with the overall annual incidence in men 53.4/10,000 and higher in women at 142.1/10,000. There was a moderate annual 10 year rise in fracture incidence from 91.2/10,000 in 2008 to 111 per 10,000 population (R^2 0.48). Fracture incidence increased with age, and this increase was higher in women (R^2 0.98) than in men (R^2 0.58). The five most common fractures were radius and ulna (42.7%), foot (17.7%), humerus (14.3%), ankle (11.4%) and clavicle (4.7%).

The average annual incidence for fractures of the radius and ulna was 44.1/10,000; foot 16.8/10,000; humerus 14.0/10,000; and ankle was 11.4/10,000 and clavicle 4.3/10,000. There was no annual increase in the incidence of these fractures specifically. Age was associated with an increase in fracture incidence in radius/ulna, humerus and clavicle; and a decrease in foot and ankle fractures.

Conclusion: The incidence of fragility fracture is high in the older population. There was an increase in its annual incidence these last 10 years. Together with an expanding older population, the absolute number of fractures presenting to medical attention will go up. At its current trajectory, it is predicted that the annual incidence in 2030 would be 124.9 per 10,000 population over 50 years. That year alone, there would be 3100 people with fractures in Nottinghamshire, representing a 30 % increase in absolute numbers from 2008. Therefore, sustaining an effective FLS to prevent falls, optimise bone health and ensuring treatment compliance is needed.

OP 4-8

Osloporosis: a study on fragility fractures and osteoporosis in Oslo

*Lund I. [*1], Frihagen F. [2], Aga R. [1], Melhuus K. [1], Basso T. [3], Omsland T. K. [4], Borgen T. T. [5], Apalset E. [6], Figved W. [7], Stutzer J. M. [8], Hagen G. [9], Wisløff T. [9], Bjørnerem Å. [10, 11], Eriksen E. F. [12, 13], Nordsletten L. [2, 13], Solberg L. B. [2]*

[1]Section of Orthopedic Emergency, [2]Division of Orthopedic Surgery, Oslo University Hospital, Oslo, [3]Department of Orthopedic surgery, St.Olavs University Hospital, Trondheim, [4]Department of Community Medicine and Global Health, Institute of Health and Society, University of Oslo, Oslo, [5]Department of Rheumatology, Hospital of Drammen, Drammen, [6]Department of Rheumatology, Haukeland University Hospital, Bergen, [7]Department of Orthopedic Surgery, Bærum Hospital, Bærum, [8]Department of Orthopedic Surgery, Molde Hospital, Molde, [9]Department of Reviews and Health Technology Assessments, Norwegian Institute of Public Health, Oslo, [10]Department of Clinical Medicine, Arctic University of Norway, [11]Department of Obstetrics and Gynecology, University Hospital of North Norway, Tromsø, [12]Department of Endocrinology, Oslo University Hospital, [13]Department of Clinical Medicine, University of Oslo, Oslo, Norway

Introduction: Oslo has the highest incidence of hip fractures in the world. However, secondary fracture prevention in Oslo and Norway has been less than optimal. The section of Orthopedic Emergency, Oslo University Hospital is the largest orthopedic outpatient clinic in Norway with nearly 12.000 fractures treated every year. Osloporosis is a sub-study of the Norwegian Capture the Fracture® Initiative (NoFRACT). NoFRACT aims to improve secondary fracture prevention to reduce fracture rates and mortality by introducing a Standardized Intervention Program (SIP) based on a Fracture Liaison Service (FLS) model of care. Osloporosis aims to investigate the prevalence of osteoporosis in Oslo among patients ≥ 50 years with fragility fracture and how osteoporosis is represented among different fracture types.

Methods: Osloporosis is a prospective study addressing nearly 10.000 patients in the intervention period from May 4th, 2015 until May 4th, 2018, with 1-year follow-up. Patients ≥ 50 years with a fragility fracture were offered assessment and treatment for osteoporosis according to the SIP, included measurement of bone mineral density with dual energy x-ray absorptiometry (DXA). A clinical quality registry has been established to ensure the inclusion of all patients and to monitor follow-up. The study uses data from this registry and is approved by the Data Protection Officer at Oslo University Hospital.

Results: From May 4th, 2015 until February 16th, 2018, 8939 patients (71% women) was registered with 9562 fractures. Of all fractures, 3852 (40 %) were offered assessment for osteoporosis with DXA and a nurse led consultation. So far 2259 out of 3852 (59 %) have had DXA performed, and 1729 (76 %) of them had site with the lowest T-score ≤-1,5. Of 969 patients with a wrist fracture, 784 (82 %) had site with the lowest T-score ≤-1,5 and 397 (41 %) had site with the lowest T-score ≤-2,5. Corresponding numbers for 371 patients with proximal humerus fractures was 297 (80 %) and 141 (38 %); for 100 patients with metacarpal fractures: 67 (67 %) and 28 (28 %); for 248 patients with ankle fractures: 154 (62 %) and 62 (25 %); and for 50 patients with fractures of patella: 40 (80 %) and 20 (40 %), respectively. 5683 patients were excluded and of those; 2603 (27 %) had their follow-up in hospitals, specialist clinics or in primary health care. 951 (10 %) belongs to other health regions, 637 (7 %) were nursing home residents, 598 (7 %) were lost to follow-up and 894 (9 %) had no follow-up for their fracture.

Conclusion: Preliminary results show a high prevalence of osteoporosis in these groups of patients. Although T-score varies among types of fracture, all types of fracture had high percentage of low T-score with a clear benefit of the SIP.

FREE PAPER SESSION 5

OP 5-1

The outcomes of hip fracture bundled care program: an early experience in a singapore tertiary healthcare centre

*Chan J. Z. [1], Ramason R. [2], Kwek Ernest B. K. [3], Chua Ivan T. H. [*3]*

[1]Orthopaedic Surgery, [2]Geriatric Medicine, [3]Tan Tock Seng Hospital, Singapore, Singapore

Introduction: Bundled Payment in the care of geriatric hip fractures, is a pilot scheme implemented by the Ministry of Health (MOH) in Singapore aimed at driving improvements in geriatric hip fracture care at a lower cost. Bundled payment schemes in joint arthroplasty have been shown to reduce costs of providing care while maintaining satisfactory outcomes in other healthcare systems. We aim to evaluate the key outcomes of this Hip Fracture Bundled Care Program (HFBCP) after implementing numerous process improvements involving both acute and post-acute hospitalisation care.

Methods: A total of 703 patients were included in this study after applying the inclusion and exclusion criteria. The control group comprised of 361 patients in the period from November 2015 to November 2016 prior to the bundled payment implementation. The comparison group (HFBCP) comprised of 342 patients in the period from June 2017 to June 2018 after various process improvements were implemented under the bundled payment scheme. The process improvement measures were aimed at facilitating acute to post-acute hospital transfers, unifying rehabilitation goals and discharge criteria under a multidisciplinary approach. The primary outcomes tracked were length of stay (LOS) in both acute and post-acute hospitals, mortality within 90 days, readmission rate within 30 days after transferring to post-acute care. Secondary outcome tracked was functional outcome using Modified Barthel Index (MBI). Statistical analysis was performed using STATA v.13.1 (StataCorp, College Station, Texas, USA).

Results: There was a statistically significant association between reduced LOS (30 days in control group vs 25 days in HFBCP group) in post-acute care setting after implementation of bundled payment (p-value < 0.001;). Despite earlier discharge from hospital care, there were no differences in adverse outcomes such as 90-day mortality and 30-day readmission rates between the control group and HFBCP group. The functional outcomes (MBI) were also similar in both groups.

Conclusion: The hip fracture program in our hospital has evolved into the HFBCP after bundled payment scheme commenced. It is effective in providing a similar quality of care and achieving similar functional outcomes within a shorter hospitalization period in geriatric hip fracture patients. This mode of care may be the model of care for many other resource demanding conditions especially in the ageing population

OP 5-2

The impact of clinical audit for hip fractures in Ireland

*Brent L. [*1], Ahern E. [2], Hurson C. [3]*

[1]Royal College of Surgeons in Ireland, Dublin, [2]St. Lukes Hospital, Kilkenny, Kilkenny, [3]St. Vincent's University Hospital, Dublin, Ireland

Introduction: The Irish Hip Fracture Database was established in 2012 as a collaborative venture backed by the Irish Gerontological Society and Irish Institute of Trauma and Orthopaedics. The National Office of Clinical Audit provides governance and operational support for the audit. To date five national reports have been published and over 14,000 cases recorded. In 2018, the Best Practice Tariff (BPT) was introduced for hip fractures the first such payment in the Irish Health System.

Methods: The data is entered through the Hospital In-Patient Enquiry (HIPE) System in the 16 eligible

hospitals in the Republic of Ireland. Care is benchmarked against the Irish Hip Fracture Standards. NOCA provides quarterly reports to the hospitals and hospital groups. An annual report is published showing hospital level comparison. Each hospital reviews their local data at the hip fracture governance committee meeting.

Results: Over the past five reports significant system change has been realised with the commencement of a national hip fracture bypass policy meaning patients with suspected hip fractures are brought direct to the operating hospital an improvement from 76 %in 2013-92 % 2017. Orthogeriatrics services did not exist in Ireland at the start of the IHFD and now over 80 % of hospitals have a service in place.

Conclusion: Clinical audit for hip fracture in Ireland has demonstrated many improvements. The recent introduction of a BPT for hip fracture shows that robust clinical audit can serve the Health System in many ways. Over the first year of the BPT there has been significant improvements in the number of patients meeting all standards of care, more hospitals entering timely data and more local governance structures in place to use the data for quality improvement

OP 5-3

Australian and New Zealand hip fracture registry: the first five years

*Armstrong E. *[1], Close J. [1], Harris I. [2]*

[1]FBIRC, NeuRA, [2]Medicine, UNSW Sydney, Sydney, Australia

Introduction: Hip fracture is the most serious and costly fall-related injury suffered by older people. More than 22,000 Australians and 4,000 New Zealanders break their hip every year, incurring hospital costs of AU$579 million and NZ$105 million, respectively. Variable care and high morbidity and mortality requires system-wide initiatives to address high levels of public resourcing of these patients in both the acute and post-acute periods of care.

Methods: The ANZHFR was established in 2013 as a bi-national audit of hip fracture care and secondary fracture prevention in Australia and New Zealand. It collects data and provides feedback of hospital performance against bi-national guidelines and standards of hip fracture care. The Registry's objective is to improve the delivery of care across both countries, and ultimately, to maximise outcomes for older people who fracture their hip by: reducing mortality and morbidity after hip fracture; reducing rates of institutionalisation as a consequence of injury; maximising functional independence; and monitoring secondary prevention interventions to reduce further fractures. The ANZHFR has two components: data collection of 'facility-level' services and elements of hip fracture care; and data collection at the level of the patient ('patient-level'), an audit of all people aged 50 years and over admitted to a participating hospital with a minimal trauma fracture of the femur.

Results: Some areas of service configuration and clinical care have improved but there is still marked variability in a number of measures. The data indicates there is a need to improve rates of follow-up, especially in Australia. Over the three years of patient level reporting, improvement is apparent in the use of nerve blocks before surgery; assessment of cognition pre-operatively; increased use of cemented stems for hip arthroplasty; and more patients leaving hospital on medication for improved bone health and secondary fracture prevention. Two modifiable reasons accounted for 51 % of surgery delayed for more than 48 hours: the availability of an operating theatre and issues with anticoagulation. There is substantial variation seen between hospitals in the mean and median length of stay in the acute ward in both countries.

Conclusion: A Registry can provide evidence of the need for improvement in the quality of care, but neither the Registry itself nor the reporting of data initiates quality improvement. Stakeholders in the local context must identify areas of improvement based on the information provided by the Registry and put in place measures to improve clinical care for their patients where required. Findings from the analysis of collected data are used to feed-back to participating hospitals and clinicians to allow them to benchmark their practices, clinical outcomes and quality of care against the Hip Fracture Care Clinical Care Standard and other hospitals. This provides opportunity for improvement in care and outcomes for older people who have fractured their hip.

OP 5-4

Early hip fracture surgery reduces mortality by preventing complications

*Sobolev B. *[1], Guy P. [1]*

[1]UBC, Vancouver, Canada

Introduction: Timing of surgery is a modifiable factor for reducing mortality after hip fracture. Yet, underlying mechanisms are less understood. Whether postoperative complications mediate the mortality effect of timing of surgery has not been evaluated before. We assessed the magnitude of reduction in postoperative mortality that could be attributed to changes in postoperative complications expected after early surgery in older patients with hip fracture.

Methods: We identified medically stable patients undergoing surgery for first-time non-pathological hip fracture in all hospitals providing hip fracture surgery between January 1, 2004 and December 31, 2012 in Canada, except in Quebec. We analyzed hospital discharge data contrasting postoperative mortality that would be expected in the study population: 1) if all surgeries were after two inpatient days; and 2) if all surgeries were same-day or next-day, but the risk of complications was corresponding to delayed surgeries.

Results: Among 139,119 patients (74.3 % women, 45.8 % 85 years or older, 66.6 % underwent early surgery), there were 60.2 complications and 45.8 deaths per 1,000 surgeries. Early surgery led to 7.9 (95 % CI 5.5 to 10.3) fewer deaths per 1,000 surgeries. This figure decreased to 4.0 (95 % CI 1.6 to 6.3) per 1,000 surgeries when the complication risk was assumed to be independent of surgical timing.

Conclusion: Difference in complication rates explains at least half of the difference in mortality between early and delayed hip fracture surgery. Effective management of postoperative complications is required to sustain the benefits of early surgery.

OP 5-5

Major trauma no longer a young man's disease- data from the major trauma audit Ireland

*Brent L. *[1], Deasy C. [2]*

[1]National Office of Clinical Audit, Royal College of Surgeons in Ireland, Dublin, [2]Cork University Hospital, Cork, Ireland

Introduction: The face of major trauma has changed over the last two decades from being typically a young male condition usually caused by a high mechanism of injury eg. road traffic accidents to now being caused by low level falls in older people most commonly in their own homes. The Major Trauma Audit (MTA) was established in 2013 using the Trauma Audit Research Network (TARN) methodology and governed and operationally managed by the National Office of Clinical Audit (NOCA).

Methods: The data is collected through the TARN system and quarterly reports are provided by NOCA to the hospital groups. An annual report is published showing hospital level comparison. Each hospital reviews their local data at the major trauma governance committee meeting. Three national reports have been published detailing over 15,500 patient journeys following major trauma.

Results: In 2017 the MTA National Report showed that 44 % of major trauma occurred in people aged 65 years and older. Low level falls accounted for 57 % of all cases of major trauma and 50 % of accidents occurred in the patients own home. Older patients present with more comorbidities and due to the rather benign presentation of a low level fall are often not treated as promptly as they should. The report showed that older patients are less likely to be pre-alerted, received by a trauma team or senior clinician in the Emergency Department and are more likely to spend longer in hospital, die or require long term care as a result of major trauma.

Conclusion: In 2017 the MTA National Report showed that 44 % of major trauma occurred in people aged 65 years and older. Low level falls accounted for 57 % of all cases of major trauma and 50 % of accidents occurred in the patients own home. Older patients present with more comorbidities and due to the

rather benign presentation of a low level fall are often not treated as promptly as they should. The report showed that older patients are less likely to be pre-alerted, received by a trauma team or senior clinician in the Emergency Department and are more likely to spend longer in hospital, die or require long term care as a result of major trauma.

OP 5-6

10 pence per patient: improving the hip fracture consenting process using consent form stickers.

*Craig J. R. M. [*1], Julian H. [1], Crean J. [1], Rizzo V. [1], Wilson R. [1], Barr R. J. [1]*

[1]Trauma & orthopaedic department, Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Hip fracture surgery has a number of possible complications. Consent forms act as a record of details discussed with the patient pre-operatively. Previous audit data in a regional trauma centre identified issues with incomplete recording of potential complications on consent forms for hip fracture surgery in mentally competent patients. Pre-filled consent form stickers containing key information regarding common hip fracture operations were introduced to improve the consistent recording of important consent information. The objective was to assess the proportion of hip fracture consent forms with adequate information when pre-filled consent form stickers were used, as compared to hand-written forms.

Methods: The British Orthopaedic Association guidelines on consent for common hip fracture operations, and multidisciplinary input, were used as the basis for designing 2 pre-filled stickers (for dynamic hip screw/intramedullary nail and hemiarthroplasty/total hip replacement). These included 9 and 10 potential complications respectively. Training was provided on consenting hip fracture patients, and on the use of the stickers. 200mm x 60 mm stickers were purchased, initially online from a nationally available vendor, then from the hospital's standard stationery supplier, and printed on standard office printers. Stickers cost around £0.04 per patient, plus printing ink costs. Hip fracture cases were identified retrospectively from review of operating lists. A convenience sample of 27 handwritten consent forms and 20 forms using stickers were reviewed retrospectively for inclusion of required complications. Patients without capacity to consent were excluded. A pro forma and spreadsheet were used for collation of data on inclusion of each complication of the form.

Results: All forms were completed by junior doctors. Arthroplasty procedures represented 55% of hand-written forms and 48% of forms using stickers. No hand-written forms contained all the required details. 95% of consent forms using stickers listed all required complications. Among consent forms using the stickers, only one form (5%) had 2 complications intentionally deleted, implying their omission from the discussion at the time of consent form completion.

Among forms for arthroplasty procedures, infection was the only complication mentioned on all handwritten forms. Among forms for dynamic hip screw or nailing, neurovascular injury and bleeding were only complications mentioned on all handwritten forms.

Conclusion: Introduction of stickers for hip fracture consent forms improved the documentation of complications on consent forms for mentally competent patients. This is likely to be associated with greater information provision to patients during the consenting process.

OP 5-7

Do we follow our own evidence based treatment algorithms?

*Frölich C. [*1], Hansen T. B. [1], Stilling M. [2], Glassou E. N. [1]*

[1]Orthopedic department, University Clinic for Hand, Knee and Hip surgery, Holstebro, [2]Orthopedic department, Aarhus University Hospital, Aarhus, Denmark

Introduction: Much research into hip fractures has investigated best treatment practices, and most institutions have integrated an evidence-based treatment algorithm for hip fracture patients. However, practice often defies theory due to patient characteristics or departmental constraints. The aim was to investigate the degree of adherence to our treatment algorithm for hip fractures based on seven indicators.

Methods: Data were collected prospectively for all patients admitted to our institution with a hip fracture from January 1 2011 to December 31 2017. The following seven treatment indicators mirroring the different procedural steps and diverse care groups were investigated with a goal of 80% adherence to the treatment algorithm:

1) pre-operative regional block (epidural or peripheral nerve block)
2) surgical delay (within 24 or 36 hours from admission)
3) peri-operative antibiotics
4) osteosynthesis choice (based on fracture and age)
5) thromboprophylaxis (injections of heparin for at least seven days and the first injection 6-8 hours postoperative)
6) postoperative mobilization to standing within 24 hours
7) blood transfusions, when postoperatively hemoglobin was below 6 mmol/L.

Data was obtained from our database, and from patient records. Descriptive statistics as proportions with 95% confidence intervals were used. An all-or-non test was used to clarify the degree of adherence to the algorithm. Contraindications were defined beforehand for each indictor. The theoretical patient-group that could fulfill the indicator was established by removing patients that did not fulfill the indicator due to a contraindication. The degree of adherence was then calculated by an all-or-none test.

Results: Preliminary results for 500 consecutive patients showed preoperative pain-management was met in 42.8%(38.5-47.2%) of patients. For surgical delay the criteria was met in 82.2%(78.5-85.3%) for operation within 24 hours and 91.5%(88.7-93.6%) for 36 hours. The result for perioperative antibiotics was 95.9%(93.7-97.4%). Osteosynthesis choice was met in 87.9%(84.6-90.6%) of patients. Thromboprophylaxis was met in both aspects in 57.1%(52.5-61.5%) of patients, with injections having a high adherence of 90.8%(87.8-93.1%), and the time-constraint having a lower adherence of 59.7%(55.2-64%). Postoperative mobilization was met in 88.5%(85.3-91.1%) of patients. Blood transfusion was given in 79.3%(71.5-85.3%) of the patients with a hemoglobin below 6 mmol/L. The all-or-non test showed that 15.7%(12.8-19.3%) of patients fulfilled all seven indicators. Corrected the all-or-non test showed that 29.9%(25.3-35%) of patients (n=341) fulfilled the algorithm.

Conclusion: Our institution did not fulfill the goal of 80% treatment adhesion, but the study displayed how many factors that affect the main-stream treatment of hip fracture patients. This may also indicate a need to investigate which steps to prioritize as this is a heterogeneous group.

OP 5-8

Use of frailty indices in ankle fracture management for the older person

*Seymour H. [*1], David S. M. [2], Samuel M. [3], Houghton E. [4]*

[1]Geriatric Medicine, Fiona Stanley Hospital, Murdoch, [2]Geriatric Medicine, Joondalup Health Campus, Wembley Downs, [3]MSc, Bruce, Canberra, [4]Orthopaedic Surgery, Fiona Stanley Hospital, Murdoch, Australia

Introduction: Ankle fracture management in the older person is complicated.Patients often have multiple significant co morbidities that impact on healing and duration of hospitalisation.Their ability to live independently and participate in rehabilitation is also affected and places them at health risks associated with immobility and institutionalisation.Identification of frail patients is useful to guide appropriate surgical management as well as rehabilitation and discharge planning. Frailty indices have been shown to predict increased morbidity,mortality and length of stay in patients with hip fractures.Currently optimal ankle fracture management is dependent predominantly on surgical factors.

Methods: We aimed to identify outcomes of patients with increasing frailty that would assist management and pre-empt need for rehabilitation and adverse outcomes.

This is a retrospective single centre study.Data was reviewed on patients aged above 65yrs who presented with a primary diagnosis of closed ankle fracture as per the ICD code from 1/1/16 to 1/6/18. Age, sex and comorbidities as well as data on a patient's length of stay (acute & rehabilitation), management of ankle fractures, complications and discharge destination from hospital were analysed. Management of ankle fractures included conservative and surgical management. Surgical management was further stratified to open reduction internal fixation (ORIF) or insertion of hind foot nails (HFN). The age adjusted Charlson Comorbidity Index (CCI) score, the Canadian Study of Health and Ageing Clinical Frailty Scale (CFS) score and the American College of Anaesthetics physical status class (ASA) were calculated from available data. Statistical analysis was performed using STATA/IC 15.1.

Results: Of the 107 patients, 76 were women (71%) with mean age 74 years. 60.7% of patients had a Bimalleolar fracture and 72% underwent surgical fixation(n=78).The average CCI score was 4.4, average CFS was 3.8 and average ASA was 2.4.Surgical fixation was the preferred management for patients with a lower mean CCI (3.8), CFS (3.3) and ASA (2.27) scores.1 patient had a Hind Foot Nail (CFS = 7) and the remaining patients had an ORIF. Of those managed surgically,70 patients had CFS <5. A higher CFS score was associated with a longer average length of rehab stay and increased episodes of care. Older patients (mean age 76.7) were more likely to be managed non operatively as compared to younger patients. Older Patients with a higher CFS score were more likely to require residential care.

Conclusion: Frailty plays a role in predicting adverse outcomes associated with management of ankle fractures in older patients.Higher CFS scores identify patients requiring complex management.We have implemented the CFS on admission for older adults with ankle fractures.Patients with a CFS >3 are receive shared care with the geriatricians and orthopaedic surgeons.This will inform a local protocol which can be audited to assess changes in decision making and outcomes for these patients.

FREE PAPER SESSION 6

OP 6-1

Equity in rehabilitation interventions after hip fracture: a systematic review

*Sheehan K. [*1], Fitzgerald L. [2], Hatherley S. [2], Potter C. [3], Ayis S. [2], Martin F. [2], Gregson C. [4], Cameron I. [5], Beaupre L. [6], Wyatt D. [2], Milton-Cole R. [2], Di Giorgio S. [2], Sackley C. [2]*

[1]Population Health Sciences, [2]Kings College London, [3]Guy's & St Thomas' NHS Foundation Trust, London, [4]University of Bristol, Bristol, United Kingdom, [5]University of Sydney, Sydney, Australia, [6]University of Alberta, Alberta, Canada

Introduction: Equity in health refers to the prevention of unfair, avoidable differences in health arising from cultural exclusion, poor governance, or corruption. Enrollment in randomized controlled trials presents patients with the opportunity to consider additional access to care. However, some patients may not be offered this opportunity as trial access is determined by eligibility criteria. Of interest is whether such eligibility criteria systematically limits access for patient subgroups who may benefit from intervention and who face poor outcomes. Therefore, we sought to determine the extent to which equity factors contributed to eligibility criteria of trials of rehabilitation interventions after hip fracture. We define equity factors as those that stratify healthcare opportunities and outcomes.

Methods: Systematic search of MEDLINE, Embase, CINHAL, PEDro, Open Grey, BASE, and ClinicalTrials.gov for randomized controlled trials of rehabilitation interventions after hip fracture published between 1st January 2008 and 30th May 2018. Trials not published in English, secondary prevention or new models of service delivery (e.g. orthogeriatric care pathway) were excluded. Duplicate screening for eligibility, risk of bias (Cochrane Risk of Bias Tool), and data extraction (Cochrane's PROGRESS-Plus framework).

Results: 23 published, 8 protocol, 4 registered ongoing randomized controlled trials (4,449 participants) were identified. A total of 69 equity factors contributed to eligibility criteria of the 35 trials. For more than 50% of trials, potential participants were excluded based on residency in a nursing home, cognitive impairment, mobility/functional impairment, minimum age, and/or nonsurgical candidacy. Where reported, this equated to the exclusion of 2,383 out of 8,736 (27.3%) potential participants based on equity factors. Residency in a nursing home and cognitive impairment were the main drivers of these exclusions. 15 trials (42.9%) included justificaiton for at least one exclusion criterion. Justificaiton included limited potential to participate in the intervention, vulnerable nature of the subgroup, and capacity for consent.

Conclusion: The generalizability of trial results to the underlying population of frail older adults is limited. Yet this is the evidence base underpinning current service design. Future trials should include participants with cognitive impairment and those admitted from nursing homes. For those excluded, an evidence-informed reasoning for the exclusion should be explicitly stated.

OP 6-2

Hip fracture outcomes in the frail older person, predictors of mortality and nursing home admission

*Small C. S. [*1], Kneafsey S. [2], O'Hanlon S. [1], Cooney M. T. [3], Hurson C. [4], Doyle R. [1]*

[1]Orthogeriatric Department, St Vincent's University Hospital, [2]Department of Medicine, University College Dublin, [3]Medicine For The Elderly Department, [4]Department of Trauma and Orthopaedics, St Vincent's University Hospital, Dublin, Ireland

Introduction: Hip fractures in the older person are associated with significant morbidity and mortality. Screening patients for frailty and assessing baseline mobility and function may help predict those with poorer outcomes including nursing home admission and mortality rates at one year

Methods: In this observational study, we assessed clinical frailty score (CFS), Zuckermann functional recovery score (FRS) and new mobility score (NMS) on admission and at 1 year following hip fracture. All patients >/= 60 years old with a hip fracture admitted under the orthopaedic team between February 2016 and February 2018 were included. At one year patients were contacted via the orthogeriatric virtual follow-up clinic and a questionnaire was completed with the patient and/or carer where available. Outcomes assessed included functional ability, mortality rate and nursing home (NH) admission rates

Results: 541 patients were included; 533 underwent surgical intervention, 4 died preoperatively and 4 of the periprosthetic hip fracture cohort were treated conservatively. The majority of patients were female (n= 396,73.2%), median age of 81.2 years. 33 patients were lost to follow-up. Overall mortality was 24.7%(n=134) at one year. A sub-group analysis based on CFS revealed the following; In the severely frail cohort (CFS7-9) (n=72); 47.2% mortality rate at 1 year. 20.8% (n=15) came from home, 2 of those were discharged to NH. In the moderately frail cohort (CFS 5-6)(n= 184), mortality rate was 30.4% at 1 year. 77.2%(n=142) were admitted from home and 8%(n=15) of this cohort were discharged to NH. In the non-frail subgroup (CFS 1-4) (n=211), mortality rate was 11.8%(n= 25)at 1 year, 97.1% (n=205) were admitted from home and 7.5%(n=11) of the cohort admitted from home were living in a NH at 1 year. Regarding Functional Recovery Score (FRS); compared to those without frailty (FRS over 75), those with a FRS between 30 and 75 had a two fold increased risk of one year mortality [OR: 2.16 (95% CI: 1.24 to 3.78)]. This increased to a nearly six fold increased risk in those with severe frailty (FRS < 30); [OR 5.73 (95%CI: 3.16 -10.41)]. This effect was independent of age. In the overall group, mean NMS was 5.6 at baseline decreasing to 4.9 at 12 months. Of patients with a baseline NMS 7-9, 96.8%(n=175) continued to live at home at one year. A dementia diagnosis independent of age and frailty is associated with 2.5 fold increased risk of NH/mortality at 1 year. Comparing the discrimination of the different measures for predicting mortality or NH residence at 1 year, analysis of receiver operating characteristic curves revealed - 0.84 (CFS), 0.83 (NMS) 0.86 (FRS). The correlation between all three tools was highly statistically significant

Conclusion: A decline in mean one-year clinical frailty score, functional recovery score and new mobility score was seen in this group. All three tools

(FRS, CFS and NMS) can accurately predict mortality and NH admission at 1 year

OP 6-3

Risk factors for new and persistent chronic opioid use after hip fracture surgery: a danish nationwide cohort study from 2005 to 2016

Edwards N. M. [*1], *Varnum C.* [2], *Overgaard S.* [3], *Nikolajsen L.* [4], *Pedersen A. B.* [5]

[1]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, [2]Department of Orthopaedic Surgery, Vejle Hospital, Vejle, [3]Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense, [4]Department of Anesthesiology and Intensive Care, [5]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark

Introduction: Opioids are commonly prescribed for acute pain treatment in hip fracture (HF) patients. We would expect that after a successful intervention, the use of opioid would no longer be necessary. However, this is far from the truth, and the relationship between pain and abuse or prolonged use is complex.

About 80 % of patients taking opioids will experience an adverse effect and some patients might develop a chronic use of opioids after surgery. Further, initially prescribe opioids for treatment of acute post-surgery pain might result in chronic opioid use. In a Danish study on 69,456 hip fracture patients, about 17 % of opioid non-users before hip fracture were still opioid users one year after. We aimed to examine risk factors for new and persistent chronic opioid use after HF surgery.

Methods: Using Danish nationwide health registries, we identified all HF surgery patients ≥65 years of age (n=69,456). Among non-users before surgery, we defined new chronic opioid use as at least two dispensing within 1 year after surgery. Persistent chronic opioid use was defined as at least one dispensing of opioids 6 months before and two dispensing within 1 year after surgery. We calculated adjusted odds ratios (aOR) with 95 % confidence intervals to explore following risk factors: age, sex, surgical indications, preoperative medications, and comorbidities defined through Charlson Comorbidity Index (CCI low, medium and high) and a number of individual comorbidities.

Results: A total of 9 % patients were new users, whereas 13 % were persistent users. The aORs for being a new user were 1.39 (1.28-1.50) and 1.23 (1.15-1.32) for age groups 65-74 and 75-84 years, (ref=85+) 1.09 (1.02-1.16) for female (ref=male), 1.02 (0.96-1.09) and 0.93 (0.86-1.02) for medium and high CCI (ref=low, no known comorbidity), 1.20 (1.12-1.29) and 1.53 (1.38-1.70) for overweight and obese patients (ref = normal body mass index), and 1.26 (1.15-1.37) for preoperative use of NSAID. The aORs for being a persistent user were 1.45 (1.35-1.55) and 1.25 (1.18-1.33) for age groups 65-74 and 75-84 years, 1.83 (1.72-1.95) for female, 1.59 (1.50-1.69) and 2.07 (1.93-2.22) for medium and high CCI, 1.19 (1.10-1.1.29) and 1.35 (1.23-1.48) for underweight and obese patients, and 1.75 (1.63-1.88) for preoperative use of NSAID. There was no association between other potential risk factors and chronic opioid use.

Conclusion: We identified several risk factors associated with new and persistent chronic opioid use, including high age, female sex, comorbidity and preoperative NSAID use. This is clinically relevant in order to identify and develop more effective and targeted preventive intervention strategies to reduce opioid use and thereby the associated adverse events among elderly patients.

OP 6-4

Why can't I stand? A local 'hip sprint' quality improvement project of failure to mobilise on day 1 post hip fracture surgery

van Berkel D. [*1], *Campbell V.* [2], *Mulvaney E.* [3], *Sahota O.* [1], *Ong T.* [1]

[1]Health Care of Older People, [2]Therapy Services, Trauma and Orthopaedics, [3]Trauma and Orthopaedics, Queens Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: Early mobilisation after hip fracture surgery is required to facilitate recovery. The national 'Hip Sprint' Audit 2017 identified potentially modifiable barriers to this. Our objective was to identify existing factors preventing patients from mobilising the day after hip fracture surgery, in order to devise strategies to address them.

Methods: Data collected prospectively on demographics, surgical care, physiotherapy contact and reasons preventing mobilisation, for all patients that underwent hip fracture surgery at Queens Medical Centre, Nottingham in January and February 2019. Relevant supplementary information obtained retrospectively from hospital-held medical records.

Results: Data from 64 patients with a mean age of 82.3 years was analysed. Most were female (77 %), still living at home (77 %), used a walking aid (66 %) and presented with an AMT ≥7 (69 %). Day 1 post-operatively, 98 % (63/64 patients) were seen by a physiotherapist and 61% of all patients were successfully mobilised. Of those not mobilised, 36 % were prevented by symptomatic orthostatic hypotension, 12 % by hypotension pre-mobilisation, 20 % by difficulties with consent or engagement (e.g. delirium) and 20 % by inadequate pain control. In addition, 15 % that were successfully mobilised reported symptoms of orthostatic hypotension. Patients symptomatic of hypotension received on average 600ml less intravenous fluid in the 48-hour perioperative period (p=0.03). Patients that received less than 1L intravenous fluid in the immediate post-operative period had a greater than 2-fold increase risk of symptomatic hypotension (RR 2.6, p<0.01). A Day 1 post-operative haemoglobin (Hb) level <90g/L had a tendency to increase the risk of hypotension preventing early mobilisation by 2-fold (p=0.06). 67 % of patients with Day 1 haemoglobin <90g/L received a subsequent blood transfusion, compared to 2 % with haemoglobin ≥90g/L (p<0.01). 49.2 % of patients were admitted on antihypertensive medications, which were held perioperatively with great variation. Patients with an admission AMT <7 had a greater than 11-fold increased risk of not engaging for early mobilisation (p= 0.02).

Conclusion: The most common reason for failure of early mobilisation after hip fracture surgery was post-operative hypotension. There is significant variability in the management of factors that may influence this, related to inconsistencies in perioperative care. Therefore, successful early mobilisation could be better achieved through better inter-departmental communication and structured perioperative planning. This would include identification of need for post-operative intravenous fluid administration and early blood transfusion in at risk patients. Further improvements could be made for patients with an AMT <7. If identified early, implementation of appropriate strategies could increase the success of this high-risk group achieving early mobilisation.

OP 6-5

Restricted-weight bearing and hip fracture

Tarrant S. M. [*1], *Du Plessis J.* [2], *Balogh Z.* [1,2]

[1]Department of Trauma, John Hunter Hospital, [2]Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia

Introduction: Full weight bearing (FWB) is advocated in many government and institutional guidelines. Surgical repair is occasionally associated with restricted weight bearing status. A paucity of evidence exists on restricted weight bearing (RWB) post-operatively. This study examines outcomes of patients who are not full weight bearing.

Methods: Patients were recruited from the Australia New Zealand Hip Fracture Registry (ANZHFR) at a Level 1 Tertiary referral major trauma centre. Demographics and peri-operative data was taken from the registry. Outcomes were death, length of stay and revision surgery. X-rays of the patients with weight bearing restrictions were examined and classified by the AO system. All weight bearing statuses as recorded in the ANZHFR were cross checked with the operative orders and throughout the course of admission and discharge to see whether the status was changed.

Results: The ANZHFR database identified a total of 1,515 patients between February 2015 and December 2018. The FWB proportion of our institution was lower than other centres. 'Restricted/Non-weight bearing' (RWB/NWB) was identified in 65 registry patients (4.2 %) patients. Eighteen (1.2 %) had the weight bearing status changed to full weight bearing post-operatively at a median of 3 days (Q1,3: 2-7). This was not identified by the registry. The fracture pattern most associated with weight bearing restrictions was the valgus impacted subcapital femoral neck fracture (AO 31B1.1; n=22 (38 %)) with

unstable reverse oblique intertrochanteric fracture the second highest (AO 31A3.3; n=11 (19 %)).
Three groups were compared: i) 'full weight bear' (FWB; or weight bear as tolerated (WBAT)), ii) 'restricted weight bear' (RWB; including all weight bearing categories other than WBAT and FWB) and iii) 'changed weight bearing' (those on restricted weight bearing who were altered to full weight bearing during admission). There was no difference between age (p=0.203), sex (p=0.159), residence (p=0.656), pre-morbid mobility (p=0.789) or cognitive state (p=0.340). A significant difference was noted in choice of operation between groups, with a lower proportion of cannulated screws and long femoral nails seen less in the (p<0.001). Outcomes of length of stay (p=0.880), discharge destination (p=0.552) and 30-day mortality (p=0.192). Re-operation rate at 120 days was higher in patients who had restricted weight bearing (n, %: 18 (1.2 %) v 3 (7.9 %) v 1 (5 %), p=0.001).
Conclusion: This study has shown how registry data can be a moment for examining practice. Whilst restricted weight bearing was not associated with increased length of stay or mortality, patients who had weight bear restrictions were more likely to need re-operation within 120 days. Small numbers however highlight the need for hip fracture registries to help reach conclusions regarding outcomes, and sub-analyse fracture patterns and intervention types.

OP 6-6

Inter-rater reliability and internal consistency of the new mobility score, the short falls efficacy scale international and the mini mental state examination when used in patients after hip fracture.

Overgaard J. A. [*1,2], *Kristensen M. T.* [2,3]

[1]*Department of Rehabilitation, Municipality of Lolland, Maribo,* [2]*Physical Medicine and Rehabilitation Research - Copenhagen (PMR-C),* [3]*Departments of Physical Therapy and Orthopedic Surgery, Amager - Hvidovre University Hospital, Copenhagen, Denmark*

Introduction: Clinicians involved in rehabilitation of patients with hip fracture are using different questionnaires to assess their patients, but knowledge of the psychometric properties is limited for many of these measurements. The objective of this study is to assess the relative and absolute reliability, and the internal consistency of three questionnaires; the New Mobility Score (NMS, 0-9 points) ("pre-fracture recall" and "present"), the Short Falls Efficacy Scale International (FES-I, 7-28 points) and the Mini Mental State Examination (MMSE, 0-30 points) when used in community-dwelling patients after hip fracture surgery.
Methods: Fifty community-dwelling patients (20 men) with hip fracture (mean (SD) age of 76.9 (8.0) years) who followed an outpatient physiotherapy programme, were assessed at a mean of 42.9 (11.2) days after hip fracture surgery. All patients were assessed independently by two physiotherapists (two days apart) with the NMS ("pre-fracture recall" & "present"), the FES-I and the MMSE questionnaires. The order of raters and tests were randomised and the raters were blinded to each other´s results, until the end of the study. Cronbach´s alpha was calculated to illustrate internal consistency, while the intraclass correlation coefficient ($ICC_{2,1}$, 95 %CI), standard error of measurement (SEM) and minimal detectable change ($MDC_{95\%}$) was used to examine the relative and absolute inter-rater reliability.
Results: The Cronbach´s α of the NMS, "pre-fracture recall" and "present" was 0.99 and 0.95, respectively, while the ICC was 0.98 (0.97 – 0.99) and 0.91 (0.84 – 0.95). The SEM and the MDC95% were 0.14 and 0.39 points, respectively for the pre-fracture NMS. Corresponding data for the present NMS was 0.46 and 1.28 points, respectively. The FES-I had a Cronbach´s α of 0.77; ICC = 0.63 (0.42 – 0.77); SEM = 2.17 and $MDC_{95\%}$ = 6.02 points. The Cronbach´s α for the MMSE was 0.84; ICC = 0.7 (0.52 – 0.82); SEM = 1.6 and MDC95% = 4.43 points. A systematic between assessments difference was only found for the MMSE (P = 0.034).
Conclusion: Excellent inter-rater reliability was found for the "pre-fracture recall" and "present" NMS, while moderate reliability was found for the FES-I and MMSE. Estimates of measurement error established for these questionnaires provide the clinician with valuable information to evaluate the status and rehabilitation process of community-dwelling patients after hip fracture.

OP 6-7

Performance stability and interrater reliability of the 10-meter walking test and isometric knee-extension strength, and agreement of the verbal ranking scale when used in patients with hip fracture.

Overgaard J. A. [*1,2], *Kristensen M. T.* [2,3]

[1]*Department of Rehabilitation, Municipality of Lolland, Maribo,* [2]*Physical Medicine and Rehabilitation Research - Copenhagen (PMR-C),* [3]*Departments of Physical Therapy and Orthopedic Surgery, Amager - Hvidovre University Hospital, Copenhagen, Denmark*

Introduction: Gait speed, knee-extension strength and hip fracture-related pain is often monitored in clinical pratice and research of patients with hip fracture (HF). However, further knowledge of the psychometric properties of these measurements when used in community-dwelling patients with HF, is needed. The aims of this study were therefore 1) to examine the performance stability of the 10 meter walking test (10MWT) and the maximal isometric knee-extension strength of the fractured limb when using a belt-fixated handheld dynamometer (MI-KES), and 2) to examine the interrater reliability of the 10MWT, MI-KES and the Verbal Ranking Scale (VRS, 0-4 points) for pain when used in patients with HF that followed rehabilitation in a community health care center.
Methods: A consecutive sample of 50 patients with HF (20 men), mean (SD) age of 76.9 (8.0) years, were assessed at a mean of 42.9 (11.2) days after HF surgery. All patients performed the 10MWT five times, as fast as safely possible using a rollator, and with 20-second pauses between each trial. A second session was conducted on the same day, also supervised by a physiotherapist (in a randomised order) with 1-hour rest intervals between sessions. The same procedure was applied two days later for the assessment of the MI-KES under strong verbal encouragement, and with each of the five trials separated with 30-second pauses. Repeated measures ANOVA analysis with Bonferroni correction was used to elucidate performance stability, while the intraclass correlation coefficient ($ICC_{2,1}$:95 %CI), the standard error of measurement (SEM) and the minimal detectable change ($MDC_{95\%}$) was used to examine interrater reliability and measurement error. The agreement of pain scores reported during the fastest of the 10MWT trials was evaluated with linear weighted kappa (k_w:95 %CI) and percentage agreement.
Results: Patients improved their gait speed significantly (P<0.001) until the third trial during the 10MWT, and with the faster of the three trials reaching a mean (SD) of 10.9 (3.1) seconds. The ICC of the 10MWT, based on the fastest of the first three trials, was 0.89 (0.82–0.94) with no systematic between rater difference (P=0.46), while the SEM and the MDC95% were 0.09 and 0.26 m/s, respectively. We used the best of the five MI-KES assessments, reaching a mean (SD: range) of 154.55 (63.89: 48.4–325.0) Newtons and converted to Newton meter (Nm) in the reliability analysis. The ICC was 0.91 (0.85–0.95); SEM=7.13 Nm and MDC95%=19.77 Nm. The kw of the VRS was 0.68 (0.52–0.85) and the percentage agreement between raters was 82%.
Conclusion: We found excellent relative reliability and acceptable measurement error for the 10MWT and the MI-KES, when using the best of three and five trials, respectively. Further, that the VRS seems reliable when used for pain assessment during performance. We suggest that these findings should be used when interpreting performances of patients with HF.

OP 6-8

The effect of a novel multidisciplinary tele-rehabilitation intervention on older adults' function after hip fracture: a non-randomized controlled trial

Ariza-Vega P. [*1,2], *Ortiz-Piña M.* [3], *Femia P.* [4], *Castellote-Caballero Y.* [5], *Prieto-Moreno R.* [6], *Delgado-Fernández M.* [6], *Ashe M. C.* [7,8]

[1]Department of Physical Medicine and Rehabilitation, Virgen de las Nieves University Hospital, [2]Department of Physiotherapy, University of Granada, [3]Vista Nevada Nursing Home for older adults, [4]Department of Statistics and Operative Research, University of Granada, Granada, [5]Department of Physiotherapy, University of Jaen, Jaen, [6]Department of Physical Education and Sport, University of Granada, Granada, Spain, [7]Department of Family Practice, [8]Centre for Hip Health and Mobility, University of British Columbia , Vancouver, Canada

Introduction: There are clinical gaps for interventions to maximize recovery of function and mobility in older adults after hip fracture. In general, there are benefits of delivering care remotely (tele-rehabilitation) for older adults, such as eliminating transportation barriers and reaching people living in rural areas. However, there are very few studies using remote delivery for older adults following hospital discharge for hip fracture.

Objective: To compare a multidisciplinary tele-rehabilitation (intervention) with usual in-person home-based rehab (control) on patient-reported (Functional Independence Measure, FIM) and performance-based [Short Physical Performance Battery (SPPB); Timed Up and Go test (TUG)] function in older adults with a surgically-repaired hip fracture.

Methods: We conducted a non-inferiority, single-blinded non-randomized controlled trial at the University Hospital of Granada, Andalusia, Spain (January 2017 and July 2018). We included older adults 65 years+ admitted to hospital with hip fracture, a high pre-fracture functional level (FIM score >90), without severe cognitive impairment, and who returned to community-living after hospital discharge. Group allocation was based on participants and caregivers choice to use the on-line platform to access the tele-rehabilitation program. Trained assessors, blinded to group allocation, conducted assessments of FIM, SPPB and TUG, at hospital discharge (baseline), four and 12 weeks. We used multivariate analysis of variance (MANOVA) to compare groups.

Results: We recruited 73 older adults with hip fracture and 71participants completed the study (97% retention). The mean (SD) was 78.8 (6.1) years, including 53 women and 18 men. At baseline, between groups there were no significant differences in function, but participants in the control group were significantly older, obtained lower levels of education, and had higher surgical risk (but no difference between groups for surgical delay). At 12 weeks there were significant differences between groups for the FIM [mean (SD) 119.95 (8.24) vs. 111.25 (20.18)] (p=0.008), and TUG 14.61 (8.68) vs. 29.67 (30.90) s (p=0.002) favoring the intervention.

Conclusion: This study highlights the adoption of a novel tele-rehabilitation intervention for older adults after hip fracture. We note participants and their caregivers adopted and used the intervention. There were also significant differences favoring the intervention for some measures of function. This study provides novel information for who chooses remote delivery of care, and its potential for improving function after hip fracture.

ClinicalTrials.gov Identifier: NCT02968589NCT.

Top 6 Oral Presentation

Friday, 30 August 2019

FREE PAPER SESSION 8

TO 8-1

Improving the quality of hip fracture care – how do we sustain the effect of quality improvement projects?

Wakeman R. [*1], *Fagan E.* [1], *Hannaford J.* [1], *Inman D.* [1], *Johansen A.* [1]

[1]Falls and Fragility Fracture Audit Programme, Royal College of Physicians of London, London, United Kingdom

Introduction: Since 2007 the National Hip Fracture Database (NHFD) has demonstrated progressive improvement in compliance with quality standards across Engalnd, Wales and Northern Ireland. These are shown in our publically accessible charts and reports at www.nhfd.co.uk. Over this period we have sought to understand how improvement has been achieved, by commissioning a series of vignettes which have been published in our annual reports. The available accounts demonstrate the importance of evidence based medicine, supported by national initiatives including audit, in initiating change, but do not explain how such quality improvement is maintained. The objective of this study was to identify factors that individuals who had participated in successful quality improvement projects considered to be most important in sustaining that improvement.

Methods: The publically accessible NHFD run charts were reviewed to identify 30 units which had demonstrated a significant improvement in at least one aspect of hip fracture care, and in which this improvement had successfully been sustained for at least three years. The NHFD database was used to contact all 339 hospital personnel at these units to ask them which factors they believe to have led to sustained quality improvement. Survey participation was by anonymous ranking of nine possible factors. Non-responders were contacted with a second email.

Results: 48 responses were received, with overall ranking determined from the sum of all weighted rank counts. The highest ranking factor was *Stable clinical leadership*, followed by *Stable managerial leadership*, *Financial incentives*, *Regular feedback to relevant staff*, and *Stable data collection*. The factors viewed as least important were *Patient involvement in hip fracture QI*, *Knowing that the data is publically accessible* and *QI team or audit department support*.

Conclusion: While evidence based guidelines and standards may help to initiate change, it is clear that factors such as clinical and managerial leadership are perceived as important in maintaining quality improvements. Units should ensure that clinicians and managers are fully engaged in sustaining quality improvement and that succession planning takes this into account.

TO 8-2

Best practice standards for hip fracture care: time to reflect?

Ferris H. [*1], *Brent L.* [2], *Crowley P.* [3], *Martin J.* [1], *Coughlan T.* [4]

[1]National Quality Improvement Team, [2]National Office of Clinical Audit, [3]Director, National Quality Improvement Team, Health Service Executive, [4]Dept of Medical Gerontology, Trinity College Dublin, Dublin, Ireland

Introduction: The Irish Hip Fracture Database (IHFD) is a national clinical audit developed to improve fracture care and outcomes. Lack of linkage to other databases such as a national death register makes determining longer term outcomes more challenging. In-hospital mortality is one quality indicator that can be very accurately measured. We sought to determine in-hospital mortality in the IHFD cohort between 2013 and 2017 and to determine which factors most influenced this outcome with particular reference to the IHFD quality standards.

Methods: A secondary analysis of the 15,603 patient records in the IHFD between 2013 and 2017 was conducted. Descriptive and analytic statistics were produced.

Results: In-hopsital mortality was 4.5% for the five years. Univariate logistic regression revealed 11 statistically significant predictors of in-hospital mortality of which only 4 (age, gender, pre-fracture mobility, mobilised day of/after surgery) remained

significant after multivariate analysis. The most striking finding is that those patients not mobilised on the day of/after surgery are 46 % more likely to die in hospital (OR 1.46, p<0.000, 95 % CI 1.25-1.70).

Conclusion: Measuring care is challenging and often one standard cannot reflect all aspects. None of the best practice standards significantly influenced in-hospital mortality after multivariate analysis but may well affect longer term and other outcomes such as ability to return to home. Further analysis of longer term outocmes is underway. The ability to be mobilised on the day of or after surgery is probably a good composite measure of both patient and organisational factors in hip fracture care: frailty, timely surgery, adequate pain relief, prevention of delirium, admission to a ward with the philosophy, skills and resources to facilitate early mobility. This data supports the adoption of mobilisation day of or after surgery as a formal best practice standard to which all units must comply.

TO 8-3

When should we start keeping people 'nil by mouth' before hip fracture surgery?

*Sivagnanam T. [*1], Tiessen L. [1], Havelock W. [1], Roche C. [2], Keen L. [2], Lloyd G. [2], Hurford D. [3], Johansen A. [1, 3]*

[1]Trauma Unit, University Hospital of Wales, Cardiff, [2]Wales Ambulance Service NHS Trust (WAST), Swansea, [3]FFN Wales, Cardiff, United Kingdom

Introduction: Frail and older patients often struggle physically and psychologically with being refused food and drink while waiting for surgery. Hip fracture is the commonest reason for a frail or older person to need emergency anaesthesia and surgery. Recognition of the urgency of hip fracture surgery can lead to ambulance and emergency unit staff keeping patients 'nil by mouth', just in case they might go for surgery. We set out to define the likelihood of early surgery in these settings.

Methods: FFN Wales is developing standards for the peri-operative care of frail fracture patients. In 2017 we combined data on time between presentation with a hip fracture and the start of operation, for all patients presenting to the 13 trauma units in Wales. Policy on 'nil by mouth' varies between units, but we specifically set out to consider whether patients might get to theatre within 2 hours or 6 hours of first presentation.

Results: In total, 3,709 patients presented in 2017, but none went to theatre within 2 hours. Mean time to operation was 37.4 hours. The minimum time to operation varied from 2.0 to 6.2 hours in different units. Only one unit sent more than 2 % of cases to theatre within 6 hours, and this figure was less than 1 % in 6/13.

Conclusion: Modern anaesthetic policy varies; usually requiring that patients receive no food for 6 hours pre-op., but permitting them to receive clear fluids up to 2 hours pre-op. Indeed, the best UK hip fracture units actively encourage patients to receive a clear high calorie drink (such as apple juice) 2 hours before surgery. The main implication of our finding is that ambulance staff should feel comfortable offering clear fluids to people in their charge; safe in the knowledge that this will not delay their operation. This is leading to a change in WAST policies – in a direction that empowers their staff and benefits their patients, especially since they may face delays in when they do arrive at hospital. Emergency unit staff should also look to local hip fracture registry data, such as that of the National Hip Fracture Database (NHFD), to help them decide whether they might adopt less draconian approaches to 'nil by mouth' policy for people who have just presented.

TO 8-4

Using artificial intelligence technology to improve case finding for vertebral fractures in the fracture liaison service {fls} setting

*Connacher S. [*1], Eckert R. [1], Javaid M. K. [1, 2], Monsour R. [3]*

[1]Oxfordshire Fracture Prevention Service, [2]NDORMS, [3]Radiology Department, Oxford University Hospitals Foundation NHS Trust, Oxford, United Kingdom

Introduction: To evaluate the impact of semi-automatic artificial intelligence technology for identification of vertebral fractures in the Fracture Liaison Service setting.

Methods: We tested the implementation of a novel artificial intelligence technology embedded in tertiary hospital radiology system. All CT scans including thoracic or lumbar spine were automatically were analysed by the Zebra platfrom to identify those with a potential vertebral fracture. The results are outputted in a spreadsheet with a visualisation of the sagittal reconstruction to permit rapid verification by the FLS nurses (RE/SC), who have attended national and local training. Patients were classified as having definite vertebral fractures, non-fracture deformities or where the visualisation was not clear enough to decide. Patients with definite fractures were assessed for anti osteoporosis therapy. A consecutive series of 55 negative scans were checked for vertebral fractures.

Results: In 4 weeks, 4623 scans were sent to Zebra. Of these, 3318 {72 %} were classified as negative. Of the 1305 positive scans, 633 {49 %} has a suboptimal sagittal visualisation, leaving 683 scans of which 279 {41 %} were identified by the FLS nurses as definite fractures and 393(58 %} as negative. None of the Zebra negative scans sampled were found to have a vertebral fracture; if true for all negative scans, this gives an expected sensitivity of 100 % and specificity of 89 % excluding suboptimal scans. By age, 50 % of screen positive scans were confirmed as definite vertebral fractures in those aged of 75 years and older vs 32 % in those aged 50 to 74 years {p<0.01). Of the first 50 patients identified by Zebra AI technology, 57 % were seen by FLS, 25 % were referred to the GP, 6 % required a Metabolic Bone consultant referral and 12 % had died.

Conclusion: Using the Zebra AI system, 73 % of eligible CT scans did not require further clinical review, a significant saving in terms of FLS time. The positive predictive value of screen postive scans was higher those aged over 75 years vs. those aged 50-75 years, despite concerns that older patients would have more degenerative changes. Work is ongoing to improve the visualisation of the sagittal reconstruction and assess the impact of the pathway on anti osteoporosis treatment recommendations and healthcare savings.

TO 8-5

1-year risk of nursing home admission after hip fracture surgery

*Riisager Wahlsten L. [*1], Palm H. [2], Gislason G. H. [3]*

[1]Orthopedic department, Herlev University Hospital of Copenhagen, [2]Orthopedic department, Bispebjerg University Hospital of Copenhagen, [3]Cardio-vascular Research Unit 1, Department of Cardiology, Gentofte University Hospital og Copenhagen, Copenhagen, Denmark

Introduction: A hip-fracture is a life-changing event for many elderly. While doctors and researchers tend to be preoccupied with mortality- and complication rates, patients are often more concerned by other aspects e.g. loss of independence and ability to remain in their own home. In this nationwide cohort study, we aimed to determine i) crude age-stratified event rates of admission to nursing home within one year following hip fracture surgery and ii) assess risk factors associated with nursing home admission in 4 age groups.

Methods: In Denmark all citizens are provided with a unique and permanent social security number. Upon contact with any part of the public system e.g. healthcare, taxed income or retrieving medicine from a pharmacy the social security number and a suitable code is registered in the proper register. Retrieving data from several nationwide registries, linkage of numerous data on an individual level is feasible. We identified 85,623 patients between 60-100 years of age, residing at home who underwent surgery for their first hip fracture between year 2000 and 2015. We determined age-stratified incidence rates for nursing home admissions and we identified risk-factors associated with an increased risk of admission to nursing home within one year of hip fracture surgery, using a Cox-regression model.

Results: Crude incidence rates of nursing home admission within 1 year of the first hip fracture were 3.4 % among the 60-69 years old, 6.9 % for the 70-79 years old, 14.0 % in the group of patients between 80-89 and 20.0 % in the oldest group between 90-99 year. The main risk factors in the entire population was age and dementia. Living alone was associated with an increased risk in all age groups, but it was a stronger risk factor among the younger HR 12.56

[CI 7.87–20.05] decreasing with higher age group down to HR 2.38 [CI 1.90–2.96] among the oldest. The impact of physical predictors i.e. sex, cardiovascular disease, kidney disease, COPD, diabetes and cancer decreased with advancing age and became insignificant in the two elder age groups. Suffering a depression followed a similar pattern but remained a significant risk factor in for all ages. A personal income in the upper third decreased risk of nursing home admission in the youngest age group.

Conclusion: In a cohort of 85,623 patients suffering their first hip fracture, advancing age, living alone and mental impairment were strong risk factors of nursing home admission. Physical disease and personal income were predictors among the youngest patients, but lost impact with advancing age.

TO 8-6

Cost-effectiveness of a provincial fracture liaison service in Ontario, Canada

*Saunders H. [1], Sujic R. [*1], Jinah A. [1], Bogoch E. [1,2], Jain R. [3], Elliot-Gibson V. [1], Mendlowitz A. [2], Linton D. [1], Inrig T. [1], Isaranuwatchai W. [1], Sale J. [1]*

[1]St. Michael's Hospital, [2]University of Toronto, [3]Osteoporosis Canada, Toronto, Canada

Introduction: A fracture liaison service was implemented in Ontario in 2007 in order to prevent recurrent fractures and improve post-fracture care. Since 2011, this FLS has been scaled up allowing screening coordinators to order bone mineral density testing and referring high-risk patients to specialists. The objective of this analysis was to determine the cost-effectiveness of this more intensive FLS as compared to usual care (no program) from the perspective of third-party health care payer (the Ontario Ministry of Health and Long-Term Care (MOHLTC)), over the lifetime of the patient.

Methods: A model consisting of a decision tree and Markov model with annual cycles was developed to estimate the cost-effectiveness of the FLS. The model simulated a cohort of patients starting at 71 years of age who had sustained a fragility fracture (i.e., hip, distal radius, or proximal humerus) and were not taking osteoporosis medications. Healthcare costs incurred to the MOHLTC (such as program costs, pharmacotherapy, bone mineral density testing, and fracture care) were included. Recurrent hip, spine, proximal humerus, and distal radius fractures were captured in the model. Utility values for each of the health states were obtained from published literature and used to calculate quality-adjusted life years (QALYs). Both costs and outcomes were discounted by 1.5%. Uncertainty in the findings was characterized using both one-way and probabilistic sensitivity analyses.

Results: The probabilistic sensitivity analysis was run with 10,000 simulations and revealed that the program was consistently more effective than usual care over the lifetime horizon. The results indicated that there was uncertainty around the incremental cost comparing the FLS to usual care with 38% of the 10,000 simulated ICERs showing cost-savings and the remaining 62% showing an increased cost of the program compared to usual care.

Conclusion: The Ontario FLS could be considered a cost-effective intervention for preventing recurrent fragility fractures including hip, spine, proximal humerus, and distal radius fractures, over the lifetime of the patient from the perspective of a third-party payer.

Poster Presentation

Fracture management

PE 1-1

Timing of surgery for internal fixation of intracapsular hip fractures; a clinical study of 2,181 patients

*Parker M. [*1]*

[1]Orthopaedics, Peterborough City Hospital, Peterborough, United Kingdom

Introduction: An intra capsular fractures may cause disruption to the tenious blood supply to the femoral head. Controversy exists on the timing of surgery of internal fixation for an intracapsular hip fracture. Potentially, delaying surgery may increase the risk of the fracture healing complications of non-union or avascular necrosis due to the comprised vascular blood supply to the femoral head. Previous studies on this topic have produced conflicting results with some favouring surgery within six hours, others 24-48 hours and others suggesting surgery shoudl be within one week of injury.

Methods: From an ongoing hip fracture database at a single centre the outcome for 2,181 patients with an intracapsular fracture treated by internal fixation were reviewed. The mean age of patients was 76 years, 31% were male. 54% of fractures were displaced. Mean follow-up for surviving patients was 564 days.

Results: Non-union occurred in 6% of undisplaced fractures and 24% of displaced fractures. For avascular necrosis the incidence was 4% and 8% respectively. No clear difference or trend was seen for either non-union or avascular necrosis rates related to the timing of surgery. These findings were similar for both displaced and undisplaced fractures.

Conclusion: In conclusion this is one of the largest studies to date on this topic and data was split to look for the different type periods that have been previously studied. No clear relationship could be demonstrated between delay from injury to fixation for either displaced or undisplaced fractures.

PE 1-2

A radiographic classification system for intracapsular hip fractures that reflects fracture displacement: a clinical study of 2235 patients

*Spacey K. [*1], Parker M. [2]*

[1]Trauma and Orthopaedics, [2]Peterborough CIty Hospital, Peterborough, United Kingdom

Introduction: Intracapsular hip fractures may present on a spectrum from clinical suspicion of an undisplaced fracture on radiograph, to off-ended with no overlap between fracture fragments.Existing classification systems attempt to describe this, but rely purely on the anteroposterior (AP) radiograph, such as AO, Garden, and Pauwels classfications. In this study we propose a classification system that details the progressive displacement of an intracapsular fracture into six grades based on the fracture characteristics on the AP and lateral radiographs. The aim was to determine if this classification system was predictive of the occurrence of fracture non-union or avascular necrosis.

Methods: Data was collected from 2,235 intracapsular hip fractures undergoing internal fixation between May 1989 and April 2018 at Peterborough Hospital, and retrospectively analysed. Those without adequate minimum follow up were excluded. Those with compounding risk factors for non union, such as; pathological fracture or deep post operative infection, were excluded.
The reproducibility of the new classification system was assessed by a further study.

Results: Fracture non-union was observed for 334 (15.1%) patients and avascular necrosis for 135 (6.1%) patients. The risk of fracture non-union increased for greater degrees of fracture displacement 4.0% to 36.7%, ($p<0.0001$). For avascular necrosis the risk increase from 3.6% to 9.0% ($P<0.0001$). The classification system was found to have good interobserver and intraobserver reproducibility.

Conclusion: This classification system was found to be highly predictive of fracture healing complications following internal fixation of an intracapsular fracture.

PE 1-3

To preserve joint capsule in bipolar hemiarthroplasty via posterior approach is effective technique to restore walking ability in the early postoperative period.

*Aoki Y. [*1], Nakagawa A. [1]*

[1]Orthopedic, Holy Spirit Hospital, Nagoya, Japan

Introduction: The conjoined tendons preserving technique for bipolar hemiarthroplasty (BHA) via posterior approach has recently evoked considerable interest. For prevention of joint dislocation, conservation of both the conjoined tendons and joint capsule is important. We usually employ the conjoined tendon and joint capsule preserving technique (CJPT) for treatment of dislocated femoral neck fractures. The CJPT helps maintain the conjoined tendons and enthesis of the ischiofemoral ligament with the joint capsule from the femoral neck. Although, we are able to conserve the joint capsule in all cases, some patients experience rupture of inferior gemellus muscle. In this retrospective study, we sought to clarify the operative steps associated with injury to inferior gemellus muscle. In addition, we analyzed the influence of preservation rate of inferior gemellus muscle on the walking ability in the early postoperative period.

Methods: Patients who had undergone BHA by CJPT between October 2018 and March 2019 were included. We measured the width of the middle of inferior gemellus muscle belly at four intraoperative time-points: at the time of identification of the conjoined tendons; at the time of dislocation of the femoral head; at the end of rasping of the medurally cavity; and at the completion of the reposition. Walking ability of patients was assessed at postoperative 14 days.

Results: Fifty-one patients (mean age: 83 years [range, 66-97]) were included. The average surgery time was 73.3 minutes (49-110). The joint capsule covered the entire bipolar outer head without repair. Before the completion of the procedure, we were able to perform hip joint flexion to >100 degrees with internal rotation without causing dislocation. The integrity of the inferior gemellus muscle was perfectly maintained in 7 (14 %) patients while 15 (29 %) patients experienced complete rupture. The preservation rates at various intraoperative time-points were: dislocation of the femoral head, 73.6 %; at the end of rasping the medurally cavity, 65 %; and reposition of the outer head, 42.1 %. These findings suggest that reposition of the outer head caused the most damage. At postoperative 14 days, the walking ability of 26 (51 %) was the same as that before fracture; however, inferior gemellus muscle of 9 of these patients was fully detached.

Conclusion: Preservation of the joint capsule contributes to the stability of the bipolar cup. This was illustrated by good recovery of walking ability in the early postoperative period irrespective of the preservation of inferior gemellus muscle. CJPT is a minimally invasive procedure for the joint capsule that facilitates early restoration of walking ability.

PE 1-4

Patients with hip fracture on direct oral anticoagulation(doac): post-operative complications.

*Pereira A. [*1], Coelho A. M. [1], Cardoso A. [1], Amaro P. [1], Marques L. [2], Rego P. [1]*

[1]Orthopaedic Surgery, [2]Internal Medicine, Hospital Beatriz Ângelo, Loures, Portugal

Introduction: What is the frequency of post-operative complications in geriatric patients with hip fracture who are on direct oral anticoagulation medication (DOACS)?

Methods: Observational retrospective cohort study of patients older than 65 years with a hip fracture on DOACs that presented to our Hospital in 2017. Inclusion criteria: Patients over 65 years with a hip fracture that were on DOACs at the time of admission. Data collected included: Age, gender, length of stay (LOS), type of DOACs, type of fracture, methods of fixation, time to surgery (TTS) ASA score, type of anesthesia, pre and post-operative hemoglobin, blood loss, transfusion rate and medical and surgical complications. A total of 31 patients met the inclusion criteria. Descriptive statistics was used to summarize the data.

Results: 313 patients presented to our fracture unit in 2017, 33 (10,54 %) were on DOACs. Two (6,06 %) died before surgery due to complications associated with existing medical conditions and were not included in the study. A total of 31 patients met criteria for inclusion. Average age on admission was 85 years (SD 4,99). Twenty five (80,65 %) were female. Average length of stay was 12 days (SD 6,98). DOACs; 13 medicated with Apixaban (41,94 %), 10 Dabigatran (32,26 %), 8 patients Rivaroxaban (25,81). The most frequent reason for DOAC prescription was atrial fibrillation (87,10 %).

Seventeen patients (54,48 %) had extracapsular fractures. Sixteen (51,61 %) underwent intramedullary nailing. The mean time to surgery was 78,8 hours (SD 42,8 hours). Four patients (12,90 %) had surgery within 48 hours. Twenty five patients (80,65 %) were graded ASA 3 and the same amount received spinal anesthesia. Average intraoperative blood loss was 192 cm^3 (SD 110cm^3). Nine patients (29,03 %) required post-operative blood transfusions (red blood cells).

Nineteen (61,29 %) patients had one or more post-operative complications.

Medical complications; Seven patients (22,58 %) with delirium, Six (19,35 %)acute renal failure. Five (16,13 %) cardiac complications (3 with decompensated heart failure and 2 with uncontrolled atrial fibrillation). Five Urinary tract infections (16,13 %) and three patients had pneumonia (9,68 %). Three patients (9,68 %) had surgical related complications (1 hematoma (3,23 %) and 2 patients (6,45 %) had wound bleeding). Five (16,13 %) patients had pressure ulcers. None needed a reoperation and no mortality due to post-operative complications was found.

Conclusion: Geriatric patients medicated with DOACs are challenging to manage. In our study, Apixaban was the most frequently prescribed DOAC (41,94 %). There was an important delay to surgery and 12,09 % of patients had surgery before 48 hrs. Blood transfusion rates were high (29,03 %) and complications were frequent (61,29 %), delirium was the most frequent complication(22,58 %). Surgical complications (9,68 %) did not prompt reoperation and there was no postoperative mortality.

PE 1-5

Short (185mm long) versus standard (220mm long) intramedullary nail for the treatment of trochanteric hip fractures. A randomised trial.

*Parker M. [*1]*

[1]Orthopaedics, Peterborough City Hospital, Peterborough, United Kingdom

Introduction: Uncertainty exists about the optimum length of intramedullary nail for the internal fixation of a trochanteric hip fracture. To resolve this issue we undertook a randomised trial to compare two different lengths of intramedullary nail.

Methods: 228 patients with a trochanteric hip fracture were randomised between either a 185mm Targon PFT (proximal femur telescrew) intramedullary nail and a 220mm Targon PFT nail. All patients were followed up to a minimum of one year from surgery. Functional assessments were by a blinded observer.

Results: The mean age of patients was 82 years (range 32-102 years). 29 % were male and 82 % came from their own home with the remainder form nursing or residential homes. The surgical time was a mean of five minutes less for the shorter nail (30 versus 35 minutes, $p<0.0001$) and operative blood loss was a mean of 51mls less (127mls versus 179mls, $p<0.0001$). There was no difference in blood transfusion requirements between groups (20 % versus 19 %). There was no significant difference between groups for wound infections, mortality, mean length of hospital stay or general medical complications or functional outcomes was seen between groups. Cut out occurred in two cases in the 185mm group versus three in the 220mm length group. Additional surgery was required for four patients in the 185mm group versus two in the 220mm group. Conclusion: This study suggests that a shorter intramedullary nail is an effective treatment option and leads to a shorter surgical time in comparison to the 'standard' 220mm nail.

PE 1-6

Nail or screw for trochanteric hip fractures; a sub group analysis of a randomised trial of 1000 patients

Parker M. [*1]

[1]Orthopaedics, Peterborough City Hospital, Peterborough, United Kingdom

Introduction: Continued debate exists about the optimum type of surgical treatment for trochanteric hip fractures. The traditional 'gold' standard has been the sliding hip screw (SHS). Intramedullary nails are an alternative option for which the design of these implants has been progressively improving. Differences in outcomes between these two implants are small and therefore the optimum treatment can only be determined by large randomised controlled trials.

Methods: We randomised 1000 patients with an trochanteric hip fracture to fixation with either an intramedullary nail (Targon® PF or PFT) or a SHS. Surviving patients were followed up for a minimum of one year by a nurse blinded to the treatment method. Primary outcome was regain of mobility. Outcome of the two groups were presented related to six variables age (<80; ≥80 years), sex, residence (admitted from own home; institutional care), mobility level prior to the fracture, mental status (AMTS<7 [cognitively impaired]; ≥7) and health status (ASA <3; ≥3).

Results: Patients admitted from their own, those that had no mental impairment, those aged less than 80 years and those with better mobility prior to the injury had superior regain of function if treated with an intramedullary nail compared to a SHS. Conversely those patients admitted from residential care, aged over 80 years, mentally impaired or with poor pre fracture mobility were less likely to show improved outcomes with the intramedullary nail. No difference between patents was seen for any other outcomes, these included mortality, residual pain and fracture healing complications.

Conclusion: Intramedullary nails may lead to better regain of function compared to the SHS for those patients who have reasonable function prior to the fracture.

PE 1-7

Predictive factors of 1-year mortality after a hip fracture. A literature review.

Condorhuamán Alvarado P. Y. [*1], *Menéndez-Colino R.* [1, 2], *Gutiérrez Misis A.* [2, 3], *González-Montalvo J. I.* [1, 2]

[1]Geriatrics, Hospital Universitario La Paz, [2]Instituto de Investigación Biomédica del Hospital Universitario La Paz (IdiPAZ), [3]Medicine, Universidad Autónoma de Madrid, Madrid, Spain

Introduction: Fragility hip fracture is a frequent event in elderly people associated with high mortality. For reasons not yet fully understood, 1-year mortality after a hip fracture varies between 12.1% and 35%, which signifies an excess of mortality of 8% to 18% per year compared to the population of the same age without hip fracture. This study aimed to review the factors most frequently described to predict 1-year mortality after a hip fracture.

Methods: Studies published in Pubmed were reviewed by dividing them into systematic reviews and meta-analysis, studies performed in orthogeriatric co-managed units, studies performed in orthopaedic services and studies that used prognostic risk scores.

Results: Seven systematic reviews and meta-analysis including 741,247 patients, 11 co-managed studies including 5,829 patients, 5 studies that used risk scores including 12,820 patients and 34 studies performed in orthopaedic services including 452,842 patients were included. The most frequently described factors associated with one year mortality were age and male sex (34 studies); prior functional status, such as impaired mobility and dependence for basic or instrumental activities of daily living (16 studies); mental problems, such as the presence of cognitive impairment or dementia (16 studies); clinical factors, such as the number of comorbidities (14 studies); malnutrition (14 studies); health-care related factors, such as delayed surgery (14 studies); high American Society of Anesthesiologists Classification -ASA- (13 studies); the presence of postoperative complications (7 studies) and social factors, such as living in nursing home (12 studies).

Conclusion: Many studies including big samples of patients have been published about this topic. Described factors are from very different nature; there are demographic, functional, cognitive, clinical, severity of illness and social factors. Unfortunately, only a few of them are modifiable factors.

PE 1-8

Periprosthetic fractures treated in a regional trauma centre: demographics and treatment.

Craig J. R. M. [*1], *McDonald S.* [1], *Diamond O.* [1]

[1]Trauma & orthopaedic department, Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Periprosthetic fractures are increasingly common. These patients are often frail and most require major surgery. The objective of this study was to review the demographics and treatment of periprosthetic fracture in a regional trauma unit.

Methods: A Fracture Outcomes Research Database search identified all inpatients treated for periprosthetic fractures in Northern Ireland's regional trauma centre from 2000 to 2018. Pathological fractures and non-operatively managed single trochanteric fractures were excluded.

Results: 528 procedures in 466 patients were identified. 45 patients (9.6%) had more than 1 procedure. 4 patients sustained a contralateral periprosthetic femoral fracture. There annual number of cases increased dramatically,2 cases in 2001 to 48 in 2018 (mean 25 injuries per year).

The mean age was 81 years (range 59 to 101 years). 73% of cases were in patients aged between 70 and 89 years. 59% of cases were in women. 75% of cases were in patients with an ASA (American Society of Anaesthesiologists) grade of 3 or more. 82% were low energy injuries, and a further 7% were spontaneous. 14% of patients lived in nursing, residential or sheltered accommodation pre-injury.

18.6% involved the proximal femur (of which 45% had internal fixation +/- cabling). 73.7% involved the femoral shaft (of which 61% had internal fixation +/- cabling). 7.7% involved the distal femur (of which 64% were treated with internal fixation +/- cabling, or dynamic plating devices). Only a quarter of patients received definitive surgery within 48 hours of admission.

Conclusion: Periprosthetic fracture management can be challenging. These injuries are usually low-energy injuries in elderly patients with significant co-morbidities, and surgical treatment is often complex, requiring specialist input. In addition, surgical management has a relatively high re-operation rate. These findings supports the treatment of these patients in specialist centres.

PE 1-9

Dual mobility total hip replacements: a service evaluation audit to measure outcomes in neck of femur patients above 65 years of age

Patel N. [*1], *Waqas Ilyas M.* [1], *Hosahalli Kempanna V.* [1], *Abbas S. K.* [1], *Dunlop D.* [1]

[1]Trauma & Orthopaedic Surgery, University Hospital Southampton NHS Foundation Trust, Southampton, United Kingdom

Introduction: Hip fracture is a major public health issue due to an ever-increasing ageing population. High dislocation rates remain a challenging problem in elderly patients with neck of femur fractures who undergo total hip arthroplasty. In our institution a large number of neck of femur fracture patients are treated using dual mobility implants to reduce complication rates. We performed a service evaluation audit to measure outcomes of dual mobility total hip replacements in elderly patients with displaced intra capsular neck of femur fractures in a major trauma centre.

Methods: All patients above 65 years who underwent dual mobility total hip replacement for neck of femur fractures between March 2009 to December 2016 were included in this study. Data was retrospectively analysed. Our primary outcome measure was dislocation rate. The secondary outcome measures were infection rate, periprosthetic fracture rate, mortality at 1 year and revision rates.

Results: The hospital neck of femur fracture data base was used to identify a total of 628 patients who received dual mobility total hip replacements between the defined period. 7 patients were excluded as they had undergone hemiarthroplasty (wrongly coded), 120 patients were excluded as no follow up data was available either because of repatriation or

for unknown reasons; 39 patients were excluded as they were below 65 years of age.
The final data set included 462 patients with mean age of 79.2 yrs. (65.2-96.1), male: female 1:2.3, mean hospital stay 14 days and mean follow up of 45 weeks.
The primary outcome measure i.e. dislocation rate (intra-prosthetic & extra articular) was 1.30 % (n=6). The secondary outcome measures were: periprosthetic fracture rate 2.16 % (n=10); infection rate 0.65 % (n=3); revision rate 3.68 % (n=17) with periprosthetic fractures being the commonest cause of revision (n=10); 1 yr. mortality 6 % (n=26).
Conclusion: Dual mobility total hip replacements in elderly patients with neck of femur fractures appear to be showing lower incidence of dislocation. Also, of note is the low mortality rate at one year as compared to the national average for neck of femur fracture patients, reflecting that fitter and more mobile patients are receiving total hip replacements. However, high-quality, prospective RCT studies are needed to evaluate further the use of dual mobility components in total hip arthroplasty for neck of femur fractures.

PE 1-10

Has the east of england changed practice for the management of intracapsular neck of femur fractures following the introduction of nice guidance? A multicentre regional audit.

Spacey K. [1,1], *Ashford-Wilson S.* [*2], *Elbashir M.* [1]

[1]*Peterborough City Hospital, Peterborough,* [2]*Norfolk and Norwich University Hospital, Norwich, United Kingdom*

Introduction: The NICE guidelines were introduced in 2011, and suggested that replacement arthroplasty should be performed for those patients sustaining displaced intracapsular neck of femur fractures (1.6.2). The guideline recommends the use of cemented arthroplasty over that of uncemented (1.6.5). It was suggested to consider the use of total hip replacement in those walking independently with up to one stick, not cognitively impaired and medically fit for the extended procedure (1.6.3). Prior to the NICE guidelines we suspected that institutions had a varied practice, and proposed that the guidelines have standardised intracapsular neck of femur fracture management not only from its introduction, but thereafter also.
Methods: A multicentre retrospective audit of all operatively managed intracapsular neck of femur fractures across five hospital trusts of the East of England, at three different time periods was conducted. Data collected included; age of patient, fracture classification, ASA grade, procedure performed and if applicable the date of death. The three time periods utilised covered episodes prior to the NICE guidelines, a year following the NICE guidelines and five years following their introduction. Five sites across the East of England were audited to allow for local practices and past experiences.
Results: Over 1100 intracapsular fractures were reviewed across the three sample time periods. The incidence of uncemented hemiarthroplasties halved, while cemented hemiarthroplasties increased. The use of total hip replacements, increased only marginally. These changes were maintained across both post-NICE guideline time periods. The incidence of fixation remained largely unchanged across all time periods.
Conclusion: We have demonstrated across the East of England region, that NICE guidelines have been interpreted, utilised, and its' use been maintained over time. While there has been a drastic fall in the use of uncemented hemiarthroplasties, we are yet to see a significant increase in total hip replacements. It appears that local experiences do affect a departments willingness to embrace new guidelines, with one site with a history of two ontable cement related deaths maintaining a higher proportion of uncemented hemiarthroplasties following the introduction of the guidelines, compared to other regional trusts.

PE 1-11

Have the changes in operative management of intracapsular hip fractures following the introduction of nice guidelines improved mortality? A multicentre regional audit.

Spacey K. [1], *Ashford-Wilson S.* [2], *Elbashir M.* [*1]

[1]*Peterborough City Hospital, Peterborough,* [2]*Norfolk and Norwich University Hospital, Norwich, United Kingdom*

Introduction: The NICE guidelines introduced in 2011 suggested offering arthroplasty for those patients with displaced intracapsular neck of femur fractures (1.6.2). Where offering arthroplasty for displaced intracapsular neck of femur fractures, it was suggested the use of cemented implants be utilised (1.6.5). Prior to the NICE guidelines there was a wide variety of implant use, both cemented and uncemented for hemiarthroplasty. The use of uncemented hemiarthroplasty raised concerns for the development of thigh pain due to poor integration, and periprosthetic fracture. Both complications could result in the need for revision surgery, which is not only costly but may be fatal in this patient population.
The uncemented hemiarthroplasty appears now to have become reserved for the 'palliative' hip fracture patient who has been deemed fit for an anaesthetic, with a view to providing comfortable care. We suspected that with increasing numbers of cemented hemiarthroplasties being performed now inline with the guidance, that mortality associated with this procedure may have increased.
Methods: A retrospective audit of all intracapsular neck of femur fractures across three fixed time periods and across five sites of the East of England was performed. The time periods included before and after the introduction of the NICE guidelines, covering a five year timeframe. The data collected included; fracture classification, procedure performed and where applicable- the days to death.
Results: Over 800 intracapsular hip fractures underwent hemiarthroplasty across five sites during the time periods.
The six month mortality rate for patients undergoing cemented hemiarthroplasty prior to the NICE guidelines was determined to be 5.9 %, in 2016 this has risen to 23.4 %. The 6 month mortality of uncemented hemiarthroplasty prior to NICE guideline introduction was 11.7 % this increased to 17.7 % in 2016. A concurrent audit demonstrated an increase in the proportion of cemented hemiarthroplasties being performed inline with the NICE guidelines.
Conclusion: Six month mortality has increased in both groups of hemiarthroplasties since the use of the NICE guidelines. This has been shown however to be a much greater increase in mortality for those undergoing cemented hemiarthroplasty, with almost a 400 % increase between 2011 and 2016. The encouragement towards cemented hemiarthroplasties inline with the NICE guidance, may result in inappropriate patient selection in the cemented cohort, for patients that may previously have been treated with uncemented hemiarthroplasty. It would appear there is still a place for the cheaper uncemented hemiarthroplasty in those patients with a poor life expectancy following a hip fracture.

PE 1-12

An audit on the use of a calibration marker on neck of femur fracture x rays: a useful but forgotten tool.

Martin R. [*1], *Anjum S.* [1], *Critchley R.* [1]

[1]*Trauma and Orthopaedics, Royal Victoria Infirmary, Newcastle Upon Tyne, United Kingdom*

Introduction: Neck of femur fractures are a common orthopaedic presentation and are prevalent in elderly osteoporotic patients. In our population, people have increasingly longer life expectancies and if a patient presents with an intracapsular fracture who is independent with minimal co-morbidities they can be considered for a total hip replacement. In order to receive a total hip replacement the pelvic X rays should be templated to determine the appropriate prosthesis and a common way this is done is by including a calibration marker on the X ray. The aim of this study is to assess and improve upon the radiological investigations performed for neck of femur fractures in the Royal Victoria Infirmary. This study set out to determine what proportion

of patients admitted with a neck of femur fracture had a calibration marker on their initial X ray and the impact of a missing marker. We also determined what proportion of these patients had a chest X ray performed with the inital X ray.

Methods: Details of patients admitted with a neck of femur fracture from January 1st 2018 until December 31st 2018 were gathered and used to review initial pelvic X rays and determine if a calibration marker was included and if they had a chest X ray performed. We also analysed the number of patients who had an intracapsular fracture and how many went on to have a total hip replacement. We then determined how many X rays from this group of patients were lacking a calibration marker and therefore required a repeat X ray.

Results: 376 patients were admitted with a neck of femur fracture over a one year period. Only 64 % of patients had a calibration marker on their initial pelvic X ray and 89 % had a chest X ray performed with the initial X ray. Intracapsular pattern of injury was the most common effecting 215 patients and, of these, 39 went on to have a total hip replacement. 12 of the patients who received a total hip replacement were lacking a calibration marker on the original X ray and required a repeat X ray to be performed to include this.

Conclusion: In conclusion, 36 % of patients admitted did not have a calibration marker on their original X rays. 10 % of those admitted went on to have a total hip replacement. Almost one third of the patients who received a total hip replacement required repeat X rays as they were missing the calibration marker. The need to repeat X rays meant more radiation for the patient, use of X ray appointment slots which could have been used by other patients and expense for the NHS. To promote the use of the calibration marker we have produced a visual aid in the form of a poster placed in the radiographer booth and are in the process of re-auditing to hopefully show improvement in its use and reduce the need for repeat X rays. All patients who lacked a chest X ray with initial X rays received one at a later time as this was required by the anaesthetic team for pre-operative assessment and this poster also reminds staff to perform a chest X ray at the time of initial imaging.

PE 1-13

The new short femoral nail for trochanteric fractures

*Shirahama M. *[1], Okazaki S. [1], Ueno T. [1], Nakama K. [1], Matsuura M. [1]*

[1]Orthopaedics, Kurume University School of Medicine, Kurume, Japan

Introduction: The role of short femoral nail for trochanteric fractures is to get the stability of proximal segment and nail itself. Though there are various implants are used for trochanteric fractures, the serious problem of the cut-out still occurs. Therefore, we developed new short femoral nail for trochanteric fractures.

Methods: We call ASULOCK®(Japan MDM Inc.), which can insert 1 lag screw, 1 anti-rotation screw, and 2 anti-rotation pins into the femoral head. According to the biomechanical test that measures the rotation torque and load resistance by increasing the number of screws and pins, the rotation torque and load resistance increased as the number of screws and pins increase. Inserting 4 screws and pins compared with 1 lag screw, the rotation torque increased up to 468.8-616.1% and load resistance increased up to 425%. In literature, the femoral neck most narrow part is 23.8mm in Japanese, a part becoming largest is set to 23mm in ASULOCK®. Therefore, we can use this nail even Japanese small sized elderly person. ASULOCK® also can insert distal locking screws in cross to stabilize the nail itself.We used this new nail for 24 fracturs of 23 cases from 2017 January to 2018 December. Patients included 6 male and 16 female, with the mean age of 81.9 (range, 27 - 99) years old. According to the AO classification, 4 patients had a stable type, and 19 had an unstable type.

Results: The average of surgical time was 80 minutes and intraoperative blood loss was 50 ml. All patients can be permitted full weight bearing walking immediately after operation. The duration of hospitalization was mean of 20.1 days. During the follow-up period of 3months, there were not complications and cut-out. All patients were recovery the function before injury. and can be achieved bone union.

Conclusion: ASULOCK® can insert 4 screws and pins into the femoral head in the three dimensions, have rotational resistance and none-sliding system. This new short femoral nail can be achieved rigid fixation, and it will prevent cut-out after fixation of trochanteric fractures.

PE 1-14

Conservative treatment using a sponge cast for transfer fractures in nursing home patients

*Cho H. *[1], Seo J. [1], Ha J. [2], Kim J. [3]*

[1]orthopedic surgery, gwangju veterans hospital, gwangju, Korea, Republic Of, [2]orthopedic surgery, king's college hospital, London, United Kingdom, [3]orthopedic surgery, busan veterans hospital, BUSAN, Korea, Republic Of

Introduction: Nursing home residents can have significant limitations to their mobility that result in them being bedridden or chair' bound. As a result of this and associated comorbidities in the process of nursing care and transferring a fracture can result. If operative treatment is not deemed to be a satisfactory option then conservative management has been indicated using a splint or cast for immobilization and pain control as the fracture heals. Issues of pressure sores have been associated with this so we evaluated the use of a sponge casting method to reduce the risks of these complications while providing sufficient support.

Methods: Between March 2011 and October 2017, 17 patients with a lower limb transfer fracture due to transferring manoeuvres in a nursing home were recruited. We evaluated the improvement in pseudo-motion and divided the patients as having bony union, fibrous union, or remaining pseudo-motion. We also investigated the occurrence of pressure sores due to immobilization up until the final follow-up.

Results: Femur fractures occurred in 15 patients and lower leg fractures in two. Six of the 15 femur fractures were periprosthetic fractures (four hip arthroplasty and two knee arthroplasty). Pseudo-motion was improved in 15 of 17 cases, within an average of 17.3 weeks for the improvement (14–23 weeks; bony union, 11 cases and fibrous union, four cases). Pseudo-motion remained in two cases: one periprosthetic fracture around the knee arthroplasty and the other a femoral neck fracture. There were no instances of pressure sores in the 17 cases observed. Conclusion: The management of transfer fractures in limited-mobility patients represents great challenge where surgical intervention is contraindicated. The use of sponge casts to satisfactory control pseudomotion whilst preventing pressure sores is an effective, low risk treatment option.

PE 1-15

Hip arthroplasty for failed internal fixation of intertrochanteric fractures

*Ha J. *[1], Cho H. [2]*

[1]orthopedic surgery, King's college hospital, London, United Kingdom, [2]orthopedic surgery, gwangju veterans hospital, gwangju, Korea, Republic Of

Introduction: To analyze the clinical and radiological results of hip arthroplasty following the failed internal fixation of intertrochanteric fractures of the femur

Methods: We analyzed the reasons for failure in 29 cases of hip arthroplasty from January 2007 through December 2018 in which the hip arthroplasty was necessary due to failed internal fixation of an intertrochanteric fracture of the femur. Furthermore, we tried to find pitfalls encountered when performing the operations. We assessed those patients and drew both clinical (Harris hip score, HHS) and radiological results. The follow-up period was 34.2 months(12-96 months), on average.

Results: The average operating time was 174 min.(115-205 min.) and the mean amount of perioperative bleeding was 1,335 ml(759-2,450 ml). The amount of packed RBC transfusion was 2.8 units(0-10units) on average. We could see prolonged operation time and a large amount of blood loss as we performed both the removal of the previously fixed implant and reduction of the displaced bone fragment simultaneously. The mean Harris hip score of the patients was improved from the preoperative score of 43 to the postoperative score of 85.7. No cases showed any radiological signs of loosening

of acetabular cups or femoral stems, although an articular dislocation and a postoperative joint infection occurred.

Conclusion: Although hip arthroplasties performed because of a failure in internal fixation could provide relatively satisfactory outcomes, as they result in extended surgery time and greater blood loss, a requirement for higher-level surgical skills, and greater consideration required for the systemic conditions of patients before performing surgery.

PE 1-16

Ipsilateral fractures of femur and tibia treated with the ilizarov apparatus

*Lalic I. [*1], Dulic O. [1], Harhaji V. [1], Lalić N. [2]*

[1]Clinic for otrthopaedic surgery and traumatology, Clinical center of Vojvodina, Novi Sad, [2]Institute of Lung Diseases, Sr. Kamenica, Serbia

Introduction: Ipsilateral fractures of the femur and tibia (floating knee), are a challenging problem to manage due to a fact that they may include combinations of diaphyseal, metaphyseal, and intra-articular parts of femur and tibia, and are often associated with soft tissue and vascular injuries. Stabilization and early mobilization of the patient produce best clinical outcomes. We present our experience and results with these type of fractures.

Methods: At the Clinic for Orthopedic Surgery and Traumatology, Clinical Center Vojvodina, we have treated 19 patients with floating knee from 2011–2018. The right leg was involved in 12 and left in 7 patients. There were 12 Type 1, 3 Type 2A and 2 Type 2B floating knee injuries (Blake & McBryde classification). Age structure consisted of 11 men and 8 women. The mechanism of injury was road traffic accident. From that amount 14 fractures were closed and 5 open. The average age was 39 years. All patients were walking full weight bearing on 4th postoperative day

Results: Average duration of hospitalization was about 3 weeks. 16 patients (84 %) united at both fracture sites, within average union in 10 months. According to the Karlstrom criteria the end results were: excellent in 10, good in 3, acceptable in 4 and poor in 2 cases. The complications were knee stiffness in 5, delayed union of tibia in 3 and superficial infection in 4 cases.

Conclusion: According to our experience transosseous osteosynthesis with the Ilizarov apparatus provides us with stabilization, early mobility and full weight bearing and manipulation of bone fragments with the device without large surgical incisions, with minimal risk of infections.

PE 1-17

Local community liaison for hip fracture in west shizuoka, japan

*Mori S. [*1]*

[1]Dpt. Bone and Joint Surgery, Seirei Hamamatsu General Hospital, Hamamatsu City, Shizuoka, Japan

Introduction: Population over 65 years old reached more than 40 % whole population in Japan. Hip fracture incidence keeps increasing,150,000/year in 2012, reached 3 times as in 1987. It was reported that 12 % of nursing care are caused by fragility fractures in Japan. Japanese health insurance has allowed tariff for treating hip fracture using hip fracture community liaison network, where hip fracture patients receive surgery and initial care at the registered management hospitals, then move to the rehabilitation hospitals for further ADL functional recovery, finally visit local clinics or care units for maintaining ADL and osteoporotic drug therapy.

Methods: Our community liaison network contains 8 management hospitals, 23 rehabilitation hospitals and 123 clinics located at west Shizuoka area (population: about 1 million). Registered number of hip fractures was 1463 in 2014, 1069 in 2015 and 1448 in2016.

Results: 535 hip fractures have been treated using local liaison network(L), while 913 hip fractures without using network (N) in 2016. Average 1st hospital stay was 22.3 days in L group, while 26.2 days in N group. In L group 375 patients have returned to their pre-fracture their own dwelling, while 48 patients have moved into nursing homes and 48 patients have moved to other hospitals or medical facilities. We will report the outcome of the hip fracture treatment including ADL score and osteoporotic medication.

Conclusion: Community based liaison network is useful system to treat and manage hip fractured patients in west Shizuoka, Japan.

PE 1-18

Management of geriatric hip fracture in china: a prospective, multi-centre observational study

*Zhang J. [*1], Wu X. [2], Zhang X. [1], Peng K. [1], Ivers R. [3], Tian M. [1], Yang M. [2]*

[1]The George Institute, [2]Orthopaedic and Traumatology, Beijing Jishuitan Hospital, Beijing, China, [3]Public Health and Community Medicine, University of New South Wells, Sydney, Australia

Introduction: Hip fractures are common in older people and often result from a minor fall in individuals with pre-existing osteoporosis. A previous retrospective study in the Chinese leading orthopaedic hospital showed a significant care gap in geriatric hip fracture management, compared with the best practices in the developed countries. Despite there was a significant quality improvement since the introduction of the orthogeriatric co-management intervention in this hospital, the comprehensive assessment of hip fracture management in other Chinese hospitals remains unknown.

This study aims to document the current management of hip fracture for older adults in seven hospitals in Beijing, China, and further determine whether the pathway of care identified is consistent with the hip fracture best practices.

Methods: This yearlong study is a prospective multi-centre observational study conducted in 4 tertiary hospitals and 3 secondary hospitals in Beijing, China. Eligible participants are those who aged 65 years and above with X-ray confirmed hip fracture, and admitted to the hospitals within 21 days after injury. Participants with pathological fractures and terminal malignancies are excluded. Collected data include participants' demographic information, pre-fracture mobility status, falls risk factors if the fracture is caused by falls, time from emergency to admission, time from admission to surgery, orthogeriatrician care, type of fracture, surgical procedure, complications including pressure ulcers, medication for bone health, falls prevention, length of stay, quality of life and healthcare cost. All participants will be then followed-up for three times at 30 days, 120 days and 1 year after admission. Morbidity and mortality status, reoperation, medication for bone health, quality of life and information in relation to rehabilitation will be collected at each follow-up. The primary outcome is the proportion of participants who received surgery within 48 h of admission to a ward. Secondary outcomes include the proportion of participants who were admitted to a ward within 4 h of presentation to emergency department, developed a pressure ulcer, received geriatrician care and who received osteoporosis and falls prevention assessment. Exploratory outcomes consist of the proportion of patients with a major complication including mortality and reoperation at 30 days, 120 days and 1 year after hospital admission.

Results: The first participant was enrolled in November 2018, and the last participant will be enrolled by November 2019. There are 635 participants enrolled to date. Of 459 participants have completed their 30 days follow-up while 21 participants have completed their 120 days follow-up. The typical participant is an 80 years old female living in the urban area.

Conclusion: The findings of this study will provide a comprehensive understanding of the geriatric hip fracture management in China, and will potentially facilitate the formation of the Chinese national hip fracture registry.

PE 1-19

Randomised trial of hemiarthroplasty versus total hip replacement for intracapsular hip fracture

*Parker M. [*1]*

[1]Orthopaedics, Peterborough City Hospital, Peterborough, United Kingdom

Introduction: Controversy exists for the optimum treatment for a displaced intracapsular fracture in the 'fitter' elderly patient with increasing recent recommendations from the UK NICE guidelines being made for the increasing use a total hip arthroplasty. These recommendations were made despite the limited evidence to date from high quality randomised controlled trials.

Methods: To assist determining treatment 104 patients with an intracapsular hip fracture have been randomised between a cemented hemiarthroplasty versus a cemented total hip replacement. Principal outcomes were a functional assessment by a nurse blinded to the treatment allocation.
Results: Mean age of the patients was 77 years, 80 % were female. All surviving patients had a minimum follow-up of one year. At one year there was no difference between groups for regain of mobility, degree of residual pain or social dependency. There was a tendency to a lower mortality (2 versus 4 cases), shorter hospital stay (9 days vs 15 days), lower operative blood loss (247 mls vs 335 mls), lower transfusion rate (1 versus 4 patients), and a lower secondary operation rate (1 versus 4 patients). Due to the limited patient numbers statisticial difference could not be demonstrated for any of these outcomes.
Conclusion: The conclusions of this study are there was a trend in favour of hemiarthoplasty for many of the outcome measures. There was no outcome for which THR was favoured. These results indicate that caution is advised before the more widespread use of total hip arthroplasty for hip fracture patients.

PE 1-20

What is the outcome after a girdlestone excision arthroplasty to the hip after a hip fracture?

Parker M. [*1]

[1]*Orthopaedics, Peterborough City Hospital, Peterborough, United Kingdom*

Introduction: There is little published evidence of the outcome after a girdlestone excision arthroplasty of the hip.
Methods: We reviewed the outcome for 45 patients treated with an excision hip arthroplasty. Three were for the primary treatment of a hip fracture and 42 for later complications of hip fracture treatment. The initial treatment for these patients was hemiarthroplasty (35 cases), multiple screw fixations (4 cases) and sliding hip screw fixation (3 cases). 25 of these cases were associated with deep wound sepsis. Other complications leading to the excision arthroplasty were fracture non-union (2), cut out of the implant (2), re-fracture (2), dislocation (15), acetabular fracture (2), loosening (1) and acetabular wear (1).
Results: The average age of the patients was 80 years. 20 % were male. One year mortality was 39 %. The mean survival time was 1223 days. For the survivors most has some degree of residual pain with a mean pain score of 2.7 which represents minimal rest pain but pain on hip movement. For the survivors 26 % could walk short distances with a frame, the remainder were immobile. 47 % were living in there own home and the remainder in institutional care.
Conclusion: This study indicates that the outcome after an excision arthroplasty after a hip fracture is that many patients die. For the survivors they are either immobile or able to walk only short distances with walking aids. Most have some degree of residual pain in the hip. Due to the poor outcome after this procedure it should be avoided if at all possible.

PE 1-21

In response to nhfd outlier status - is it always bad to be an outlier?

Avery S. [*1,2], *Haran H.* [3], *Popat A.* [4], *Rao M.* [5], *Griffin R.* [6]

[1]*Anaesthesia,* [2]*Consultant,* [3]*Orthorgeriatric SpR,* [4]*Foundation doctor,* [5]*Orthopaedic consultant,* [6]*Orthogeriatric consultant, Western Sussex Hospitals NHS Foundation Trust, Chichester, United Kingdom*

Introduction: NHFD 2018 report for our institution documented a well led, responsive, safe & effective hip fracture program. We were an outlier for non-operative management at 5.6 % (nat av 2.2 % - range 0 to 11 %). This led to our multidisciplinary governance group performing a comprehensive review to identify common themes & outcomes for this cohort of patients.
Methods: A thorough notes review of all patients was conducted with orthogeriatric, surgical & anaesthetic consultant input. General demographics, ASA, NHFS, AMTS, mobility status & original residence were noted, in addition to outcome measures of 30d mortality, 120d follow-up & return to original residence.
Results: 22 of 395 patients did not receive an operation in 2017 (5.6 %). The average age was 81 (range 65-99), 59 % females, 41 % males, 18 graded ASA 4 (82 %), 2 graded ASA 3 (9 %), 2 graded ASA 2 (9 %), median NHFS 7 (predicted mortality 11 %).
11 patients admitted from own home and 10 patients came from supported care (warden/care/nursing homes). 5 were independently mobilizing, in contrast to 16 requiring aids (stick/frames) & 2 wheelchair bound & hoisted.
11 patients had documented AMTS >6, & further 8 patients < 6.
The patients fell into four subgroups: orthopaedic, medical, anaesthetic reasons & patient choice.
4 patients had non-displaced intracapsular fractures and could weight bear without pain. All patients survived to discharge.
7 patients were deemed medically unfit for surgery due to additional acute illness presentation (CVA, heart & respiratory failure). 1 CKD patient was transferred to renal unit as required dialysis.
7 patients deemed too high risk by anaesthetists with chronic co-morbidities, frailty and dementia, at risk of on table deaths.
2 patients were offered operations but declined.
68 % of all patients survived to discharge, with 30d mortality 27 %. 45 % patients went back to original residence. 45 % patients received FNC for analgesia.
Conclusion: Surgical fixation of hip fractures remains gold standard care. However, our review demonstrates a small cohort of higher risk patients who may not benefit from operative fixation.
5 patients were appropriately managed orthopaedically & all discharged home without mortality increase.
Remaining patients represent the highest risk cohort, namely male, ASA 4, AMTS <6, NHFS >7, institutionalized and mobilized with aids. The medically unfit patients had inter-current acute illnesses & appropriate end of life care was initiated.
3 patients received FNC for analgesia.
The 7 anaesthetically deemed high risk patients had high expectation of death in hospital and alternative pain relief was offered. This was in balance with death on table avoidance in these patients. 2 patients died in hospital and 5 patients returned to nursing home care & died within 30 days. All patients received FNC for analgesia.
Our small sample suggests that for the highest risk cohort, non-operative management can be considered with multidisciplinary input to provide a humanitarian approach to end of life care.

PE 1-22

Transosseus osteosynthesis in treatment of acute humeral fractures and humeral shaft nonunions

Lalic I. [*1], *Dulic O.* [1], *Harhaji V.* [1], *Lalić N.* [2]

[1]*Clinic for otrthopaedic surgery and traumatology, Clinical center of Vojvodina, Novi Sad,* [2]*Institute of Lung Diseases, Sr. Kamenica, Serbia*

Introduction: Methods of treating multiple diaphyiseal fractures of the upper arm have never been uniformly adopted anywhere in the world. Treatment with nonoperative and operative methods is usually justified while treating one of the surgical methods has a lot of controversy.
Methods: In period from 2004. to 2018, 54 patients with various types of acute humeral fractures and non-union were treated. Of that number, 24 of them (44 %) had acute fractures. Non-union was treated 30(56 %) in total. In this study we used the methods of clinical examination, standard radiography, CT-scans, as well as Stewart-Hundley functional scale after humeral fractures treatment and DACH - scoring scale after treatment non-union of humerus.
Results: In acute fracture treatment, full recovery was obtained in 21 patients (87,5 %). We have delayed union in 3 patients (12,5 %). In the presentation of functional results, we used the Stewart-Hundley scale and we had 17 excellent, 5 good and 2 bad results.Results after treatment of humeral nonunions was: Complete healing was observed in 27 (90 %) cases, while in 3 (10 %) cases there was disagreement. In these three cases, the re-use of the appliances was carried out, of which 2 were completely healed and in one not because there was an intolerance of the apparatus. Mean DASH score after nonunion treatment were 22,1.

Conclusion: Good functional and bone results, minimizing the risk of infection, high stability of the device give a valid place to this method in the treatment of acute humeral fractures and humeral shaft nonunions.

PE 1-23

Hip hemiarthroplasty dislocation and dysplastic hip – is there any significant association?

*Vinay S. *[1], Housden P. [1], Charles L. [2], Parker M. [3]*

[1]Trauma and Orthropaedics, East Kent Hospital NHS Foundation trust, Ashford, [2]Trauma and Orthropaedics, Dartford and Gravesham NHS Trusts, Dartford, [3]Trauma and Orthropaedics, North West Anglian NHS Foundation trusts, Peterborough, United Kingdom

Introduction: Background: Hip Hemiarthroplasty is one of the commonest orthopaedic operation done in UK with recent NHFD data from 2017 report showing that 43% of the 77000 patients who presented to hospital had hemiarthroplasty. Literature suggests dislocation rate of 0.8% - 6.1% for Hip Hemiarthroplasty. Dislocation of hemiarthroplasty may lead to significant morbidity and mortality.
Aim: To investigate if acetabular dysplasia has a significant association with hemiarthroplasty dislocation.
Methods: A Retrospective multicentre review. Review of radiographs of patients receiving a hip hemiarthroplasty for a hip fracture measuring Acetabular index (sharp angle) and Lateral Centre edge angle(CEA). A large acetabular index and a lower value for the center-edge angle suggest acetabular dysplasia. Measurements were made for 20 patients with dislocation and 20 patients without dislocation. Statistical assessment of the results with unpaired t test was performed.
Results: Mean acetabular angle for those with dislocation was 42.65 degrees versus 37.8 for those without dislocation_giving a p value of 0.000861. Mean Center-edge angle of those with dislocation was 26.1 degrees versus 37 for those without dislocation giving a p value of 0.000019.
Conclusion: This study showed that the hemiarthroplasty dislocation group had higher acetabular index and Lower Center-edge angle compared to the hemiarthroplasty group without dislocation clearly demonstrating that acetabular dysplasia is implicated in the etiology of hip hemiarthroplasty dislocation.

PE 1-24

Insufficiency fracture of bilateral pubic rami, ischium and medial wall of acetabulum after total hip arthroplasty

*Nishi M. *[1], Yoshikawa Y. [1], Okano I. [2], Kaji Y. [1], Inagaki K. [1]*

[1]Department of Orthopaedic Surgery, Showa university, Tokyo, Japan, [2]Hospital for Special Surgery, New York, United States

Introduction: It has been reported that pelvic insufficiency fractures (PIF) occur after total hip arthroplasty (THA). These post-THA PIFs include various types of fractures in different locations. Post-THA PIF in the pubic rami and/or ischium are considered as benign fractures and usually treated with symptomatic care, whereas medial wall fractures often require immediate interventions, such as restriction of weight bearing or surgical fixation. Correct diagnosis of fracture location is crucial, but it can be challenging if the patient have concomitant fractures in multiple locations. Here, we report a delayed diagnosis case of post-THA PIF in the medial wall of the acetabulum, masked by concomitant ramus/ischium fractures.
Methods: A 47-year-old woman with a 13-year history of rheumatoid arthritis and ongoing long-term oral corticosteroid therapy underwent bilateral THA. The patient had been asymptomatic for 2.5 year, but left groin pain gradually developed without any traumatic event thereafter. The follow-up radiographs demonstrated an ipsilateral inferior pubic ramus fracture and a contralateral ischium fracture. The acetabular component of THA was slightly shifted upward, but the further diagnostic study was not conducted at that time. The patient returned 6 months later, and radiographs showed a medial wall fracture and supero-medial migration of the acetabular component.
Results: We performed a two-stage revision procedures: 1)implant removal and internal fixation with reconstruction plate, 2)After confirming negative micorbilological exams at the first pricedure, revision THA with massive allograft (8 weeks after the first procedure). At 7-month follow-up after the operation, the patient was completely pain-free and radiographs demonstrated a solid fusion of implanted bone and no sign of loosening.
Conclusion: This case highlights that the medial wall post-THA PIF can occur along with pubic/ischial fractures which mask the symptoms of the medial wall fracture. Reviewing the current literature, we discuss the diagnostic strategy of this rare type of injury.

PE 1-25

Our experience in hip fragility fracture in war circumstances in syria

*Kaadan G. *[1]*

[1]clinic, al fayha hospital center, Damascus, Syrian Arab Republic

Introduction: Hip fracture in osteoporotic patient is a challenge for an orthopedic surgeon, the great number of the material of ostheosynthesis means unsatisfactory procedure for most type of unstable fractures .the situation of war would make more challenge the surgical indication Also the choice of the material
Methods: We present here our experience in war circumstances with a new personal device for ostheosynthesis of hip fracture. Patients have a long stay at home without treatment, the osteoporosis is very severe because of malnutrition, many cases have had
Bed scar, intensive general treatment and well preparation of the patient is very important before surgery, many patient have had a parenteral nutrition solution with blood transfusion before surgery ,some patient have had a concomitent blastic lesion and must be treated first.
Results: *This procedure have a good result with minimal complication also we use the traditional moor prosthesis for a economic raison for sub capital fracture with acceptable result the simplicity of treating the complication by the material by local anesthesia can presnt a tremendous favour for thos osteoporotic and delibrating patient.*
Conclusion: The HIS plate is a hip minimal invasive surgery, have a multiple choice (screw, nail) for ostheosynthesis ,and easy dealing with complication even by local anesthesia .especially: *in such a difficult and disastrous situation of war cheap material may give a reasonable result. all attempt should be addressed to the salve life management of the patient.*

PE 1-26

Preliminary results from a retrospective case series of carbon fibre anatomical distal femur plates in frail orthopaedic patients with supracondylar fractures of the femur.

*Morley H. *[1], Deierl K. [1]*

[1]Trauma and Orthopaedics, West Hertfordshire Hospitals NHS Trust, Watford, United Kingdom

Introduction: With the ever ageing population in Europe, it is likely that the field of Orthopaedics will have to manage an increasingly complex myriad of patients presenting with fragility fractures. As such, we need to produce more effective methods of managing fragility fractures surgically, drawing upon knowledge gained in materials science and biomechanics. Plate osteosynthesis for distal femur fractures in the frail is not a new concept; however, using carbon fibre instead of metal products is still a relatively emerging area within the UK.
This is a small retrospective case notes review following up a number of patients with closed fragility fractures of the distal femur who we manged with anatomical carbon fibre plates.
Methods: To assess the outcomes of a number of patients with fragility fractures of the distal femur with the use of carbon fibre plating. The patients' case notes and the hospital electronic records were interrogated to ascertain their progress following fixation with a carbon fibre plate.
Results: 3 patients (one with bilateral distal femur fractures) who fit the above criteria were assessed for premorbid status, ASA grade 30 day mortality, 6 month mortality, time to union of fracture, return to baseline mobility, complications were also noted.

100 % of patients survived 30 days post operatively. 66 % survived 6 months post operatively. None of the patients had an ASA grade as stipulated by the anaesthetist below 3. All fractures demonstrated good callus formation, one united fully within the 6 months. 100 % of patients returned to their baseline mobility. There were no hardware failures. There were no surgical site infections.

Conclusion: Using a plate which allows greater strain may be beneficial in osteoporotic patients where the intention of fixation is secondary bone healing and callus formation. In a carefully selected group of patients where their only other options would be a distal femur replacement or non-operative management; carbon fibre plates offer a refreshing alternative. This represents a very small group of patients; however, the preliminary results are promising in this particular group of patients. The authors accept that more extensive data, with 1 year follow up is required in order to gather a greater understanding of the relevance of carbon fibre plates in the frail patient.

PE 1-27

Fascia iliaca compartment block reduces differently pain in proximal femur fracture

*Franzoni S. *[1], Regazzola G. M. [1], Cassinadri A. [1], Scialabba D'Amico P. L. [2], Terragnoli F. [1]*

[1]Orthopedic and Traumatology Department, Poliambulanza Foundation Hospital, Brescia, [2]Orthopedic and Traumatology Department, Università Cattolica S.Cuore, Roma, Italy

Introduction: The Fascia Iliaca Compartment Block (FICB) helps to reduce pain in proximal femur fracture, and it can integrate conventional analgesic drug therapy.

The aim of the study is to verify the efficacy of FICB in both medial and lateral fracture of femur.

Methods: From February 2018 to February 2019 all patient (n.209) with suspected proximal femur fracture underwent FICB in the Emergency Department (ED) of our institution. The block and standard analgesia (paracetamol 1g iv, ketorolac 30mg iv) has been executed after nursing triage and before radiological procedures. Pain level was measured by nurse staff during procedural movements of the affected limb and / or lifting up the leg at 15 degrees. The intensity was scored with Verbal Rating Scale (VRS) before, 10-20 minutes and 1 hour after FICB respectively.

Results: The data refer to 151 patients (age 82.2 ± 9.5 years, 68.9 % F) with proximal femoral fracture, underwent FICB and able to respond to the VRS. The intensity of incidental pain before the FICB was 15.2 % excruciating, 53 % severe, 23.9 % moderate, 6.6 % mild, and 1.3 % absent. After 10/20 minutes from the block the pain was excruciating in 3.5 %, 22.4 % severe, 37.7 % moderate, 26.6 % mild, and 9.8 % absent. After 1 hour it was further reduced, becoming in 3.2 % excruciating, 12 % severe, 30.4 % moderate, 35.9 % mild, and 18.5 % absent. 55.2 % of patients had an effective pain reduction (mild or absent): 31 % after 10 minutes and 24.2 % after 1 hour. 16.1 % of patients had no benefit. A supplementary analgesic therapy (ketorolac 30mg iv or oxycodone/naloxone 5/2,5mg per os) was used in 20.3 % of subjects. The FICB was more effective in lateral femoral fractures compared to medial (61.7 % vs 47.1 % respectively), however percentage of subjects without any analgesic effect was greater in the first group (17 % vs 11.8 % respectively). Good accuracy was detected among all operators, and no complications were identified.

Conclusion: FIBC was effective (mild or absent pain) after 10 minutes and 1 hour in 25 % and 50 % of the patients, respectively. The analgesic effect is greater in lateral femoral fractures, however 40 % are more refractory to FICB than medial fractures.

FICB is a safe and effective analgesic treatment applicable to all patients with suspected femoral fracture in ED. Ultrasound location of the femur fracture (before radiological investigations) would allow an adjustment of the analgesic power of FICB based on the subtype lateral femoral fractures.

PE 1-28

Bilateral basicervical femoral fracture in a patient with osteomalacia due to malnutrition in a developed country : case report

*Yokogawa K. *[1], Nagira K. [2], Yonei T. [1], Yoshida M. [1], Kouno R. [1], Otsuka T. [1], Hagino H. [3], Nagashima H. [2]*

[1]Department of Orthopedics Surgery, Masuda Red Cross Hospital, Masuda, [2]Department of Orthopedics Surgery, [3]School of Health Science, Tottori University Faculty of Medicine, Yonago, Japan

Introduction: A 68 year-old female consulted our department with 2-month history of both thighs pain. She had an eating disorder at a young age, and was diagnosed with malnutrition by department of internal medicine in our hospital 3 years ago. On physical examination, her body mass index was 16.4kg/m^2. Plain radiographs showed normal bone structure; however, MRI detected a slight signal change in the bilateral proximal femurs. Her blood analysis demonstrated lower levels of hemoglobin, albumin, Ca, P, and 25(OH)vitaminD, and higher levels of alkaline phosphatase, TRACP-5b, and total P1NP. Dual energy X-ray absorptiometry revealed a significant loss in right femoral bone mineral density (0.376g/cm^2 ; T.Score -7.61SD ; Z.Score -4.45SD). After her first visit, the pain in her thighs increased, and a bilateral basicervical femoral fracture with displacement was noted with plain radiographs taken 1-month later.

Methods: She underwent surgical osteosynthesis with Gamma-nail in both hips after hospitalization.

Results: Bone morphometry of iliac bone, which was taken during surgery, showed high values in all parameters related to osteoid and bone erosion. From the above results, a bilateral basicervical femoral fracture with osteomalacia was diagnosed. Active vitamin D was started to be administered after surgery. Bone healing smoothly proceeded, and her bone mineral density has significantly increased postoperatively.

Conclusion: It has recently been reported that poor dietary intake causes osteomalacia and bone fragility. Physicians should keep in mind the possibility of fatigue fractures when a thin patient complains of extremities or back pain without a history of trauma.

PE 1-29

The importance of multidisciplinarity in taking care of the elderly hospitalized for fragility fractures

*Medioli A. *[1], Scaglia L. [1], Colosio W. [1], Pezzoli C. [1]*

[1]geriatric acute care, richiedei, brescia, Italy

Introduction: The oldest old patients who are hospitalized in acute care unit due to fragility fractures are seen to change their autonomy of daily life. To support this new state of life for patients and for caregivers, the need for multidimensional care on part of patients and caregivers is required, especially when the oldest old was autonomus before the acute event.

Methods: Hospitalizations from january 2014 to december 2018 of patients who were in acute geriatric unit for fragility fracture were analyzed. The study examined data concerning the autonomy of the daily life, cognition, presence an type of caregivers before and after the acute event.

Results: Out of 2531 patients admitted to the hospital had a mean age of 84 end they was 32 % male and 68 % females. The average of Barthel Scale at home was 42/100 while after acute event was 14/100. After acute event the average of MMSE was 14/30. The identity of patient's caregivers was: 3,59 % were autonomus before the acute event, 26,94 % were looked after paid staff, of this 2,39 % had the only caregivers in the paid staff. Of the patients analyzed 70,2 % had sons and only 5,77 % had activated domiciliary service.

Conclusion: From the data analyzed above the importance of multidimensional and multidisciplinary managment of the oldest old patients hospitalized for fragility fracture is highlighted, a support that must often be continued even after hospitalization, to support the patients and their families with new management needs in oldest old who see their autonomy of daily life change in a quick way.

Peri-operative Management

PE 2-1

Delirium. Awareness, assessment, treatment

*Andersen L. R. *[1], Fredholm L. M. [2], Grejsen H. [1]*

[1]Ortopaedic, [2]Kolding Hospital, Kolding, Denmark

Introduction: Delirium is a seriously condition leading to high mortality and increase in "length of stay"in the elderly fragile patients admitted to hospital. We have made a retrospective study on patients with hip fracture in our ortogeriatric ward.

We wanted to se, how many patients developed delirum, how to predict the risk of developing delirium, reduce the number of patients, who developed severe delirium and test our treatment algorithm

Methods: An audt was done on 157 patients treated in Ortogeriatric ward Kolding Hospital in 2 periods, January to March 2018 and August to October 2018. Two patients with terminal cancer were exluded. We used Hindsoe Mental Test score to group the patients, CAM to define delirium and an algorithm for medical treatment.

Results: The Hindsoe Mental Test score was made in 137 patients(90 %).

The number of patients with Hindsoe Mental Test score of 6 or less were 42 patients(31 %). Among these 33 patients (75 %) developed delirium. The number of patients with Hindsoe Test score higher than 6 were 95 patients (69 %). Among these 17 patients(18 %) developed delirium Fourteen patients had diagnosed dementia, 13 of these(93 %) developed delirium. In patients with delay in operation 24 hours or more 43 % developed delirium, patiens operated within 24 hours, 35 % developed delirium. Stages of delirium and medical treatment following our algorithm:

Twentyfour patients were in ligth delirium and treated with Mirtazapine 3 died (12,5 %) Twentyfour patients were in moderate delirium and treated with Haloperidol 6 died (25 %) Teen patients were in severe delirium and treated with Haloperidol 5 died (50 %).

Conclusion: We found that Hindsoe Mental Test score is a god assessment to predict delirium and easy to implement in a ward. Dementia is a strong predictor for developing delirium, delay in surgery is not. By following our algorithm of medical treatment in delirium, severe delirium can be prevented. Mortality rice with the severity of delirium and treatment started as eraly as possible seams to be very important.

PE 2-2

Can ice cream based supplements help address malnutrition in hip fracture patients?

*Sahota A. *[1], Taib A. [2], Ong T. [2], Mulvaney E. [3], Neale C. [4], Sahota O. [2]*

[1]School of Medicine, University of Leicester, Leicester, [2]Ortho-Geriatric Medicine, [3]Trauma and Orthopaedics, [4]Nutrition & Catering, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: Malnutrition is common in hip fracture patients and leads to impaired mobility due to muscle wasting and reducedmuscle function, which hinders and prolongs recovery. Malnutrition also increases the risk of medical complications such as infections and pressure sores. Oral nutritional supplements are frequently prescribed but poorly tolerated. Common supplements in the UK include Fortisip ® and Scandishake ®. The aim of our study was to explore the role of ice cream nutritional supplements.

Methods: Using a Plan-Do-Study-Act framework:

4. We undertook a baseline assessment of daily calorie intake (25 patients with hip fractures across the trauma and orthopaedic wards, averaged over 3 days);
5. We then introduced an oral nutritional supplement (Scandishake ®, 240kcal, 3.8g protein), modified from a drink into an ice-cream;
6. The ice cream was offered during an afternoon'build up round' to hip fracture patients across the trauma and orthopaedic wards;
7. We evaluated the acceptability & calorific intake following the ice-cream supplements.

Results: The mean baseline post operative calorie intake was 732kcal/day. Scandishake ® required full cream milk, double cream, egg yolks and caster sugar to modify to an ice-cream, cost per ice cream £2.29 (exc staff costs) (€2.67). Seventy seven % of the patients offered the ice cream during the 'build up round' accepted and ofthose, 84 % said they would have it again. Mean calorific intake increased from 849kcal to 959kcal.

Conclusion: Calorific intake in hip fracture patients is poor. Modifying oral supplements to an ice-cream formulation is practical, acceptable and preferable to patients. Ice supplements improve daily calorific intake. Further largescale studies are required to evaluate the clinical benefits of ice cream supplementation.

PE 2-3

Surgeon grade has a significant impact on short term postoperative outcomes in hip fracture surgery

*Hughes H. *[1], Sheridan G. [1], Storme J. [1], Kelleher U. [1], Curtin P. [1], Hurson C. [1]*

[1]Department of Trauma and Orthopaedic Surgery, St. Vincent's University Hospital, Dublin, Ireland

Introduction: Very little is known about the impact of surgeon grade on hip fracture surgery outcomes. We describe the effect that the grade of operating surgeon can have on short-term outcomes in hip fracture patients.

Methods: The aim of this study was to investigate the impact of surgeon grade and operative times on short-term postoperative outcomes in hip fracture patients undergoing surgery. A prospectively collected National Hip Fracture Database (HFD) was retrospectively analysed over a six-year period. The major short-term dependant variables that were assessed included blood loss, postoperative transfusion rate, day 1 mobilisation rates, length of stay (LOS) and the 'cumulative ambulatory score'. Predictor variables included procedure performed, surgeon grade and operative time. The statistical test used was dependent on the variable types. A p-value of less than 0.05 was significant.

Results: In total, 1,593 operative procedures for hip fractures were analysed. The most common type of fracture pattern observed was intertrochanteric (n=633, 39.9 %). The commonest procedure performed was hemiarthroplasty (n=710), followed by short intramedullary (IM) nail (n=468). Attending surgeons had significantly lower operative times compared to residents ($p<0.05$). *Shorter operative times were associated with significantly higher rates of day 1 postoperative mobilisation ($p<0.05$).* Univariate analysis demonstrated that operative time and surgeon grade were significant predictors of postoperative transfusion. After multivariate analysis, surgeon grade was still a significant predictor of transfusion ($p<0.05$). For both short and long intramedullary (IM) Nails, an increased operative time lead to a significantly increased intraoperative blood loss and postoperative transfusion rate ($p<0.05$).

Conclusion: Operative times and surgeon grade are important factors that impact on the short-term outcomes for hip fracture patients. The most significant predictor of operative time was surgeon grade, even after multivariate analysis ($p<0.05$). For this reason, we call for a renewed vigilance around prolonged operative times for these procedures with appropriate supervision from an experienced attending surgeon.

PE 2-4

Intramedullary nailing and prolonged operative times increase transfusion rates in hip fracture surgery

*Hughes H. *[1], Sheridan G. [1], Storme J. [1], Kelleher U. [1], Curtin P. [1], Hurson C. [1]*

[1]Department of Trauma and Orthopaedic Surgery, St. Vincent's University Hospital, Dublin, Ireland

Introduction: Little is known about the impact of intramedullary (IM) nailing on postoperative transfusion rates and hip fracture surgery outcomes. We describe the effect of intramedullary procedures on short-term outcomes in hip fracture surgery and attempt to identify an optimal operative time to reduce postoperative transfusion requirements.

Methods: The principle aim of this study was to investigate the impact of IM nailing on short-term postoperative outcomes in hip fractures. Secondary aims included identifying the major predictors of postoperative transfusion rates and blood loss in this patient cohort. The major short-term dependant variables that were assessed included blood loss, postoperative transfusion rate, day 1 mobilisation rates, length of stay (LOS) and the 'cumulative ambulatory score'. Predictor variables included the procedure performed, operative time and surgeon grade. The statistical test used was dependent on the variable types. When significant relationships were identified on univariate analysis, multivariate analysis was performed. Subgroup analyses assessing inter-surgeon and inter-procedure outcomes were performed. A p-value of less than 0.05 was significant.

Results: For both short and long IM Nails, an increased operative time lead to a significantly increased intraoperative blood loss and postoperative transfusion rate ($p<0.05$). Significantly poorer outcomes were noted for short IM Nails exceeding 60 minutes and long IM Nails exceeding 105 minutes in duration. Univariate analysis demonstrated that operative time and surgeon grade were also significant predictors of postoperative transfusion ($p<0.05$).

Conclusion: IM Nailing procedures lead to significantly higher intraoperative blood loss and postoperative transfusion rates when compared to 'Non-Nail' procedures. We recommend an operative time of less than 60 minutes for short IM nails and 105 minutes for long IM Nails to reduce the postoperative transfusion requirement.

PE 2-5

Impact of acute kidney injury and hip fractures

*Lewis-Jones G. *[1], Tsang J.* [1]

[1]*Wirral University Teaching Hospital NHS Trust, Wirral University Teaching Hospital NHS Trust, Wirral, United Kingdom*

Introduction: National Hip Fracture Database 2018 annual report showed Wirral University Hospital (WUTH) registered 479 cases with 76.7% achieving Best Practice Tariff criteria placing us within the top quartile. 98.1% of admissions aged 60 or above had a peri-operative assessment (within 72 hours) by a Geriatrician.

Aim of our study was to look at the impact of Acute Kidney Injury (AKI) within our hip fracture population. We looked at the impact on morbidity and mortality. We wished to highlight the proportion of hip fractures that would develop an AKI.

Methods: Retrospective review of aged 60 or above who sustained a hip fracture and developed an inpatient AKI during the months of July to Dec. We selected individuals who developed an inpatient AKI. Serum creatinine levels were used to define an AKI and severity of AKI graded 1, 2 or 3 based on NHS England detection algorithm.

Further variables were also measured to determine predisposing risk factors such as gender, smoker, age, body mass index (BMI). Rates of premorbid comorbidities such as 'hypertension', 'diabetes', 'chronic kidney disease', 'cerebrovascular disease' and 'myocardial infarction' were measured. Other outcomes measured included length of hospital stay (LOS), mortality and when AKI occurred (i.e. pre or post-operative period*).

**Post-operative AKI defined as occurring within 72 hours post operation*

Results: During the review period 40 people developed an inpatient AKI. 30/40 (75%) were stage 1 AKI, 9/40 (22.5%) were stage 2 AKI and 1/40 (2.5%) was stage 3 AKI. 34/40 (85%) developed post-operative AKI.

Over 12 months, WUTH data had 480 people aged 60 or above with hip fractures. 132/480 (27.5%) developed an inpatient AKI (Advancing Quality AKI data WUTH).

Average LOS for hip fracture and AKI was 19.8 days, average LOS of our overall hip fractures was 21 days. Average age of AKI perioperatively was 85 years; average age for hip fractures over 12 months was 82 years. Females were 67.5% of our AKI group and females were 71.7% of overall hip fractures. Mean BMI of AKI group was 23.9, median BMI was 23.5.

Pre-morbid comorbidities, 57% of the AKI group had hypertension, 22.5% diabetes, 37.5% chronic kidney disease, 20% cerebrovascular disease, 12.5% myocardial infarction and 15% smokers.

In-hospital mortality for all aged 60 or above admitted with a hip fracture over 12 month period was 8.13%. In-hospital mortality rates for our cohort of 40 people that developed an AKI was 20% (8/40), p value= 0.0199 (Fisher's exact test). Our results show that developing an AKI is associated with an almost 2.5 times greater mortality rate.

Conclusion: Our results show that AKI within our hip fracture population develops in approx. 1 in 4 (27.5%). They have almost 2.5 times higher mortality. Majority of AKI develop in the post-operative period. Early recognition, early diagnosis and best management should be prioritised. We encourage all hip fracture services to develop ways to ensure early identification and appropriate management of AKI.

PE 2-6

The role of depression in perioperative pain perception amongst elderly with fracture neck femur.

*Aly M. A. E. G. *[1], Saber H.* [1]

[1]*Faculty of medicine-geriatric medicine department , Ain shams university , Cairo, Egypt*

Introduction: Orthogeriatrics is a relatively new concept in Egypt, and our service in Ain Shams university is one of the few centers who provide it. The fracture liaison service aims to optimize perioperative morbidity and mortality by actively seeking out problems faced by the older surgical patient. Elderly patients with fracture neck femur are often burdened by many co-morbidities. The impact of chronic disease and health status on pain perception has been studied before, but few studies have focused on depression, and its effect on effective pain reduction. The purpose of the current study was to look at the part played by depression in perioperative pain.

Methods: The aim of the work was to study the role of depression in both preoperative and postoperative perception of pain in patients aged above sixty admitted with fracture neck femur.

A pilot study of twenty five elderly patients with fracture neck femur admitted to the orthopedic department in Ain Shams University teaching hospitals, over a period of six months (September 2018- February 2019), were enrolled in our study.

Comprehensive geriatric assessment was performed preoperatively and the patients were followed up postoperatively for three days or until discharge. Part of the assessment was screening for depression using Patient Health Questionnaire 2 (PHQ2) and the numerical pain scale.

Results: There were ten gentlemen and fifteen ladies. The mean age was 74+/- 6.4 years old. 40% were previously diagnosed with type 2 DM, and 44% with hypertension. 60% were positive for depression screening.

The mean pain score preoperatively was 7.1+/-1.9 and postoperatively was 4.6+/-2.2. The median of reduction of pain postoperatively was 2 and the median of the percentage of pain reduction was 33.3%.

There was no significant difference between depressed and non depressed patients as regards sex, presence of DM, presence of hypertension or age. Nor was there a significant difference between depressed and nondepressed depressed when we compared preoperative numerical pain scale scores with p value 0.709. But there was a highly significant difference between depressed and non depressed in postoperative numerical pain scale score I, reduction of pain and percent of reduction of pain postoperatively with p values of <0.001.

Conclusion: We found that the presence of depression significantly affects pain reduction postoperatively. In light of our results. Actively searching for depression among patients with fracture neck femur to optimize pain management may be justifiable.

PE 2-7

External validation of the nottingham hip fracture score to predict 30-day mortality after hip fracture surgery in a sample of elderly patients in the us

Alvarez-Nebreda M. L. [*1], *Heng M.* [2], *Allen E.* [3], *McTague M.* [3], *Harris M. B.* [2], *Weaver M. J.* [3]

[1]*Geriatrics, Hospital Universitario Ramón y Cajal IRYCIS, Madrid, Spain,* [2]*Harvard Orthopaedic Trauma Initiative, Massachussetts General Hospital,* [3]*Harvard Orthopaedic Trauma Initiative, Brigham & Women's Hospital, BOSTON, United States*

Introduction: While several risk prediction models for 30-day mortality after hip fracture exist, the Nottingham Hip Fracture Score fared the best in term of predictive value in the geriatric orthopedic population, with moderate discrimination, reasonable calibration, and documented validation. Despite extensive research on the NHFS in the UK, little work on the score has been done internationally, except the two external validation studies performed in Singapore, and in the Netherlands. The goal of this is study is to investigate the accuracy of the Nottingham Hip Fracture Score (NHFS) to predict 30-day mortality after hip fracture in a sample of elderly patients in the US.

Methods: Retrospective observational cohort study including 734 patients aged 65 or older, admitted to two Level I Trauma centers, with a hip fracture that required surgical treatment. NHFS predictors were collected: age, sex, malignancy, institutionalization, comorbidities, hemoglobin, and *cognitive frailty* (either delirium, dementia or Mini-Cog test positive) The outcome variable was 30-day mortality after presentation. NHFS performance was evaluated through its discrimination and calibration. Cut-off points were selected to differentiate mortality risk groups.

Results: Mean age 83 ± 8 years, 69% female, 12% institutionalized, 48% with ≥ 2 comorbidities, 20% with dementia, 44% with cognitive frailty, 44% ambulate without aids, and 67% with an ASA classification ≥ III. 58 patients (7.9%) died within 30 days. The discrimination was acceptable (area under the ROC curve: 0.72, CI 95%: 0.66-0.79; p<0.001) and calibration was good (Hosmer-Lemeshow test: p=0.33). NHFS cut-off points of ≤ 4 and ≥ 8 were set to identify low- and high-risk groups (predicted mortality of 2.8% and 18.2%, respectively).

Conclusion: The Nottingham Hip Fracture Score can be used to accurately predict 30-day mortality after hip fracture surgery in elderly patients in the US. It could serve to identify high-risk patients to better inform about prognosis and to help design preventive strategies, such as comanaged care or exercise and nutrition programs. Future studies will ascertain whether improved versions of the score - adding functional measurements - or even frailty screenings, have a better predictive ability.

PE 2-8

Reducing delays for fractured neck of femur surgery for patients on direct oral anticoagulants (doacs)

Irons R. [1], *Menon D.* [1], *Ralhan S.* [*1]

[1]*Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom*

Introduction: Use of direct oral anticoagulants (DOACs) is increasing as they have now become first line treatment for stroke prophylaxis in atrial fibrillation and treatment of venous thrombo-embolism. Unlike warfarin, for most of the DAOCs (with the exception of dabigatran), there is currently no available reversal agent. Although a reversal agent for the factor Xa inhibitors will likely be approved for use in the near future, its likely cost may mean that use will be restricted to emergency situations only initially.

Practice around timing of cessation of the DOACs to facilitate surgical interventions seems to vary between specialities. Practice in orthopaedic surgery, including for fractured neck of femur (NOF) has been to delay surgery until at least 48 hours after last dose. The target for emergency fractured NOF surgery as set out under the UK best practice tariff (BPT) is for surgery to take place within 36 hours of admission. Increasing prevalence of DOAC use amongst this population of patients therefore makes it impossible to meet BPT if a 48 hour limit is imposed.

Anecdotal reports have emerged in the last few years of centres operating on DOAC patients for fractured NOF between 24 hour and 36 hours after last dose (including part of our own trust), without deleterious consequences. With the support of our haematology and anaesthetic colleagues we developed a new protocol to facilitate and support surgery taking place at 24 hours post last dose.

Methods: We retrospectively analysed cases from our local hip fracture database over 1 year since the new protocol was adopted. We calculated time to theatre for the DOAC vs non DOAC groups, including BPT compliance. We then performed a case-control analysis looking at estimated blood volume loss, transfusion rates, and post-operative haematoma rates between the two groups.

Results: 456 cases were identified for inclusion, 52 of whom were on DOACs (11%). Two DOAC patients actually went to theatre within 24 hours, whilst 38 (76%) went to theatre between 1 and 2 days. 10 patients (20%) went to theatre after more than 2 days. There was no significant difference in estimated blood volume loss, transfusion rates, or haematoma complications between the DOAC and non DOAC groups.

Conclusion: We have developed a robust and widely accepted (amongst specialities) protocol to enable pragmatic and optimal timing of surgery for fractured NOF in patients on DOACs. This has enabled improvements in timing of surgery and therefore recovery speed in a significant number of patients with no obvious negative effects. Similar protocols should be considered in all trauma centres undertaking surgery for fractured NOF.

PE 2-9

Novel oral anticoagulants and timing of hip fracture surgery

Tarrant S. M. [*1], *Catanach M.* [1], *Balogh Z.* [1, 2]

[1]*Department of Trauma, John Hunter Hospital,* [2]*Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia*

Introduction: There is increasing pre-hospital use of antithrombotic medication in hip fracture. Early surgery for hip fragility fractures is recommended but can be compromised by the patients taking blood thinning medications. There is emerging but limited evidence on the surgical timing of hip fracture patients admitted whilst taking direct oral anticoagulants (DOACs).

Methods: The institutional Long Bone Fracture Database and Australia New Zealand Hip Fracture Registry were queried over regular intervals for patients over 65 years of age who had treatment for a hip fracture between January 2011 and December 2018. Demographics, comorbidities and perioperative data were collected on patients taking DOACs. The outcomes were time to OT, Hb changes, transfusion rates, serious adverse events (SAE) and 30-day mortality. Outcomes were assessed with a typical 'Early' vs 'Late' surgery (demarcated by 36 hours post admission) and time as a continuous variable post last dose.

Results: Over 8 years, 3,264 patients were examined, with 113 (3.6%) taking DOACs. This proportion increased over the study period (2011 n=0 (0%), 2012 n=6 (1.4%), 2013 n=5 (1.3%), 2014 n=6 (1.4%), 2015 n=11 (2.7%), 2016 n=17 (4.4%), 2017 n=31 (7.9%), 2018 n=37 (9.4%)). Comparing 'Early' (n=42, 37%) vs 'Late' (n=71, 63%) surgery showed no difference in age (84.1 (±5.9) vs 84.7 (±6.3); p=0.617), gender (Female; n, %: 28 (67%) vs 49 (69%), p=0.796), ASA (Grade 2:3:45; 5:28:8:0 vs 6:41:21:1; p=0.494) or CCI (6.0 (± 2.3) vs 6.0 (± 2.0), p=0.946). There was no differnece in the admission creatinine (83.5 (±21.5) vs 88.0 (±32.7), p=0.459) or estimated glomerular filtration rate (64.2 (±15.4) vs 62.0 (±15.7), p=0.488). More patients received arthroplasty in the delayed group (5 (12%) vs 24 (34%), p=0.012).

There was a significant difference in Hb drop between 'Early' vs 'Late' groups (25 (±12) g/dl vs 18 (±15), p = 0.017), but no difference in transfusion (12 (28%) vs 18 (25%), p=0.708), SAE (9 (21%) vs 17 (24%), p=0.759) or 30-day mortality (6 (14%) vs 10 (14%), p=0.976). When time is used as continuous variable (per hour) with regression adjusted for confounding variables (age, sex, ASA, CCI), there was no significant change in the probability of being transfused (OR: 0.99, 95 % CI: 0.97- 1.00, p=0.209) or sustaining an SAE (OR: 1.00, 95% CI: 0.99-1.02 p=0.863). There was a significant increase in 30-day mortality per hour post dose (OR: 1.02, 95% CI: 1.00-1.04, p=0.049).

Conclusion: This study demonstrates that there is no benefit in transfusion and morbidity by delaying surgery in patients taking DOACs. The risk of 30-day mortality increased with time post dose. Cautious interpretation of results that arbitrarily dichotomise continuous variables should be undertaken in this study and through the wider literature. The rapidly increasing prescription of these antithrombotics necessitates evidence based policy on surgical timing.

PE 2-10

Current trends and cost effectiveness of hemiarthroplasty implant usage for hip fracture in england, wales and northern ireland.

*Inman D. *[1], Fagan E. [1], Hannaford J. [1], Johansen A. [1]*

[1]Falls and Fragility Fracture Audit Programme,, Royal College of Physicians of London, London, United Kingdom

Introduction: In 2018 the National Hip Fracture Database (NHFD) reported on 66,668 people who had a hip fracture in England, Wales and Northern Ireland, of whom 28,451 (43 %) underwent hemiarthroplasty (HA).

The National Institute for Health and Care Excellence (NICE CG124, 2011) recommends that all HAs should be cemented. A recent multi-centre randomised controlled trial (WHITE3) found no difference in health-related quality of life at 4 months using two commonly used cemented HA implants; one modular and one monoblock.

Implant details for patients undergoing elective total hip replacement in the UK are recorded in the National Joint Registry (NJR), but no such data is recorded for patients undergoing HA for hip fracture. We set out to identify the range of HA implants being used in the NHFD catchment, and to highlight cost to individual hospitals and NHS purchasers of using expensive implants without proven clinical benefit.

Methods: HA implants can be cemented or uncemented, monoblock or modular with unipolar or bipolar bearings. Uncemented implants can be coated or uncoated. In January 2019 the NHFD asked every trauma unit in England, Wales and Northern Ireland to identify the specific HA implants they used, and which type was their usual implant of choice. Implant list price data and variation in actual prices paid by hospitals were obtained through collaboration with the 'Get It Right First Time' (GIRFT) programme.

Results: In total 174 of 177 hospitals (98 %) responded. The number of different types of HA used in each hospitals ranged from 2 to 6, with significant variation in implant usage across the country.

95 % of hospitals reported cemented implants as the prosthesis of choice: 49 hospitals (28 %) usually used the monoblock Exeter Trauma stem, 37 (21 %) the modular Exeter unipolar stem and 22 (13 %) a monoblock Thompson stem.

Regarding uncemented stems, 16 usually used the modular Corail unipolar stem and 10 used the modular Corail bipolar stem, and 24 usually or occasionally used the monoblock Austin Moore stem.

Contrary to NICE guidance eight hospitals (5 %) exclusively or predominantly used uncemented implants. Modern, uncemented implants are coated to improve bonding to the bone, but their cost is higher.

Our description of variation in implant choice is set against GIRFT data demonstrating significant inter-implant price differences, and variation in the prices paid by different hospitals for identical implants.

Conclusion: The two commonly used cemented unipolar HA implants in the WHITE3 study had list prices that varied by a factor of four (£273 *vs.* £1,202), which across the NHFD could equate with an annual total in excess of £25 million. Hospitals should review their HA inventory for cost effectiveness and consider rationalising stock options. This will lead to significant cost savings that might be more appropriately and more cost-effectively invested in other parts of the hip fracture patient pathway.

PE 2-11

Risk discussion including end of life preferences in asa grade 4 patients with fracture neck of femur surgery

*Rajeev A. *[1], Lekhak B. [2]*

[1]Trauma and Orthopaedics, [2]Anaethesia, gateshead health foundation Nhs Trust, Gateshead, United Kingdom

Introduction: The one year mortality of fragility fractures of the hip is about 30 %.The risk is even higher in ASA grade4 patients. There is only one study looking at the outcomes and frequency of risk discussions with patients or their relatives regarding the preferences of whether to undertake resuscitation in the event of a cardiac arrest. The aims of our study is to look at whether a discussion has taken with the patients undergoing fracture neck of femur surgery or next of kin regarding the risk of surgery and end of life preferences in ASA grade 4 patients,30 day and one year .

Methods: An audit of presence or absence of pre-op DNACPR forms of one hundred consecutive patients with fracture neck of femur that were classified as ASA grade 4 from January 2017 was carried out. The patient demographics including age, co-morbidities and whether they had dementia were noted. The type of anesthesia administered was also documented. The number of patients who died within 30 days and one year were recorded. The hospital case notes and electronic data of all the patients were audited for existence of DNACPR forms.

Results: The mean age was 83.4 years (Range 50-99).Forty one patients (41 %) had dementia. The average number of co-morbidities were 4.79. Forty eight patients had GA+RA, 30 and 22 patients had GA and RA respectively. The risks of the surgery have been explained to the patient or next of kin but discussion regarding resuscitation in the event of cardiac arrest was not documented in most cases. Only 29 had DNACPR forms in place. Twenty patients had pre and 9 had post-operative DNACPR forms. Fifteen out of 41 patients (27.3 %) with dementia had DNACPR forms signed pre-operatively. The overall 30 day mortality was 18 %(18 patients) of which 11patients had no forms. The one year mortality was 39 %(39 patients) of which 20 patients did not have forms. The number of patients alive at the end of one year was 61 of which 7 patients had DNACPR forms. Out of the 29 patients who had DNAR forms, 30 day mortality was 10 % and one year mortality was 22 %.

Conclusion: Our study shows that in ASA grade4 patients with fracture neck of femurs after discussion of high risk of mortality with the patient or their relatives before the surgery 29 patients had DNACPR forms in place. We recommend that in ASA grade 4 patients who are undergoing surgery for hip fractures the outcomes, mortality rates, end of life preferences and expectations should be discussed and documented .DNACPR forms should be considered only in selected patients.

PE 2-12

Trial of geriatrician-led treatment system for elderly patients with hip fractures

*Kaku T. *[1], Oh Y. [1], Miyatake K. [1], Yoshii T. [1], Okawa A. [1]*

[1]Department of Orthopaedic Surgery, Tokyo Medical and Dental University, Tokyo, Japan

Introduction: In the treatment of elderly patients with hip fractures, orthopaedic surgeons often struggle with perioperative systemic complications, and attentive management by geriatrician is recommended. We aggressively started surgical treatment for hip fractures in elderly patients with severe underlying disease from 2014. Initially, orthopaedic surgeons were in charge of whole-body management, and a geriatrician-led system was introduced from April 2017. Here, we report our trial of geriatrician-led treatment system for elderly patients with hip fractures.

Methods: Between January 2014 and March 2018, we surgically treated 52 elderly patients with hip fractures in a university hospital. Patients were divided into two study groups according to main medical departments: the orthopaedic group (n = 34; mean age, 79.0 ± 7.6 years) and the geriatrician group (n = 18; mean age, 82.1 ± 9.0 years). Retrospectively, we evaluated waiting period (days from initial visit to surgical intervention), length of a hospital stay, incidence of perioperative systemic complications

(e.g., aspiration pneumonia, heart failure, urinary tract infection, deep venous thrombosis, or pulmonary embolism), and in-hospital mortality.

Results: Mean waiting period and hospital days were 5.0 ± 4.5 days and 29.5 ± 13.2 days in the orthopaedic group, and 3.7 ± 4.7 days and 27.4 ± 23.5 days in the geriatrician group. Waiting period was significantly shorter in the geriatrician group ($p < 0.05$), and no significant difference was seen in hospital days ($p = 0.1570$). Although statistical analysis revealed no significant difference in incidence of perioperative systemic complications between the groups (26.5 % and 16.7 %; $p = 0.4369$), only one patient in the orthopaedic group was resulted in in-hospital death.

Conclusion: The present geriatrician-led treatment system allowed orthopaedic surgeons to concentrate purely on surgery and shortened waiting period. If the present system develops to multidisciplinary and regional approach, hospital days may also be significantly shortened.

PE 2-13

Peri-operative enhanced recovery hip fracture care of patients with dementia (perfected)-cluster randomised controlled feasibility trial.

Cross J. L. [*1]

[1]*school of health sciences, university of east anglia, norwich, United Kingdom*

Introduction: Hip fracture in people with dementia and delirium, presents major challenges for older patients, their families/carers and health and social care. The outcomes after surgery for elderly hip fracture patients are often poor and are worse in patients with cognitive impairment (CI). Patient with CI and fracture die sooner, memory problems get worse during their admission and admissions are often longer. They are also less likely to return to their pre fracture residence and only a quarter return to their previous level of mobility. The costs of care are 40 % more than in those without CI. There is little research on how best to look after this patient group in hospital. Our previous work shows that patients, families, carers and staff repeatedly report the need for more sensitive ways to look after people with CI. Staff have also highlighted the need for staff training to engage them more meaningfully with the needs of this group.

To address this need we developed a complex intervention called PERFECT-ER (featuring 68 patient level care and 15 organisational items) made up of: a best practice checklist, a staff training manual, staff time to implement the items on the checklist, staff time to train colleagues and a process to help continuous improvement in care.

Methods: A cluster randomised control trial and process evaluation of the PERFECT-ER complex intervention in 11 hospitals in England and Scotland involving 282 people with hip fracture and CI.

Results: We recruited to the trial and implemented the intervention over 15 months and PERFECT-ER shows potential for improving cognition (MMSE) and in-patient hospital survival rate.

The process evaluation showed that despite difficulties in the acute hospital environment including staffing levels, bed pressures and numbers of frail patients, the intervention was welcomed and utilised in the intervention hospitals.

Conclusion: People admitted to hospital with hip and CI are vulnerable. National audits have shown some improvement in recognition of this issue, but communication and planning have repeatedly been found to be poor and in hospitals, training for staff is at best limited. The process evaluation indicates that ***ward practice changes***, which aim to enhance care for people with hip fracture and cognitive impairments ***are possible and practicable*** and may have the potential to improve important outcomes.

PE 2-14

Statins and myocardial infarction in geriatric hip fracture

Tarrant S. M. [*1], *Kim R.* [1], *Balogh Z.* [1, 2]

[1]*Department of Trauma, John Hunter Hospital,* [2]*Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia*

Introduction: Patients who sustain geriatric hip fracture have a high prevalence of cardiac disease. Perioperative cardiac events are under-reported in hip fracture. Statins have been shown to reduce myocardial infarction (MI) in cardiac and vascular surgery and may have a protective role in hip fracture surgery.

Methods: Patients aged 65 years and over who sustained a hip fracture at our institution between 2015 and 2017 were identified from the Australian New Zealand Hip Fracture Registry (ANZHFR). Variables included age, sex, comorbidities, American Society of Anesthesiologists (ASA) score, age-adjusted Charlson Comorbidity Index (CCI), Revised Cardiac Risk Index (RCRI) and admission medications including type of statin were collected. Outcomes were MI and mortality. The association between statin use and occurrence of MI was examined using logistic regression with propensity score weighting to account for potential confounding or selection bias, dose-response association between statin medications and MI was examined using logistic regression and multinomial regression modelling was then used to examine the associations between statin use and severity of MI.

Results: Between January 2015 and December 2017, 1,166 patients sustained a geriatric hip fracture. Of those, 391 (34 %) were taking a statin on admission. Thirty-one (2.7 %) patients were diagnosed with an MI. Risk factors for MI were older age (p=0.027), a history of ischaemic heart disease (<0.0001), chronic renal failure (0.006), aortic aneurysm (0.036), pace maker (0.041) as well as increased Charlson Comorbidity Index (0.004) and Revised Cardiac Risk Index (<0.0001). Of the patients who sustained an MI, patients taking statins in admission (n=13, 42 %) compared with those not (n=18, 58 %) had lower inpatient mortality (15 % v 50 %; p=0.047). When this was modelled using severity of MI as a combined outcome to reduce bias, a significant difference was noted (OR 2.45, 95 % CI: 1.01-5.96; p=0.049) which lost significance when adjusting for covariates (OR 1.47, 95 % CI: 0.58-3.71; p=0.416).

Conclusion: After adjusting for bias, preadmission statin use in geriatric hip fracture was not associated with a reduction in clinically diagnosed MI, all-cause mortality, or the ability to survive an MI. A low rate of clinical MI suggests a potential to increase diagnosis, identify high risk patients and explore perioperative cardioprotection.

PE 2-15

Dual antiplatelet therapy and surgical timing in geriatric hip fracture

Tarrant S. M. [*1], *Kim R.* [2], *Balogh Z.* [1, 3]

[1]*Department of Trauma, John Hunter Hospital, Newcastle,* [2]*Department of Trauma, John Hunter Hospital, Cooks Hill,* [3]*Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia*

Introduction: Dual antiplatelet therapy (DAPT; aspirin and clopidogrel) is increasingly prescribed for high-risk vasculopathic patients who sustain geriatric hip fractures. This study examines how timing of surgery affects transfusion, major complications and mortality.

Methods: Patients aged 65 years with a geriatric hip fracture were investigated at a single University-affiliated Level 1 Trauma Centre between 2002-2017. Patients admitted on DAPT were stratified into 'early' (<36hr) and 'late' surgery (>36hr). Demographic and perioperative data were collected from patient records, institutional databases and national hip fracture registry.

Results: Of the 6,724 patients sustaining a geriatric hip fracture, 122 were taking DAPT on admission. 73 patients received 'early' surgery and 49 'late' surgery. No differences were seen with total transfusion units (Incidence Rate Ratio[IRR] 0.84, 95 % CI: 0.51-1.36, p=0.473), major complications (OR 1.11, 95 % CI: 0.51-2.42, p=0.801) or 30-day mortality (OR 1.97, 95 % CI: 0.71-5.48, p=0.196). When time to surgery was considered as a continuous variable from last dose, the units transfused did not relate to timing of surgery (IRR 1.00, CI 95 %: 0.99-1.01, p=0.968), however major complication (time as quadratic; ORs ranging from 0.93 to 1.09, $p_{time}=0.001$, $p_{time*time}<0.001$) and 30-day mortality (OR 1.01, CI 95 %: 1.001-1.022, p=0.030) both increased with operative delay.

Conclusion: Surgical delay does not change the need for transfusion of hip fracture patients on DAPT, but is associated with an increased probability of major complications and increased probability of 30-day mortality.

PE 2-16

Improving peri-operative care in the hip fracture unit at the royal berkshire hospital.

*Butt S. *[1], Alsahab M. [1], Chatterjee A. [1]*

[1]Royal Berkshire Hospital , Reading, United Kingdom

Introduction: The 'acute monitoring bays' in the Hip Fracture Unit at the Royal Berkshire Hospital were established in October 2015 to improve perioperative care. A guideline was developed to monitor and manage such patients. Cohorting of patients led to an improvement in patient outcomes, however adequate staffing in the acute bays was difficult to maintain and this was highlighted in incident forms. A Quality Improvement Project was conducted to look at the nursing workload in the 'acute bays' and to establish safe staffing levels.

Methods: In May 2017, proforma were designed to capture prospective data for nursing workload on the admission day, day of surgery, recovery and post-operative day. Data was exported to an Excel sheet and analysed. A staff survey was also conducted during this period.

Interventions included meetings with the Matron and Ward Manager to improve staffing level. Monthly teaching sessions were conducted for staff to enhance their knowledge and skills. Following the PDSA (Plan-Do-Study-Act) interventions a further audit was repeated in May 2018.

Results: The staff survey showed that nurses enjoyed working in the acute bays, but felt they needed more training for managing medical complications and suggested that more staff should be allocated to manage the increasing workload, particularly at night.

A total of 13 and 33 patients were included in the first and second audits respectively. The busiest period for a nurse was on the day of admission often taking an average of 105 and 115 minutes to complete the task. The time spent in recovery was constant in both cycles (122 minutes), similarly hand over from recovery took approximately 14 minutes. Duration of nursing shifts were amended after staff consultation to reflect longer days which led to an improvement in the staffing for the 'acute bays'. Staffing was higher in the second cycle by 13 % for admissions, 27 % on the day of surgery and 36 % on the post-operative day. Interestingly the medical complications fell by 20 % in the second cycle.

Analysis of the 103 inpatient falls showed the majority (29 % n=31) occurred in the first acute bay, which supported our recommendations to cohort patients in order to monitor and avoid complications.

Conclusion: Our current staffing levels have improved to 4 Nurses and 4 Health Care Assistants (HCA's) in the morning shift, 4 nurses and 3 HCA's in the late shift and 3 Nurses and 2 HCA's in the night shift. It has now been agreed to appoint a HCA for the night shift. We hope to visit another hip fracture unit with a higher monitoring area to learn from their experience.

Perioperative care for frail older people is complex and should be provided by collaborative work between surgeons, anaesthetists and orthogeriatricians. Cohorting pre and immediately post-operative patients has an advantage as they can be monitored closely. However this may lead to a high volume of acute patients and each unit should look to ensure adequate staffing as suggested in the NHFD facilities audit in 2018.

PE 2-17

Reducing time to surgery for hip fracture patients on direct oral anticoagulants

*Reynolds S. *[1], Seymour H. [1], P'Ng S. [1], Lindfield K. [1], Jones C. [1]*

[1]Fiona Stanley Hospital, Perth, Australia

Introduction: The Direct Oral Anticoagulant (DOAC) medications are increasingly utilised in Australia due to the numerous clinical advantages that they offer when compared to Warfarin. Orthopaedic surgery is frequently delayed due to the increased risk of bleeding associated with therapeutic anticoagulation. The decision to delay surgery is complicated by the large body of evidence that supports improved short-term and long-term outcomes associated with early orthopaedic intervention for a fractured neck of femur.

There is limited evidence available to guide the optimal management of patients of emergency surgery patients taking DOAC medications in the perioperative setting. DOAC levels may be useful to estimate the pharmacodynamic effect of DOAC medications. A level of < 50ng/mL has been used in the elective surgery setting as a threshold level to proceed with surgery. At the end of 2017, our hospital approved a protocol to manage hip fracture patients on DOACs utilising a DOAC level. DOAC levels were tested on admission and if the level was >50ng/mL, surgery was delayed and the DOAC level was repeated the following morning until the level was <50ng/mL.

Objectives: To determine whether implementing a protocol for measuring DOAC levels and agreeing a safe DOAC level for surgery reduced time to surgery for hip fracture patients on DOACs compared to historical controls and patients not on anticoagulant medication.

Methods: A retrospective review of 2022 consecutive patients admitted with hip fracture were identified using the ANZ Hip Fracture Registry dataset at our institution between June 2015 and December 2018. Patients were included if they were aged 50 years or older and were admitted with a hip fracture and had surgical management. Medication on admission was identified using the Electronic Medical Record.

Results: Of the 2022 patients reviewed during the study period, 141 were taking a DOAC on admission. Three patients were excluded from analysis as they underwent non-operative management of their hip fracture. Patients not taking any anticoagulation admitted to our hospital during 2018 had a mean time to surgery of 25 hours. Prior to the implementation of the protocol 89 patients on a DOAC had a mean time to surgery from presentation to first hospital ED of 46 hours (median 44 hours). In 2018 following the protocol implementation 52 patients were admitted on a DOAC and mean time to surgery was 33 hours (median 22 hours).This is comparable to all other hip fracture patients. There was no difference in drop in haemoglobin or transfusion rates between patients taking DOACs and patients not taking anticoagulation. Complication rates at our institution were similar to rates described in the literature.

Conclusion: Implementing an agreed protocol using a DOAC level of <50ng/ml to proceed with surgery demonstrated a reduction in time to surgery at our institution. It is possible to safely operate on hip fracture patients taking DOACs within recommended times.

PE 2-18

Managing fragility hip fracture patients on direct oral anticoagulants - an emerging problem

*Greenhalgh M. S. *[1], Iyengar K. [1], Sangani C. [1], Adam R. [1]*

[1]Trauma and Orthopaedics, Southport and Ormskirk NHS Trust, Southport, United Kingdom

Introduction: Managing elderly patients with fragility hip fractures (FHF) on direct oral anticoagulants (DOACs) is an emerging problem. Early operative intervention has been shown to improve outcomes. This must be balanced against bleeding risk, patient safety, and accruement of Best Practice Tariff (BPT) and management of reversible coagulopathy.

This observational study assesses FHF patients on DOACs or warfarin and their peri-operative course during their journey in a district general hospital with the aim of developing local guidelines.

Methods: We included consecutive FHF patients on DOACs or warfarin and their peri-operative course whilst admitted to Southport and Ormskirk NHS Trust from 1st October 2017 to 31st September 2018. Data was collected from the National Hip Fracture Database (NHFD), Electronic Patient Records, Patient Archived Computer System (PACS) and discharge summaries. This included demographics, anticoagulation status (agent, dose, and biochemical levels), fitness for surgery (ASA Grading), reasons for surgical delay (if any), perioperative Haemoglobin (Hb) change, renal function, and time to surgery (TTS) and the effect on accruing BPT. Two-sample t-test and correlation coefficient with descriptive analysis was undertaken.

Results: 326 FHF patients were included with an average age of 83.3 years. 252 were female (77.3%) and 74 (22.7%) male. 45/326 (13.8%) were

on anticoagulation on admission. 22 (6.7%) were on DOACs Apixaban (19), Rivaroxaban (3) whilst 23 (7.1%) on warfarin. The average ASA grade for non-anticoagulated patients was 2.78, for anticoagulated was 3.16 (DOAC 3.23 and warfarin 3.09). There was a statistically significant difference between ASA grade for anti-coagulated and non-anticoagulated patients (p=<0.05), but no significant difference between DOAC and warfarin patients (p=0.16). The average INR of FHF patients on warfarin was 2.52 at admission (range 1.7 – 4.3). Average TTS was 38.9 hours (range 14 to 71).

The average eGFR in patients taking a DOAC was 57.9 (range 25 – 78); average TTS was 42.1 hours (range 2 to 94). There was no statistically significant difference in Hb drop between the two groups (p=0.31). Delay in surgery in the 16/23 patients of warfarin group, resulted in a potential loss of £19,520 whilst delay in the 8/22 patients of DOAC group, resulted in potential loss of £9,760 following BPT adjustment.

Conclusion: Anticoagulated patients made up a significant portion of FHF patients. When optimised for surgery there was no statistically significant difference in perioperative blood loss between patients taking warfarin or a DOAC. Delay of surgery for reversal of anticoagulant attributed in potential financial loss to the Trust whilst accruing BPT. A balance must be struck between early intervention, delaying surgery for optimisation and accruement of BPT. Local guidelines have been developed for the management of these FHF patients taking DOACs.

PE 2-19

An audit of red cell transfusion practice among trauma & orthopaedics inpatients

Park S. H. [*1], *Bellofatto I.* [1], *Moezmahdavi F.* [1], *Ong T.* [1]

[1]*Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom*

Introduction: The Joint UK Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee (JPAC) emphasised that blood transfusion should only be used when benefits outweigh the risks and when there are no alternatives. A Cochrane systematic review on red cell (RBC) transfusion for people undergoing hip surgery suggests the current evidence is in favour of restrictive transfusion threshold based on lower haemoglobin (Hb) levels and symptoms rather than a liberal Hb threshold of 10g/dL. The aim of our audit was to analyse the transfusion practice in the Trauma & Orthopaedics wards of our hospital.

Methods: Patients who received RBC transfusion were sourced from local registry. Data were collected retrospectively from hospital electronic health records. The records detailed the pre-transfusion haemoglobin, transfusion unit and episode, transfusion setting, presence of symptoms, and comorbidities. The audit standard used is the NUH blood transfusion guideline.

Results: We audited 227 patients (Male 33% , female 67%) admitted in Trauma & Orthopaedics wards in 2018. The patients selected were age 50 and above, with an average age of 82. Majority of the patients 97% (n=220) were hospitalized due to fracture, which 96% of them had surgery.

There were a total of 312 transfusion episodes, 81% were given for acute blood loss, 13% for pre-op optimisation and 6% for chronic anaemia. Prior to transfusion, 12% of transfusion episodes had a Hb of <70, 32% had Hb of 70-80, 56% had Hb >80. Among patients who had pre transfusion Hb above 80, only 24% had known cardiorespiratory disease.

Neck of Femur (NOF) fracture accounted for 71% (n =156) of the fracture cases. Among the NOF fracture group, 15% of transfusion episodes were given pre-op, 17% intra-op and 68% post-op. The average transfusion episode among the NOF patients were 1.32, with median 2 units per episode.

Conclusion: There is significant variety in Hb threshold for RBC transfusion among orthopaedic inpatients despite clear NUH guidance of transfusing only if Hb <70 and Hb <80 for those with cardiorespiratory disease. This indicates room of improvement for decision making regarding RBC transfusion in the department. This is extremely important considering that blood transfusions are associated with several risks especially in patients with hip fractures, who are usually frail and have several comorbidities.

PE 2-20

Opportunities for intervening? - timelines in prehospital hip fracture care

Dixon J. R. [*1], *Wilson F.* [2], *Charlton K.* [3], *Eardley W.* [1]

[1]*Trauma and Orthopaedics, James Cook University Hospital, Middlesborough,* [2]*Care of the Elderly, Sunderland Royal Hospital, Sunderland ,* [3]*North East Ambulance Service, North East Ambulance Service , Newcastle, United Kingdom*

Introduction: Most patients sustaining hip fractures require input from ambulance services and require ambulance transportation to hospital. Currently the patient journey from scene of fall to the emergency department remains poorly understood. We aim to report the timelines and distances travelled prehospital by patients sustaining hip fractures, in order to improve understanding and inform the feasibility of prehospital clinical interventions in this population.

Methods: An analysis of North East Ambulance Service (NEAS) and National Hip Fracture Databases (NHFD) databases from units across the North East of England was performed. Distances from scene to hospital were calculated from post-codes. ANOVA analysis was performed to assess variance in timelines.

Results: 735 patients were included. Mean time spent at the scene of injury by paramedics was 41 minutes, and total time paramedics spent with patients, including travel from the scene to hospital, was 1 hour and 7 minutes on average. Total time from a call being made to emergency services and patient presentation to hospital with hip fracture was 1 hour 59 minutes. Distances travelled ranged from 4.17 to 25.01km.

Conclusion: Ambulance response times varied little across centres. Time spent at scene was very similar across all units and was independent of transit times and distance, as such offering the greatest potential 'window' for interventions. Journey time from scene to hospital ranged from 15.21 to 31.12 minutes and is limited in terms of procedural interventions by the complications of being in transit.

PE 2-21

Management of fragility hip fractures in a developing country: a combined team-based multidisciplinary orthogeriatric care setting and fracture liaison service

Reyes P. V. S. J. [*1], *Tabu I.* [1]

[1]*Orthopedics, University of the Philippines Manila-Philippine General Hospital, Manila, Philippines*

Introduction: Hip fractures in the elderly have become an increasingly common health concern. A joint care model in orthogeriatric care shows better outcomes in terms of time to surgery, length of hospital stay, and inpatient mortality. In the setting of increasing rates of osteoporosis and fragility fractures, the UPM-PGH Orthogeriatric Multidisciplinary Fracture Management Model and Fracture Liaison Service (FLS) was launched and a hip fracture database was established.

Methods: In adapting this model, all patients aged 60 years old and above with acute fragility hip fractures were treated by a multidisciplinary team. An FLS was in charge of documentation and coordination of follow-up consultations. Data collection from the database was done to gather information regarding the patient profile, time to surgery, length of hospital stay, and follow-up rate, since this model was implemented.

Results: Twenty-eight patients were seen for a period of nine months. Majority were female, with an average age of 74. Most injuries were from a fall from standing height.

Analysis showed a decrease in time to surgery and in length of hospital stay, when compared to previous data. Follow-up consults reveal more than 50% compliance with anti-osteoporosis medication, and that no secondary fractures or periprosthetic fractures have occurred since.

Conclusion: The implementation of a team-based orthogeriatric multidisciplinary care is likely to be beneficial to patients and feasible in a government hospital with limited resources. An FLS establishes consistent communication between the patient and health care providers which encourages better follow-ups and prevention of secondary fractures.

PE 2-22

The impact of adopting low molecular weight heparin in place of aspirin as routine thromboprophylaxis for patients with hip fracture

*Hoskins H. [1], Protty M. [2], Havelock W. [*1], Hickey B. [1], Lewns G. [1], Pettit R. [1], Saad T. [3], Johansen A. [1]*

[1]University Hospital of Wales, [2]Systems Immunity University Research Institute, Cardiff University , [3]University Hopsital of Wales, Cardiff, United Kingdom

Introduction: Deep vein thrombosis (DVT) is a significant cause of morbidity and mortality following hip fractures. National Institute of Health and Care Excellence guidelines recommended both mechanical and pharmacological measures (NICE CG96, 2010); calling for anticoagulant use rather than aspirin. We examine the impact of changing our unit's pharmacological thromboprophylaxis policy in response to this recommendation.

Methods: We examined data for patients presenting with hip fracture in a single UK trauma centre between 2007 and 2017; before and after our change in practice from use of aspirin to low molecular weight heparin (LMWH) in June-2010. Concern about the safety of compression stockings meant the rate of mechanical prophylaxis remained low across this period. We excluded 544/5,583 patients who normally reside outside our catchment area. Data for the remaining 5,039 was compared with medical physics records to all Doppler ultrasound scans they had undergone in this period. We examined the impact of the change of practice by calculating rates of lower-limb DVT in affected and unaffected limbs, both before and after hip fracture.

Results: 913 patients (18.1%) received Doppler scans. 307 scans (33.6%) were prior to the fracture, but 400 were 'relevant scans' in the 180 days after a hip fracture. These identified 40 ipsilateral and 14 contralateral DVTs (p=<0.001). Fewer DVTs occurred after June-2010; 29/3,475 patients compared to 25/1,542 in previous years. The rate of DVT reduced significantly following the change in departmental policy; from 1.62% to 0.83% of patients with hip fracture (p=0.012).

Conclusion: This retrospective study suggests the rate of clinical DVT fell by half following this change in pharmacological prophylaxis. Our figure of <1% for the incidence of clinical DVT in a unit that routinely uses just LMWH following hip fracture will provide a context for discussions of alternative strategies, and for power calculations for future research.

PE 2-23

Description of an orthogeriatric unit

*Reynolds S. [*1], Seymour H. [1]*

[1]Fiona Stanley Hospital, Perth, Australia

Introduction: Orthogeriatric units use different models to care for older orthopaedic patients but many only manage hip fracture patients. Orthogeriatric units have evolved with some units now co-managing patients admitted with other fractures and joint infections. Orthogeriatric units that co-manage all older orthopaedic patients are not well described, in terms of the number of patients that are managed and who will benefit most from co management. Orthogeriatrics at our tertiary hospital routinely sees all hip fracture patients, which was 547 patients in 2017. Patients >65 admitted under Orthopaedics are routinely reviewed on the Orthopaedic ward. Further reviews are daily if orthogeriatrics believe that is required. The Allied health staff triage orthopaedic patients who will most benefit from Orthogeriatric review in other areas of the hospital at the daily ward meeting. Patients who are admitted overnight in the Day of Surgery Unit (DOSA) are not routinely reviewed by orthogeriatrics.

Methods: A retrospective review of all orthopaedic patients aged >65 years admitted to a tertiary hospital between July-December 2017

Results: Over the six month period 651 patients were co-managed by orthopaedics and orthogeriatrics, including 255 patients with hip fracture and 396 with another diagnosis. The most common admission reasons other than hip fracture were lower limb fracture n=49, upper limb fracture n=75, septic arthritis n=60 and other admission reasons n=93. There was no difference in length of stay between hip fracture and non-hip fracture patients (5.15 vs 5.01 days). Orthogeriatrics reviewed 71% of all patients with other orthopaedic diagnoses at least once during their admission compared to 95% of hip fracture patients. Orthogeriatrics did not review any wrist fracture patients admitted to DOSA. Patients admitted with other orthopaedic diagnoses were younger and had fewer co-morbidities compared to hip fracture patients. Patients with femoral fractures (periprosthetic and distal femoral) had similar demographics to hip fracture patients, with a higher Charlson Comorbidity Index score and mean age compared to all other patients admitted without hip fracture. Patients with septic arthritis had similar demographics compared to all patients admitted without hip fracture but had the longest length of stay of all the groups.

Conclusion: Not all older orthopaedic patients necessarily benefit from inpatient orthogeriatric review. Patients with septic arthritis, femoral and humeral fractures benefit from routine orthogeriatric review due to their comorbidities and increased morbidity related to their injury or illness. Using our model of care, we are able to review most older patients admitted under orthopaedics, however, we are missing the opportunity to identify and treat osteoporosis in patients who are admitted to our DOSA. Planning for new orthogeriatric services should anticipate reviewing twice as many orthopaedic patients as the number of hip fractures' admitted at a tertiary institution

PE 2-24

Nutrition in hip fracture units: characterising everyday practices in preoperative supplementation

*Dixon J. R. [*1], Channell W. [1], Arkley J. [1], Wilson F. [2], Eardley W. [1]*

[1]Trauma and Orthopaedics, James Cook University Hospital, Middlesborough, [2]Care of the Elderly, Sunderland Royal Hospital, Sunderland , United Kingdom

Introduction: Hip fractures pose a major burden on UK health services. The hip fracture population is associated with high rates of malnutrition, multiple comorbidities and frailty. Key to addressing the needs of this vulnerable patient group is nutrition optimisation, including reduction of arbitrary nil by mouth regimens. In order to understand current practices and introduce interventions that may confer benefit, we aim to characterise preoperative nutrition in a regional hip fracture population.

Methods: Data submitted to the NHFD from 6 centres was interrogated over a 15 month period between 2017 and 2018. Preoperative nutritional regimens were analysed. AMTS, Rockwood score, Nottingham Hip Fracture Score, Age and Charlson score were also analysed between nutritional strata. Results: 24.2% (*n* =205) patients received no oral intake at all preoperatively (NBM). 15.3% of NBM patients were at risk of malnutrition and 6.9% were malnourished at time of assessment. Median time to surgery for NBM patients was 16.75 hours, and 6.34% of NBM patients were fasted for > 36 hours. 6.53% (n=44) of patients with an AMTS of 8 or above were deemed to be at risk of malnutrition at admission, compared to 11.26% (n=50) of patients with an AMTS of 7 or below. NBM patients had similar mean Rockwood (4.97), Charlson (5.09) and AMTS (6.51) scores to patients given oral nutrition.

Conclusion: We present a characterisation of nutritional practices in the management of hip fracture patients preoperatively. Age, AMTS, Rockwood and Charlson scores vary little when stratified by nutritional regimen. Given that key aspects of perioperative management of hip fracture, namely pain control, vary by cognition, this study would suggest that this does not apply to nutrition. We have, however, identified widespread, prolonged NBM fasting and undersupplmentation in hip fracture patients across a region, suggesting a need to address systematic practices regarding perioperative nutrition in hip fracture in the UK.

PE 2-25

Staff attitudes towards the creation of an 83 bedded trauma and orthopaedic unit including the development of an acute hip fracture ward- the merger of three wards.

*Mulvaney E. *[1], Ong T. [1], Mee C. [1], Campbell V. [1]*

[1]Trauma and Orthopaedics, Nottingham University Hospitals Trust, Nottingham, United Kingdom

Introduction: The trauma and orthopaedic wards saw 100% increase in the amount of hip fracture patients admitted from Nursing Homes as well as a 16% increase in patients admitted who already required a walking aid across winter 2017/2018.

The managers of the three trauma and orthopaedic wards in a large East Midlands Major Trauma Centre propose a merger to create an 83-bedded unit, resulting in an acute ward for newly admitted patients and two step-down wards. The acute ward will be staffed to facilitate the timely and skilled care required by patients in the immediate pre and post-operative phase and will also include those patients who are more unwell. The two step-down ward areas will be for those patients who are in recovery or have less acute care needs.

Examination of the attitudes and responses of the nursing staff on all three wards to the creation of such a unit is essential for success.

Methods: Questionnaires were issued to all 110 staff. Questionnaires are inexpensive and can be shared widely amongst all staff. (Rattray and Jones, 2007). Questionnaires are extensively used in studies. (Coghlan, Cronin & Ryan, 2007).

Scoping work was carried out to ascertain how best the staff wanted to provide their information. Social media was utilised.

Staff who use social media (n=85 staff read the post) (9.4% n=8) reported via social media that they would like a paper questionnaire.

Questionnaires were issued 17th May 2018 to all 110 staff of all bands, 2-6.. Either placed in their pigeon holes, or handed to them by a member of their team. Staff were identified on each ward to support the data collection and a tick list was provided ensuring all staff were issued with the questionnaire. The closing date was 8th July 2018.

Results: The band 5 nurses are 96% (n=19) positive on the merger. 39% (n=9) feel it is a good idea to improve patient care, with another 25% (n=4) voicing positive opinions about supporting each other, care being more structured.

Data collected identified that 59% of band 5s felt they would be able to provide more specific care, with 36% feeling they would be able to provide a higher level of care, with 5% identifying it wouldn't leave a ward top heavy.

Band 5 staff were asked about their worries around the proposed merger whom 32% (n=5) state they have no worries, 31% (n=5) state they are worried about working with new staff, 25% (n=4) also state that they are worried about an increase in stress. The overall response rate was 42.6%.

Conclusion: Winter 2017/2018 was widely regarded as a significant challenge for the NHS. The senior nursing team on the Trauma and Orthopaedic wards identified a creative staffing solution to the current nursing shortage. The unit will also utilise the new Nursing Associate role on the step down wards.The merger will go ahead to build on the evidence in the literature that patient outcomes are improved when cared for by registered nurses.

PE 2-27

An observational study to see the post operative outcome of patients on direct oral anticoagulants having neck of femur fractures.

*Ali J. *[1], Simon A. [1], Chaudhry S. [1]*

[1]Orthogeriatrics, Birmingham Heartlands Hospital, BIRMINGHAM, United Kingdom

Introduction: Direct oral anticoagulants (DOACs) are in wide use among patients requiring both short- and long-term anticoagulation, mainly due to their ease of use and the lack of monitoring requirements. Increasing number of patients on DOACS are having hip fractures requiring surgical intervention and post-operative management. In this observational study we aimed to compare the outcomes of patients admitted with hip fracture on DOACs who have to wait for 48 hours as a standard for their surgical correction versus those who are admitted with neck of femur fracture and are not on any anticoagulation.

Methods: We reviewed two months of data to see the outcomes of patients admitted on DOACs having neck of femur fracture on a major trauma and orthopedic ward in a secondary care hospital. This data compared the time from admission to having anaesthesia either general or spinal, length of stay and post operative need for blood transfusion, were the main components

Results: Number of patients on an average on DOACs getting admissions with neck of femur fractures have increased, time from admission to general anaesthesia is not meeting the standard NHFD guidelines due to the recomendations of 48 hours wait from last dose of oral anticoagulant, but the data shows that the length of stay of these patients has decrease, the number of patients needing blood transfusion did show an increase when compared to those not on oral anticoagulants.

Conclusion: Patient on DOACs are optimized better preoperatively, although the time from admission to anaesthesia has prolonged our observational study results suggest that these patients had a better outcome in terms of length of stay when compared to population with hip fractures not on DOACs.

Research in Fragility Fractures

PE 3-1

The hidden fracture? Identifying sacral fractures at a university teaching hospital.

*van Berkel D. *[1], Herschkovich O. [2], Taylor R. [2], Ong T. [1], Sahota O. [1]*

[1]Health Care of Older People, [2]Queens Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: Fractures of the pubic rami are the most common pelvic insufficiency fractures. 60-80% of patients with a pubic rami fracture will have a concurrent sacral fracture identified on magnetic resonance imaging (MRI). Sacral fractures are more unstable and load-bearing, thus it is postulated that their presence increases the risks associated with pain-dependant mobility reduction. Minimally invasive sacroplasty is available and has been shown to improve pain related outcomes. We aimed to quantify the number of patients identified with sacral insufficiency fractures.

Methods: Prospective screening of pelvic imaging in patients aged 70 years or over presenting to Queens Medical Centre, Nottingham over a 6 month period (October 2018 to March 2019). Relevant supplementary information obtained retrospectively from hospital-held medical records**.**

Results: 88 predominantly female (84%) patients presented with presumed insufficiency fractures of the pubic rami. 14% of these patients were discharged direct from the Emergency Department, 34% were admitted under Trauma and Orthopaedic (T&O) teams, 46% under Health Care of Older People (HCOP) teams and 7% to other specialities. Those admitted to T&O were on average 3 years younger than those admitted to HCOP (85 vs 88, p=0.03). Overall length of stay was 13 days, with no differences observed between admitting speciality. 9% of patients were returning with on-going pain associated with previously missed or identified pubic rami fractures. 8% of initial plain x-ray imaging missed pubic rami fractures. 38% of patients received further pelvic imaging, either computerised tomography (CT) or MRI. There was no significant difference in uptake of further imaging if admitted either to T&O or HCOP teams. For those patients who obtained further imaging, 15% did not have an acute pubic rami fracture as identified on plain x-ray, 36% were shown to have acetabular fractures and 70% showed sacral fractures of all types. Of the patients that received further imaging, 52% were diagnosed with a Type 1 Lateral Compression pelvic fracture (pubic rami with ipsilateral sacral fractures).

Conclusion: Plain x-rays are a poor modality for the identification of pelvic fractures. Where pelvic fractures are missed or their severity not appreciated, appropriate pain control can be more difficult to achieve. Despite this, 62% of patients are not receiving further imaging to confirm the extent of pelvic insufficiency fractures. Further imaging confirms that a high proportion of these patients have concurrent sacral fractures, that may be amenable to minimally invasive intervention to confer better outcomes. Future work would attempt

to identify factors or markers that could predict those patients at risk of poorer outcomes; in order to target further imaging resources to those patients who may benefit most from early identification of sacral fractures.

PE 3-2

The osteoporosis treatment gap in patients at risk of fracture in european primary care: a large, multi-country cross-sectional study.

*McCloskey E. [1], Rathi J. [2], Heijmans S. [3], Blagden M. [4], Palmer K. [5], Stad R. [6], O'Kelly J. [*5], Papapoulos S. [7]*

[1]University of Sheffield, Sheffield, United Kingdom, [2]Carrig Medical Centre, Cork, Ireland, [3]ResearchLink, Linkebeek, Belgium, [4]Ashgate Medical Practice, Chesterfield, [5]Amgen Ltd, Uxbridge, United Kingdom, [6]Amgen Europe GmbH, Rotkreuz, Switzerland, [7]Leiden University Medical Center, Leiden, Netherlands

Introduction: Primary care may be the first setting where osteoporosis can be recognised, and therefore primary care physicians act as gatekeepers for osteoporosis management. However, recent European data regarding diagnosis and treatment rates of postmenopausal osteoporosis in the primary care setting are lacking. The objective of this study was to assess patterns of real-world OP diagnosis and medical treatment in European primary care.

Methods: Eligible patients were community-dwelling women aged ≥ 70 who visited their primary care physician for any reason and consented to participate in the study. Patient demographics, OP treatment history and clinical risk factors were collected via self-reported questionnaires and medical records. The primary outcome of the study was the proportion of women aged ≥ 70 years at increased risk of fragility fracture (FF) who were not receiving OP medication (the "treatment gap"). Increased risk of FF was defined as at least one of (1) history of fracture, (2) 10-year probability of both hip and major OP fracture above country-specific FRAX thresholds, (3) T-score ≤ -2.5.

Results: 3798 patients were enrolled between Mar-Oct 2018 from 8 countries (approximately 500 patients each from Belgium, France, Germany, Ireland, Poland, Slovakia, UK, and 205 from Switzerland). Overall, 2077 women (55%) met at least one definition for increased risk of FF, including 1200 women with a prior fracture and 318 with a T-score ≤ -2.5. For the primary outcome, three quarters of women at increased risk of FF were not receiving any OP medication [1550/2077; 75% (95% CI: 73-77%)]. The treatment gap was higher in women not diagnosed with OP (94% [1318/1401]) than those who had been diagnosed with OP (31% [198/641]). There were variations between countries in the proportions of patients at increased risk of fracture (from 41% in Slovakia to 76% in Switzerland) and in the proportions diagnosed with OP (from 15% in Poland to 30% in Switzerland). The treatment gap was over 50% in all countries (Ireland 53%, Switzerland 64%, UK 65%, Belgium 68%, Slovakia 75%, France 82%, Poland 88%, Germany 91%), and the difference in treatment gap between those with and without an OP diagnosis ranged from 37% to 79%. Types of OP medication used in the different countries were consistent with known local reimbursement guidelines.

Conclusion: This real-world study of OP management in European primary care found a large treatment gap among women aged 70 or more who are at increased risk of FF. Across eight European countries, and despite variations in reimbursement, clinical practice and clinical risk factors for fractures, more than half of patients at increased fracture risk were untreated. Insufficient OP diagnosis appears to be an important barrier to treatment.

PE 3-3

Age and the distribution of major injury across a national trauma system

*Dixon J. R. [*1], Lecky F. [2], Bouamra O. [3], Wilson F. [4], Edwards A. [5], Eardley W. [1]*

[1]Trauma and Orthopaedics, James Cook University Hospital, Middlesborough, [2]Emergency Medicine, University of Sheffield , Sheffield , [3]Faculty of Biology, Medicine and Health, University of Manchester, Manchester, [4]Care of the Elderly, Sunderland Royal Hospital, Sunderland , [5]Trauma Audit and Research Network, University of Manchester, Manchester, United Kingdom

Introduction: Trauma places a significant burden on healthcare services and how its managed impacts greatly on the injured patient. The demographic of major trauma is changing as the population ages, unveiling gaps in processes of managing older patients. Key to improving patient care is the ability to characterise current patient distribution. There is no contemporary evidence available to characterise how age impacts on trauma patient distribution at a national level.

Through an analysis of the Trauma Audit Research Network (TARN) database, we describe the nature of Major Trauma in England since the configuration of regional trauma networks, with focus on injury distribution, ultimate treating institution and any transfer in-between.

Methods: The TARN database was analysed for all patients presenting from April 2012 to the end of October 2017 in NHS England.

Results: 307,307 patients were included of which 63.8% presented direct to a non-specialist hospital (Trauma Unit (TU)). Fall from standing height in older patients, presenting to and largely remaining in TU's, dominates the English trauma caseload. Contrary to perception, major trauma patients currently are being cared for in both specialist (Major Trauma Centres (MTC)) and non-specialist (Trauma Unit) hospitals. Paediatric trauma accounts for <5% of trauma cases and is focussed on paediatric MTC's.

Conclusion: Within adult major trauma patients in England, mechanism of injury is dominated by low level falls, particularly in older people. These patients are predominately cared for in Trauma Units rather than Major Trauma Centres. This work illustrates the reality of current care pathways for major trauma patients in England in the recently configured regional trauma networks.

PE 3-4

Seasonal variation in pressures on trauma services and in deaths following hip fracture

*Grose C. [*1], Havelock W. [2], Johansen A. [2]*

[1]University Hospital of Wales, Cardiff, United Kingdom, [2]Trauma Unit, University Hospital of Wales, Cardiff, United Kingdom

Introduction: Seasonal variation in numbers of patients presenting with hip fracture is well recognised, and the implications of this for trauma and orthogeriatric service have been discussed (*Age Ageing 2016* doi:10.1093/ageing/afw133). We set out to examine whether increased pressures in the winter months might lead to poorer outcome for the frail older people who typically suffer this injury.

Methods: The National Hip Fracture Database (NHFD) has been reporting data for all patients presenting in England, Wales and Northern Ireland since 2007. Monthly data for over 175 individual hospitals are made freely available by the Crown Informatics website www.nhfd.co.uk. We analysed this published data for the 450,754 people who presented during the seven years from April 2011 to March 2018.

Results: We found the previously described seasonal variation in number of people presenting: 8.0% more people presenting in the winter months (December-February) than in the summer (June-August). However, the total number of people dying within 30 days of hip fracture was 30.5% higher among those presenting in the winter. In total 33,649 people (7.46%) died within 30 days of hip fracture, but this figure varied significantly ($p<0.001$, Chi^2 test); ranging from 6.66% in July to 8.65% (29.9% higher) in January.

Conclusion: The public health impact of these findings is significant. An 8% increase in hip fractures during the winter would equate with 1,250 additional fractures during these months each year. Patients average over 20 days in hospital, so these additional cases will compound the stresses on hospital services of the Christmas and New Year holiday period. Such factors must be taken into consideration when organising trauma and orthogeriatric services if we are to try and avoid the additional 325 deaths that we found to occur each winter.

PE 3-5

The influence of combination therapy with zoledronate and treadmill training in ovariectomised rats

*Tsubouchi Y. *[1], Kataoka M. [2], Ikeda S. [1,3], Tsumura H. [3]*

[1]Department of Rehabilitation, Oita University Hospital, Yufu, [2] Faculty of Welfare and Health Sciences, Oita University, Oita, [3]Department of Orthopaedic Sugery, Oita University, Yufu, Japan

Introduction: This study aimed to investigate the effect of combination therapy with zoledronate (ZA) and treadmill training (TT) on the microstructure and strength of bones in ovariectomised (OVX) rats.
Methods: A total of 40 female Sprague–Dawley rats aged 24-week-old were divided into 4 groups (n = 10 each) after 2 months of ovariectomy according to interventions: Control (C group, administered saline); ZA administration (ZA group, 0.1 mg/kg_single administration); TT (T group, 20 m/min, 1 h/day, 5 days/week) and ZA administration + TT combination (ZA + T group). In addition, 10 rats without ovariectomy were included as the sham group (S group). 6 weeks after intervention, rat femurs were collected and subjected to bone morphometry by μCT. The cortical bone was observed at the centre of the diaphyseal region using scanning electron microscopy (SEM). To evaluate bone strength, the maximum compressive load and stiffness were measured using a 3-point bending test. SPSS 22.0 was used for statistical analysis. Following one-way analysis of variance, Tukey test was performed as post-hoc test for intergroup comparisons.
Results: No differences were observed for cancellous bone mass between the C and ZA groups, with values 42.8% lower in both these groups than that in the S group, but these values in the T and ZA + T groups were 34.6% and 45.2% higher than that in the C group, respectively. However, compared with this value in the S group, values in the T and ZA + T groups were reduced by 23.0% and 16.9%, respectively. Cortical bone mass did not differ significantly among the groups; cortical bone thickness in the ZA group (0.42 mm) was significantly greater than that in the S (0.37 mm), C (0.39 mm), T (0.37 mm) and ZA + T (0.38 mm) groups. For bone strength, maximum compression load was 132.4, 114.8, 126.5, 130.7 and 134.7 N in the S, C, ZA, T and ZA + T groups, respectively; the ZA + T group had a significantly higher value than that in the C group. Stiffness was 0.040, 0.028, 0.038, 0.041 and 0.039 N/m^3 in the S, C, ZA, T and ZA + T groups, respectively; the T and ZA + T groups had significantly greater values than that in the C group. The SEM observation of cortical bone revealed more widely distributed lamellar structures in groups receiving TT compared with that in the C group.
Conclusion: This study demonstrated that exercise therapy had a strong effect on osteoporosis. However, full recovery was not achieved even at 6 weeks after intervention with combination of adequate exercise and a therapeutic drug. The results of this study suggest that it is difficult to restore the reduced bone mass in osteoporosis to its original level once appropriate treatment opportunities are missed.

PE 3-6

Fractures of the hip sustained whilst inpatient –a retrospective study of outcomes and mortality rates

*Rajeev A. [1], Zourob E. *[1], Jabbar F. [1], Anto J. [2]*

[1]Trauma and Orthopaedics, [2]Anaesthesia, QUEEN ELIZABETH HOSPITAL, Gateshead, United Kingdom

Introduction: Fracture neck femur is one of the commonest fragility fractures in elderly and associated with increased mortality and morbidity. Even though majority of these fractures happen in the community about 7% happen while they are being admitted as an in-patient for other medical illness. These patients have more than one significant morbidities and the time taken to get these patients to operating theatre is long compared to those admitted from the community. They also have a prolonged post-operative stay and rehabilitation period which contributes to the adverse outcomes of these injuries. The aim of this study is to look at the mortality of patients with fracture neck of femur sustained while as an inpatient and document the 30 day and one year mortality.

Methods: A retrospective review of all the patients admitted to the acute hip unit with fracture neck of femur sustained while as an inpatient over a period of ten years from January 2007 to December 2017. The patient demographics including age, sex, side of injury, place of injury (type of ward), ASA grade and AMT score were recorded. The Fracture pattern and details of operation were also noted. The mortality at 30 day and one year were recorded.
Results: A total of 3445 patients were admitted to our unit during this period. There were 292 patients identified who had fracture neck of femur sustained while as in-patient. The mean age was 79.6 years (Range 70-101 years).The majority of patients were females 74.2%. The right side affected in 150 patient a and left side in 142 patients. The mean ASA grade was 3.4 (3.4± 0.8).The median AMT score was7.4 (7.4± 3.3). Majority of patients 102(71%) was an inpatient in the medical ward, followed by 82 (28%) in the surgical wards. There were 181 (62%) intra-capsular fractures, 100(35%) intertrochanteric fractures and 11(3%) sub trochanteric fractures.180 (62%) patients had more than one co-morbidities. The average time taken to get to the operating theatre was 27.8 hours and the mean length of stay in the hospital after surgery was 17.4 days. 94(32%) patients were discharged to their own homes. The 30 day mortality was 25.7% (75 patients).The mortality at the end of one year was 47.94 %(140 patients).
Conclusion: In our study we found that 30 day mortality was 26% and one year mortality was 48% in patients who had sustained fracture neck of femurs whilst in the hospital compared to 6.3% and 22.4% respectively for the patients admitted from the community. We conclude that the patients with fracture neck of femur sustained while as inpatient have got higher mortality rate. The presence of significant co-morbidities, delay in surgery, dementia and high ASA grades contribute to the higher mortality rate

PE 3-7

Cognitive impairment in hip fracture patients: demographics and outcomes.

*Craig J. R. M. *[1], McDonald S. [1], Barr R. J. [1]*

[1]Trauma & orthopaedic department, Royal Victoria Hospital, Belfast, United Kingdom

Introduction: Cognitive impairment can affect fragility fracture patients, either as part of a long-term condition such as dementia, or as an acute confusional state. Patients with cognitive impairment present challenges such as reduced ability to communicate regarding symptoms and comply with recommendations for rehabilitation.
The objective was to assess the effect of a cognitive impairment (CI), i.e. Abbreviated Mental Test (AMT) scores of 0-6 out of 10 on admission, on mortality and outcomes functional outcomes among hip fracture patients in a regional trauma centre. Comparisons were made with patients with normal cognition (AMT scores 7-10).
Methods: A Fracture Outcomes Research Database (FORD) search identified all hip fracture patients with recorded AMT scores on admission to Northern Ireland's regional trauma centre from January 2000 to September 2016. Patients aged under 65 were excluded. P-values of 0.05 or less were deemed significant.
Results: Of 10220 included patients, 37% had CI.
The patient group with CI had a higher mean age, more female patients, and were more likely to have American Society of Anaesthesiologist (ASA) grades 3-4.
Patients with CI had a higher mortality rates at 30, 120 or 365 days, overall, and among subgroups with ASA grades 1-2, and with ASA grades 3-4 ($p<0.0001$ for all comparisons).
Patients with CI were more likely to require walking aids or assistance for mobilising, or be immobile, have lower functional scores, and were less likely to be admitted from their own home($p<0.0001$ for all).
Among patients who survived for 1 year, those with CI were more likely to have reduced mobility, require additional walking aids, and have reduced functional scores. Among patients who had lived at home prior,

those with CI were less likely to be living at home at 1 year (p<0.0001 for all).

To remove the potential bias associated with higher age, matched groups were identified (201 patients with AMT 0-6 & 201 with AMT 7-10) with similar ages, ASA grades, full functional scores, and the ability to independently mobilise without aids.

Within these matched groups, patients with CI had significantly higher mortality rates at 30, 120 & 365 days (p-values 0.013, 0.008 & 0.011 respectively). At 1 year, survivors had worse functional scores (p=0.0001) but aids and independence in walking were statistically similar in the matched groups.

Conclusion: Patients with cognitive impairment represent a frail and elderly cohort who are at higher risk of death, reduced mobility, dependence on walking aids, reduced function and requiring institutional care at 1 year. However, in a demographically matched cohort, patients with cognitive impairment had higher mortality rates and more functional deterioration at 1 year but not significantly worse mobility or dependence on walking aids. While hip fracture patients with cognitive impairment may be at increased risks, some elements of deterioration may be attributable for pre-existing demographic, mobility or functional limitations.

PE 3-8

Mexican hip fracture audit: results from the pilot phase

*Viveros Garcia J. C. [*1], Robles Almaguer E. [2], Albrecht Junghanns R. [3], Lopez Cervantes R. [4], Lopez Paz C. [5], Olascoaga Gómez De León A. [6], Ramirez Izquierdo G. [7], Torres Naranjo F. [8], Zuñiga Gil C. [9]*

[1]Geriatria, Issste Leon, Leon, [2]Geriatria, Pemex, Reynosa, [3]Geriatria, Hospital Angeles Puebla, Puebla, [4]Traumatologia Y Ortopedia, Hospital Country 2000, Guadalajara, [5]Anestesiology, Hgz 58 Imss, Leon, [6]Rehabilitation, Instituto Nacional De Rehabilitacion, Ciudad De Mexico, [7]Geriatria, Hgz 21 Imss, Leon, [8]Osteoporosis, Centro De Investigacion Osea, Guadalajara, [9]Geriatria, Hospital General De Tijuana, Tijuana, Mexico

Introduction: Hip fracture (HF) is a major public health problem. It has a high morbidity, mortality, costs and increases the risk of dependence. The audits on HF have shown to be helpful in describing the epidemiology of hip fracture, improving quality indicators and decreasing mortality.

Methods: The main objective is to know the demographic characteristics, quality indicators and healthcare outcomes in HF in Mexico. We made an observational, cross-sectional, epidemiological, multicenter study. We report the pilot pahse. We included patients 65 years and older with a diagnosis of hip fracture in 10 public hospitals and one private hospital. We analyzed the sociodemographic variables, functionality, gait and healthcare outcomes in the acute phase and after 30 days.

Results: Between April and December 2018, 119 patients with fragility hip fracture were included. The mean age was 79 years and 82% were women. The 79.8% walked independently. The most frequent type of fracture was the pertrochanteric with 58%. Regarding quality indicators, only 21% were in the emergency room less than 4 hours. Only 10.5% had surgery before 48 hours. The main cause of delay was lack of surgical time with 58.8%. The main complications were sore ulcers with 34.1% and delirium 35.7%. The mortality of the acute phase was 8.4%. After 30 days the 69.2% were not able to walk.

Conclusion: This study shows that adherence to quality indicators is way below the recommended standards and maybe has repercussions on healthcare outcomes. Policies must be generated to increase adherence to quality indicators.

PE 3-9

Understanding the role of social factors in recovery after hip fractures:

a scoping review

*Auais M. [*1], Al-Zoubi F. [2], Matheson A. [3], Brown K. [4], Magaziner J. [5], French S. [6]*

[1]School of Rehabilitation Therapy, Queen's University, Kingston, [2]McGill University, Montreal, [3]Queens University, [4]Queen's University, Kingston, Canada, [5]University of Maryland, Baltimore, United States, [6]Macquarie University, Sydney, Australia

Introduction: Poor recovery among older adults with hip fractures can occur despite successful surgical repair and rehabilitation, suggesting other factors might play a role in recovery, such as social factors. Objective: Provide an overview of the literature on the role of social factors in older adult's recovery after hip fracture.

Methods: Protocol followed the York Framework. Two independent researchers searched main medical databases (CINAHL, EMBASE, Medline, PsycINFO and the Cochrane libraries) from inception to June 2017, for studies investigating social factors and recovery post hip fracture. Studies were excluded if they were qualitative, perspective papers, or if participants were <65 years or they were not living in the community.

Results: We screened 2,503 unique abstracts and 19 studies fulfilled the inclusion criteria. Only two included studies were randomized controlled trials. Social factors investigated in the included studies were: social support, socioeconomic factors, and living arrangement. We classified outcomes into three subgroups: physical functional recovery, mortality, and other factors (pain, hospital length of stay, and quality of life). We found evidence that social support and socioeconomic factors (e.g. socioeconomic status) were significantly associated with an increase in functional recovery, a decrease in mortality, and other outcomes, but conflicting evidence was found for the effect of one's living arrangement.

Conclusion: Social factors, such as social support and socioeconomic status, affect physical functional recovery and mortality in older adults with hip fractures. However, this is an under researched area that lacks rigorously designed studies and would benefit from more studies with rigorous designs.

PE 3-10

Association of cha2ds2-vasc score with stroke, thromboembolism and death in hip fracture patients with or without atrial fibrillation.

*Hjelholt T. J. [*1], Johnsen S. P. [2], Brynningsen P. K. [3], Pedersen A. B. [1]*

[1]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, [2]Department of Clinical Medicine, Aalborg University Hospital, Aalborg, [3]Department of Geriatrics, Aarhus University Hospital, Aarhus N, Denmark

Introduction: The risk of postoperative stroke and other thromboembolic events in hip fracture (HF) surgery patients is elevated up to 10 times compared to the background population. Postoperative mortality is also high, 8-10% of the patients die within 30 days following HF. Identifying high-risk patients at the time of admission is thus of great clinical interest. The CHA_2DS_2-VASc score has been widely used to assess stroke risk in patients with atrial fibrillation (AF), but it is unclear if the score can be used to assess risk of cardiovascular events in older, comorbid and medically complicated HF patients without AF.

We aimed to evaluate the association of CHA_2DS_2-VASc score and stroke, thromboembolism and all-cause mortality in HF patients with or without AF.

Methods: In this nationwide cohort study, we used prospectively collected data from the *Danish Multidisciplinary Hip Fracture Database* to identify all patients aged 65 years and older, admitted with a first time HF between 1st January 2004 and 30th November 2016. We collected data on medical and pharmacological history on an individual level from other medical databases. Outcomes were first-time hospitalization for ischemic stroke, all thromboembolisms (stroke, myocardial infarction, peripheral arterial embolism or pulmonary embolism), or death. We calculated cumulative incidences and hazard ratios (HR) with 95% confidence intervals, by CHA_2DS_2-VASc score, stratified on previous history of AF.

Results: Among 80,316 HF patients, 12,886 patients (16.04%) had a diagnosis of AF. The AF patients had a mean CHA_2DS_2-VASc score of 4.30 (standard deviation (sd) 1.47) whereas the non-AF patients had a mean score of 3.52 (sd 1.30). Only 32 % of patients

in the AF- group were treated with anticoagulants at the time of admission.

Cumulative incidence for ischemic stroke increased with ascending CHA_2DS_2-VASc score from 1 through ≥6, 1 year after HF: 1.80%, 2.53%, 2.56%, 3.73%, 4.82%, 8.70% in AF patients and 1.54%, 1.50%, 1.86%, 3.27%, 4.68%, 7.64% in non-AF patients. Compared with a CHA_2DS_2-VASc score of 1, adjusted HRs were 1.72 (0.62-4.81), 1.68 (0.62-4.56), 2.27 (0.84-6.09), 2.71 (1.01-7.28), 4.46 (1.67-11.96) among AF patients for CHA_2DS_2-VASc score 2 through ≥6, and 1.14 (0.89-1.46), 1.33 (1.05-1.68), 2.21 (1.74-2.8), 2.65 (2.08-3.38), 4.27 (3.35-5.46) for non-AF patients for CHA_2DS_2-VASc 2 through ≥6. A similar "dose-response" relationship was observed for thromboembolism and death as outcomes, however less pronounced for death.

A sensitivity analysis excluding all patients treated with anticoagulants 6 months prior to the HF incident provided similar results.

Conclusion: Among elderly and multimorbid HF patients, CHA_2DS_2-VASc score is associated with stroke, thromboembolism and death in patients with a history of AF as well as in patients without AF. Less than one third of the patients diagnosed with AF were treated with anticoagulants, indicating a very conservative treatment approach in these high-risk patients.

PE 3-11

Patients do not perceive a connection between their bone health and other health conditions or the medications taken for these conditions

*Sale J. [*1], Frankel L. [1], Bogoch E. [1], Gignac M. [2], Hawker G. [3], Elliot-Gibson V. [1], Jain R. [4], Funnell L. [4]*

[1]St. Michael's Hospital, [2]Institute for Work & Health, [3]University of Toronto, [4]Osteoporosis Canada, Toronto, Canada

Introduction: Little is known about patients' perceptions of the relationship between bone health and their other chronic health conditions, or the medications they are taking for these conditions. Among patients with a fragility fracture presenting with at least one other chronic health condition, we examined: 1) perceptions of the association between bone health and their other health conditions; and 2) perceptions of the association between bone health and the medications they were currently taking for other health conditions.

Methods: We identified fragility fracture patients who presented to an urban fracture clinic in Toronto, Canada, with at least one self-reported chronic health condition (in addition to bone health) based on a predetermined list of conditions considered as comorbidities. The coordinator responsible for recruitment was blinded to our study objective. We conducted in-depth qualitative interviews that were 60-90 minutes in duration. Data were analyzed relying on Giorgi's phenomenological approach.

Results: We interviewed 26 patients (21 females, 5 males) aged 45 to 84 years old. Overall, participants were taking 1-12 medications each and presented with a variety of comorbidities (range 1-6 per individual). All 26 participants described at least one condition or medication they were currently taking that has been reported to have a negative impact on bone health (increased fracture risk; increased risk of falling). The most commonly reported *condition* with a reported negative impact on bone health was depression and/or anxiety (n=12) and the most commonly reported *medication* with a reported negative impact on bone health was taken for high blood pressure (18 medications taken by 12 participants). Of the 26 participants, 4 were taking a bone sparing medication at the time of the interview and an additional 4 participants reported a previous history of taking bone sparing medication. Our analysis indicated that 8 participants perceived an association between their other conditions and bone health, with 5 of these referring to mental health affecting their motivation to exercise. Only 4 participants reported they were aware of an association between their medications and bone health which they had learned through conversations with various health care providers and family members, or by conducting their own research.

Conclusion: We found that few patients were taking bone sparing medication but that all patients were taking at least one medication that potentially compromised their bone health. Patient awareness of the association between bone health and other chronic health conditions, or the medications taken for other health conditions, was low. Health care providers should consider the impact of prescribed medications on bone health when recommending medication for other health conditions.

PE 3-12

Does identifying frailty from icd-10 coded data improve prediction of adverse outcomes in patients with hip fracture?

*Harvey L. A. [*1,2], Harris I. [3,4], Mitchell R. [5], Cameron I. [6], Close J. [1,7]*

[1]Falls, Balance and Injury Research Group, Neuroscience Research Australia, [2]School of Public Health and Community Medicine, [3]South Western Sydney Clinical School, University of New South Wales, Sydney, [4]Whitlam Orthopaedic Research Centre, Ingham Institute for Applied Medical Research , Liverpool, [5]Australian Institute of Health Innovation , Macquarie University, [6]Sydney Medical School, University of Sydney, [7]Prince of Wales Clinical School, University of New South Wales, Sydney, Australia

Introduction: Frailty is increasingly recognised as an independent risk factor for adverse outcomes, separate from age, sex and comorbidities. A new Hospital Frailty Risk Score (HFRS) to identify patients with frailty and prolonged hospitalisation in ICD-10 coded hospital data has been developed and validated in a national sample of older patients admitted as an emergency to acute hospitals in the UK. (Gilbert et al, Lancet 2018;391:1775-82)

This study aimed to: (1) evaluate the performance of the HFRS in the prediction of adverse outcomes in a hip fracture population, and (2) compare the HFRS performance against the Charlson Comorbidity Index (CCI), a commonly used comorbidity measure.

Methods: Hospitalisation and death data for individuals aged ≥50 years admitted to hospital in New South Wales, Australia, for a hip fracture between 2007-2017 were linked to provide comprehensive person-based records. The frailty score was calculated using the Gilbert algorithm and categorised into low (<5), intermediate (5-15) and high risk (>15). The Charlson comorbidity score was calculated using the Quan CCI coding algorithm. A two year lookback period was used to calculate both scores. Outcome measures assessed were 30-day mortality, prolonged acute care length of stay (LOS >75th quartile) and 28-day unplanned readmission. Several regression models were fitted for each outcome: 1) base model (age and sex only); 2) base + CCI; 3) base + HRFS; 4) base + CCI+ HRFS and 5) base + CCI+ HRFS + socioeconomic status quintile + number of hospitalisations in previous 2 years. The area under the receiving operator curve (AUC) and Akaike information criterion were assessed for each model.

Results: For the 55,871 patients (mean age 82.3 ± 9.9, mean CCI score 1.5 ± 2.1) just under a quarter (23.3%) were categorised as low frailty risk, 41.3% intermediate frailty risk and 35.4% as high frailty risk.

Whilst all models performed better than base alone for prediction of 30-day mortality; adjusting for CCI score (AUC 0.72, 95%CI 0.71-0.73) provided better prediction than adjusting for frailty (AUC 0.69, 95%CI 0.68-0.70). Adjustment including all factors (model 5, AUC 0.73, 95%CI 0.72-0.74) did not significantly improve model performance above that achieved by adjusting for CCI. All models had poor ability to predict prolonged length of stay (AUC range 0.54-0.60) or readmission (AUC range 0.54-0.60).

Conclusion: Although the HFRS was developed and optimised to identify individuals with characteristics of frailty who are at risk of adverse outcomes from hospital data, adjusting for frailty did not improve prediction of 30-mortality in our hip fracture population. Neither frailty nor CCI score were useful for predicting prolonged hospital stay or unplanned readmission within 28 days of discharge. While the HFRS did not improve risk prediction models in our cohort, it may be useful in identifying patients at the point of hospital admission for whom a frailty-attuned approach to care will be beneficial.

PE 3-13

Newly diagnosed cognitive disorders and associated factors in a two-year systematic post-hip fracture follow-up

Jaatinen R. [*1,2], *Luukkaala T.* [3,4], *Nuotio M.* [5,6]

[1]Department of geriatric medicine, Seinäjoki Central Hospital, Seinäjoki, [2]Doctoral Programme in Clinical Investigation, Turku University, Turku, [3]Health Sciences Faculty of Social Sciences, [4]Research, Development and Innovation Centre, Tampere University, Tampere, [5]Geriatrics Department of Clinical Medicine, Turku University, [6]Department of geriatrics, Turku City and Turku University Hospitals, Turku, Finland

Introduction: Cognitive disorders and dementia increase risk for falls and fractures and are thus common in older hip fracture patients. Less is known about specific diagnoses of cognitive disorders emerging after hip fracture. This study aims to describe newly diagnosed cognitive disorders and associated factors in a systematic two-year follow-up after hip fracture.

Methods: A population-based cohort of 1165 consecutive patients aged 65 years and older sustaining their first hip fracture between January 2010 and August 2015 were systematically followed up for two years. Prefracture diagnosis of cognitive disorder were excluded. Of the remaining patients, 541 (91.2% of the survivors) underwent a CGA at the geriatric outpatient clinic 6 months post-hip fracture. Diagnostic investigations of cognitive disorders based on the 2010 update of the National Care Guideline including internationally accepted diagnostic criteria were conducted. Data on diagnostic investigations and diagnoses were extracted manually from the patient files by one researcher (RJ).

Results: A new cognitive disorder was diagnosed in 184 (22.1%) patients. Alzheimer's disease (AD, n=79, 42.9%), vascular cognitive impairment (VCI, n=23,12.5%) and mixed type (AD+VCI, n=83, 39.7%) were the most common diagnoses. Less common cases, including Lewy body disease, dementia in Parkinson's disease, alcohol induced dementia and a case of ALS dementia complex were also identified (n=9,4.9%). Of the patients with a cognitive disorder, 77.3% scored under 24 in the Mini Mental State Examination and 75.3% under 5 points out of 6 in the Clock Drawing Test. Dementia was mild in 23.7% and at least moderate in 46.4% of the patients according to the Clinical Dementia Rating. Compared with patients with no cognitive disorder, 64.4% vs. 38.6% (p<0.001) patients with newly diagnosed cognitive disorder had difficulties in physical and 83.5% vs. 59.1% (p<0.001) in instrumental activities of daily living, 21.6% vs. 12.7%8 (p=0.017) reported depressive mood on the 15-item Geriatric Depression Scale, 40.8% vs. 24.8% (p=0.001) had poor nutritional status according to the Mini Nutritional Assessment, short form 49.5% vs. 40.6% (p<0.001) scored at least moderately abnormal on Timed Up and Go and 52.1vs. 42.4%(p=0.037) reported urinary incontinence. Patients with cognitive disorder were more likely have poorer mobility (48.5% vs.25.6%; p<0.001) and to live in more supported living accommodation (39.2% vs. 21.3%; p<0.001) than in the prefracture situation.

Conclusion: Undiagnosed cognitive disorders are a significant source of morbidity and disability after hip fracture. In most patients dementia was at least moderate. AD with or without VCI were the most common diagnoses. A systematic post-hip fracture follow-up with diagnostic investigations and CGA is needed to optimize the care of patients with cognitive disorders and in terms of a rehabilitation plan and secondary prevention of falls and fractures. Earlier diagnosis of cognitive disorders is needed

PE 3-14

The sufficiency of 25-hydroxyvitamin d in elderly patients with proximal femoral fracture

Kanno A. [*1], *Aizawa T.* [2]

[1]Orthopaedics, Sendai South Hospital, Sendai, [2]Orthopaedics, Iwaki City Medical Center, Iwaki, Japan

Introduction: 25-hydroxyvitamin D (25[OH]D) is used as good indicator of vitamin D stores. In previous reports, insufficient vitamin D is one of the risk factors of fragility fractures. However, there had been seldom reports about the sufficiency of vitamin D stores the patients with fragility fractures.The aim is to investigate the concentration of 25[OH]D in the patients with hip fragility fracture.

Methods: Subjects were 34 men and 164 women with fragility hip fracture, who suffered from April 2017 to February 2019. Average age was 84.7 (65-98). All subjects were treated in Iwaki City Medical Center of Fukushima Rosai Hospital and gave informed and written consent of this study. Concentration of 25[OH]D was measured. The number of vertebral fractures was counted by plane X-ray. Bone mineral density (BMD) of lumbar spine (L2 to L4) and that of femoral neck were measured using DEXA method. Vitamin D sufficiency, insufficiency, and deficiency was defined as the concentration of 25[OH]D: ≥30ng/ml, 20 to 30ng/ml, <20ng/ml, respectively. The correlations between the concentration of 25[OH]D and other variables by Spearman's rank correlation coefficient: the number of vertebral fractures, YAM value of the lumbar and that of the femoral neck.

Results: The average concentration of 25[OH]D was 11.4 ng/ml (4 to 26.1). 25[OH]D was not sufficient in any subjects. 25[OH]D was insufficient in 11 subjects (5.6%). In the rest of 187 subjects (94.4%), 25[OH]D was deficient. The average number of the vertebral fractures was 3.0 (0 to 11). The average YAM value of lumbar spine and femoral neck was 75.7% (36 to 134) and 53.9% (29 to 93), respectively. The concentration of 25OHD is not correlated to the number of vertebra fracture, and both YAM values.

Conclusion: In previous reports, 25[OH]D is not sufficient in community-dwelling people. Much severe 25[OH]D deficiency was apparent in the elderly patients with hip fracture, in other words, severe osteoporosis. When fragile hip fracture occurred, there had been already multiple vertebral fractures in most patients. Lumber degeneration and bone quality might influence high values of BMD.

PE 3-15

Direct oral anticoagulants (doacs): outcomes in a single centre cohort

Moppett I. [*1], *Chatterton D.* [2], *Wachtl M.* [2], *Nightingale J.* [3]

[1]Anaesthesia, University of Nottingham, [2]Anaesthesia, [3]Trauma & Orthopaedics, Nottingham University Hospitals, Nottingham, United Kingdom

Introduction: There is currently a paucity of evidence to guide management of patients with hip fracture taking Direct Oral Anticoagulants (DOACs). As part of an ongoing local qulaity improvement project we wished to describe the current management and outcomes for our local hip fracture DOAC population.

Methods: Following local approvals, we extracted data from our local prospectively collected database for all patients with hip fracture in 2018.

Those with multiple trauma/injuries/fractures or non-acute hip fractures were excluded, leaving 877 patients. These patients' case notes were then reviewed to identify those patients on DOACs. In total, 50 patients were recorded as taking DOACs before admission. We sought data on characterstics (ASA, Nottingham Hip Fracture Score (NHFS), admisison haemoglobin, process (time to theatre, transfusion rates, anaesthesia), and outcome (30-day mortality). Data are deliberately presented without formal statistical analysis.

Results: 48/50 patients in the DOAC group underwent surgery. There was no difference in rates of operations being performed within 36 hours of admission between DOAC patients and non-DOACs (62.5% for both groups). One DOAC patient had documented deranged clotting as the reason for delay to surgery. In those delayed more than 36 hours for surgery the documented reason awaiting medical stabilisation or surgical review was greater in the DOAC group than non-DOACs (38.9% vs 29.4%).

General anaesthesia was performed more commonly in the DOAC group than overall (72.9% vs 66.0%).

Patients taking DOACs had a lower admission Hb (120.5 (110.5 - 133.5) vs 124.0 (113.0-135.0) g/L (median (IQR)) and were more likely to receive a blood transfusion (32.0% vs 27.8%). Four (all with haemoglobin < 80 g/L) were transfused pre-

operatively. Intraoperative tranexamic acid was given in 14/48 (29%) of the DOAC group.
Thirty-day mortality was greater in the DOAC group than overall (10.0% vs 6.3%), despite similar ASA (3 (3-3) vs 3 (2-3) and Nottingham Hip Fracture Scores (5 (4-6) both groups). 11/50 patients in the DOAC group had documented history of ischaemic heart disease.
Conclusion: Around 6% of hip fracture patients in our unit are taking DOACs. There were small differences in haemoglobin and transfusion rates compared with non-DOAC patients. If the difference in 30-day mortality is real, this may represent the impact of co-morbidity rather than any effect of DOACs per se. Units should be encouraged to share their data to provide a larger evidence-base for management.

PE 3-16

Elderly patients with hip fractures, treatment for osteoporosis, evidence for sarcopenia and malnutrition. A preliminary report

*Kougioumtzis I. [1], Tottas S. [1], Titsi Z. [1], Ververidis A. [1], Tilkeridis K. [1], Drosos G. [*1]*

[1]Orthopaedic Department, Democritus University of Thrace, University General Hospital of Alexandroupolis, Alexandroupolis, Greece

Introduction: Several studies from different countries have shown that elderly patients with fragility have not been tested or treated for osteoporosis and suffer from comorbidities related to fragility. The data from our country so far is very limited.
Our aim was to investigate the status of elderly patients with a low energy hip fracture treated in our department in terms of concurrent treatment for osteoporosis and evidence of sarcopenia or malnutrition.Several studies from different countries have shown that elderly patients with fragility have not been tested or treated for osteoporosis and suffer from comorbidities related to fragility. The data from our country so far is very limited.
Methods: We collected prospectively data concerning demographics, concurrent treatment for osteoporosis, history of previous fracture, bone mass index (BMI), Vit. D status, serum albumin, calcium, phosphorus and parathyroid hormone status in all consecutive patients.
Results: There were 110 patients, of a mean age of 82.3 years, most were female 64 (58%). Only 8 (7.3%) patients were on treatment for osteoporosis despite the fact that in 12 (10.9%) there was a history of previous low energy fracture and in 9 (8.2%) a history of cortisone treatment. The 30-day mortality rate was 6.4%. BMI was less than 25 in 44 (40.0%) and serum Vit. D was normal in only 5 (4.5%). Serum albumin was low (less than 3.5 gr/dl) in 34 (30.9%) and also, calcium, phosphorus and parathyroid hormone status was abnormal in 50.9%, 11.8% and 21.8% respectively.
Conclusion: The findings of this preliminary study shows that there is a need for improvement in both primary and secondary fragility fracture prevention in our area together with an establishment of an orthogereatric care for our patients.

PE 3-17

Analysis of sarcopenia during admission and three months after hospitalization in old patients with a hip fracture

*Capdevila-Reniu A. [*1], Jordan-Agud A. I. [1], Navarro-López M. [1]*

[1]Internal Medicine, Hospital Clinic , Barcelona, Spain

Introduction: Osteoporotic hip fracture in elderly patients is a common problem and it is expected an increase of prevalence due to higher life expectancy. Age is the main cause of bone loss and muscle atrophy, and the consequence of this are falls and fragility fractures.
The objective of the study is to determine the prevalence of hip fracture patients with sarcopenia and evaluate the muscle mass at three months of the fracture.
Methods: We include 74 patients admitted during 2018 to the Trauma department with a fragility hip fracture. The diagnosis of sarcopenia is based on muscle mass and/or muscular function (strength). We evaluate sarcopenia during the firsts 2 days of fracture and we repeat that at three months, during the rehabilitation period.

Muscle mass (IMM) was obtained using Bioimpedance (BIA) and applying the results to the Jansenn approach. Normal parameters were established by European Working Group on Sarcopenia in Older People (EWGSOP) with the cut-out points of <8.31 Kg/m2 in men and <6.68 kg/m2 in women.
Strength has been assessed with a hand grip dynamometer with cut-out points of <30kg in men and <20kg in women, adjusting on body mass index, according to EWGSOP definition.
Chi-square test was used in subgroup analysis; sex, age categories (≥90 and <90 years), Barthel Index and dementia. Statistical significance was <0.05.
Results: 74 patients with a hip fracture had sarcopenia evaluated during hospitalization and at three months after the fracture. The mean age was 85 years (range of 69-98 y.), 25 patients had ≥90 years (34%). 61 (81%) were women. Mean BMI was 25.75 kg/m2 and mean Barthel Index was 90. 11 patients had dementia (15%). 33 (44%) had previous osteoporotic fractures.
25 patients (34%), 3 men (21.4%) and 22 women (36%) had low muscle mass (IMM). All patients had low strength in hand grip test. Mean Hand-grip was 7.57 kg and 10.33 kg at three months (min 2 kg- max 26 kg). After 3 months, IMM remains low in 18 (24%), 2 men (14%) and 16 women (27%). Hand grip has no changes.
The gain of muscle mass during these period had improve (p<0.005), especially in women (p<0.002), patients younger than 90 (p=0.002) as well as patients with Barthel≥85 (p=0.009) and non-previous dementia (p<0.04).
Conclusion: Sarcopenia is prevalent in our cohort of patients with hip fracture; in our data the total of patients with sarcopenia are higher than other reports, especially in men (33% in women and 10% in men). The gain of muscle mass at three months is significative in women, <90years, better barthel index and non-dementia. The lost of strength is low in all patients during this period.
Understanding the pathophysiology of osteosarcopenia,is fundamental in providing the best falls and fragility fractures prevention strategies. This is a preliminary study and we have to include more patients to obtain more robust conclusions.

PE 3-18

Risk factors for vertebral fracture in patients with spondyloarthritis

*Cunha A. R. N. [*1], Barcelos A. [1], Ambrósio C. [1]*

[1]CH BAIXO VOUGA, CH BAIXO VOUGA, Aveiro, Portugal

Introduction: Patients with Spondyloarthritis (SpA) have an increased risk of vertebral fractures, even after a minor trauma. They can be transvertebral, involving the posterior arch, or can be transdiscal through the syndesmophytes. They can be located at cervical spine, which is never involved in typical osteoporotic vertebral fractures. The prevalence of vertebral fractures is highly variable in different studies, up to 30%. Several risk factors were pointed for fractures in SpA: bamboo spine, hyperkyphosis and disease duration.
Methods: To determine the prevalence of vertebral fractures in patients with SpA and assess the association with patient characteristics and clinical assessments. A cross-sectional study involving patients with SpA, according to ASAS criteria, was performed. Medical records were reviewed to retrieve the following data: gender, age, disease duration, HLA-B27 status, previous uveitis, peripheral arthritis, modified Stokes AS Spine Score (mSASSS), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI) and Body Mass Index (BMI). In a small subgroup of patients with Dual-energy X-ray absorptiometry (DXA), data were collected
Results: One hundred and five patients were included, 61 (58.1%) were men and 44 (41.9%) were women, with a mean age of 47.2 ±15.4 years and mean disease duration of 13.6 ±12.0 years. The majority of the patients had higher disease activity (mean BASDAI - 7.7 ± 38.9) and higher mSASSS scores (mean 15.3 ± 20.9). The mean of BASFI and BMI was 3.4± 2.7 and 26.0 ± 4.3, respectively. Thirteen patients (12.7%) had previous uveitis, 43 (12.2%) had peripheral involvement, 54 (69.2%) were HLA B27 positive and 12 (11.4%) had vertebral

fractures (cervical and lumbar). No thoracic fractures was found.In the subgroup of 30 patients with DXA, 11 (36.7%) had osteopenia and 3 (10%) had osteoporosis. Three patients had fractures (cervical and lumbar) and the mean bone mineral density in femoral neck was -1.9± 2.8 and in lumbar spine was 1.2±2.3. The presence of vertebral fractures (according to morphometric definition) was significantly associated with older age (p= 0.001) and higher mSASSS score (p=0.002). No association was found with gender, disease duration, HLA-B27, previous uveitis, peripheral arthritis, disease activity (BASDAI), functional (BASFI) and BMI.

Conclusion: Despite the small size of our sample, it was possible to verify that older age and higher mSASSS were associated with prevalence of vertebral fractures with statistical significance. Only a few patients had bone mineral density values and this is a study limitation. We intent to do DXA in all patients and include these data in a further analysis.

PE 3-19

Cervical spine fragility fractures in older people: 5-year experience at a regional spine centre

*Tarawneh A. M. [*1], Taqvi S. [1], Salem K. M. [1], Sahota O. [2]*

[1]The Centre for Spinal Studies and Surgery, Queen's Medical Centre, Nottingham University Hospitals NHS Trust, [2]Department of Healthcare of Older People, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: Cervical spine fractures are particularly prevalent in older people and commonly occur following a fall from standing height or less, in the presence of degenerative spinal disease. Atlanto-axial complex and odontoid process injuries are the most frequent type of fractures and are potentially life threatening. Published in-hospital and 1-year mortality rates in older people are eightfold higher than in younger patients.

The aim of this study was to identify the incidence and characteristics of cervical spine fractures in older people presenting to a regional spine centre.

Methods: Clinical records and radiographs were retrospectively reviewed using our institutional registry covering a 5-year period. Data included patient age, gender, mechanism of trauma, level of fracture, stability of the fracture, treatment modality, imaging modality, and mortality rates.

Results: A total of 209 patients above the age of 70 with cervical spine fractures were treated in our centre from 2015-2019. The mean age of the patients at the time of injury was (82.4 ±7.5) years with the majority (n=117; 56%) being females.

One-hundred fifty-one patients (72.2%) experienced fractures in the atlanto-axial complex. Particularly, Dens fractures were the most commonly reported fracture (n=119; 56.9%). Most of the patients encountered stable cervical spine fractures (n=181; 86.6%) and these were managed by external immobilization with hard collar or halo vest. Mechanism of trauma was divided into two main categories, low energy and high energy. Low energy trauma was the most common cause that lead to cervical spine fractures (n=169; 80.9%), compared to high energy trauma (n=40; 19.1%). CT scan and X-ray were the main imaging modalities utilized to detect cervical spine fractures. Whereas, MRI was only utilized in (n=51; 24.4%).

Overall mortality rate was (n=17; 8.1%) at 30 days. Out of which (n=1; 5.9%) was in a patient who was surgically treated while the remaining (n=16; 94.1%) were in those treated conservatively.

Conclusion: Cervical spine injuries in older people are clinically important. Low energy trauma particularly falls, were the main mechanism of cervical spine injury. Upper cervical spine injuries, mainly C2, is the most common cervical spine fracture and were most commonly detected using CT scan. External immobilization was our treatment of choice for most of the cervical spine injuries in the older people.

These patients are very similar with respect to mean age, mechanism of injury and 30 days mortality rate as hip fracture patients.

PE 3-20

Regional variation in the incidence of post-operative infection among hip fracture patients.

*Vesterager J. D. [*1], Kristensen P. K. [1,2], Petersen I. [1,3], Pedersen A. B. [1]*

[1]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, [2]Department of Clinical Medicine, Regionshospitalet Horsens, Horsens, Denmark, [3]Institute of Epidemiology & Health, University College London, London, United Kingdom

Introduction: Post-operative infection after hip fracture is one of the most serious and challenging complications in hip fracture patients - adversely affecting mortality, quality of life, and hospital costs. Variation in 30 days mortality after hip fracture surgery has been observed between hospitals in Denmark during the last several years, which could not entirely be explained by differences in patient characteristics, treatment or hospital level factors. We therefore, hypotheses that there is variation in post-operative infection following hip fracture patients, which potentially could explain variation in mortality. The objectives of this study were to examine the incidence rates (IR) of post-operative infections after hip fracture surgery at hospital and regional level in Denmark.

Methods: In this nationwide population-based cohort study using prospectively collected data from the Danish Multidisciplinary Hip Fracture Registry, we included all patients who underwent surgery for an incident hip fracture in the time period from 2011 to 2016 (n=31,024). Patients were followed 30 days from operation date. Post-operative infections were defined as any hospital-treated infections at in-patient or outpatient clinics based on International Classification of diseases 10th revision (ICD-10) codes collected from the Danish National Patient Register. The 5-years IRs were calculated per 1000 person-days for each hospital performing hip fracture surgery (n=25) and for each Danish region (n=5).

Results: The overall IR of post-operative infections after hip fracture was 5.38 (95% confidence interval (CI), 5.22 - 5.54) per 1000 person days. We found that the lowest hospital incidence was 2.69 (95% CI, 1.98 - 3.65) per 1000 person days and the highest hospital incidence was 26.92 (95% CI, 24.97 - 29.02) per 1000 person days. The incidence rate-ratio between the highest and lowest hospital incidence was 10.03 (95% CI, 7.31 – 14.10). The lowest regional incidence was 3.84 (95% CI, 3.57 - 4.13) per 1000 person days and the highest regional incidence was 6.88 (95% CI, 6.49 - 7.3) per 1000 person days. The incidence rate-ratio between the highest and lowest regional incidence was 1.79 (95% CI, 1.63 -1.97).

Conclusion: This study showed a difference in incidence rates of post-operative infections following hip fracture surgery on both hospital and regional level. However, in order to gain insight into the difference, further adjusted analyses are necessary.

PE 3-21

Does age influence clinical outcome and recovery of elderly patients with a hip fracture?

*Capdevila-Reniu A. [*1], Ventosa H. [1], Camacho P. [2], Navarro-López M. [1]*

[1]Internal Medicine, [2]Traumatology, Hospital Clinic , Barcelona, Spain

Introduction: Hip fracture in elderly patients is a common problem and it is expected an increase of prevalence due to higher life expectancy.

Methods: Description of the characteristics of patients with hip fracture admitted to an orthogeriatric unit during June 2012 to September 2013. Data was collected on patient characteristics, fracture pattern and surgery-related factors and events occurred during hospital stay and data after hospital discharge in 2 groups of patients: patients between 70 to 89 year-old and patients older than 90years. Data was evaluated with SPPS vs19.

Results: 274 patients were analysed, 90 patients ≥90 years and 184 between 70-89 years.

In the older group 81.1% of patients were women (75% in younger). Mean previous Barthel index in this group was similar 80 vs. 85

points. More CKD and less % of diabetes mellitus and dementia. ASA was equal in both groups. With regard to the type of fracture, little differences found (60% vs 50%

intertrochanteric and 30% vs 37% to a femoral neck fracture) . Both groups had an important delay of surgery, more than 48h (75.5% vs 70%) The rates of infection and of blood transfusion were similar in both groups. Re-admission to hospital during the first month after discharge occurred in only 2.2% vs 1% and 1-year mortality was 8% vs. 3.3%

Conclusion: Baseline characteristics in older old people with hip fracture were similar to younger ones.Nonagenarians had no increase on fatal events, infections and needs of blood transfusion. One year mortality was higher but with a lower rate of hospital readmission during the first month after fracture. The multidisciplinary approach to hip fracture has been very useful in reducing the incidence of fatalevents during and after hospital admission and has decreased 1-year mortality. Age older than 90 yearsshould not be considered as a negative predictive factor when considering the treatment of thesepatients.

PE 3-22

Randomised trials of vitamin d and calcium for the prevention of fracture in their epidemiological context

*Yao P. [*1], Clarke R. [2]*

[1]Nuffield Department of Population Health, Big Data Institution, [2]Nuffield Department of Population Health, 1Clinical Trial Service Unit and Epidemiological Studies Unit (CTSU), Big Data Institute, Oxford, United Kingdom

Introduction: Vitamin D and calcium supplements have been recommended for the prevention of fractures in institutionalized older people, but results of previous trials have been conflicting.

Methods: We conducted 3 meta-analyses: (i) observational studies of 25(OH)D concentrations and risk of fracture, (ii) trials of vitamin D alone for prevention of fracture; (iii) trials of vitamin D and calcium for prevention of fracture by searching PubMed, Embase, and Cochrane library from their inception to Dec 31, 2018, using search terms "vitamin D", "fracture" and additional keywords. Observational studies were restricted to those including a prospective design, involving at least 200 fracture cases, reporting blood 25(OH)D concentrations and risk estimates with 95% confidence intervals (95%CI) for any fracture and hip fracture. Trials were eligible for inclusion if they: (i) compared the effects of vitamin D supplementation with a placebo or no treatment, or compared both calcium and vitamin D supplements with a placebo or no treatment group; (ii) reported a minimum of 10 incident fracture cases and included at least 500 participants. All trials were assessed for different types of bias using the Cochrane risk assessment tool for trials. Data from individual trials were pooled using inverse-variance-weighted fixed-effects models.

Results: In a meta-analysis of 11 prospective studies (39141 participants, 6278 cases with any fracture, 2367 cases with hip fracture), each 25 nmol/L higher circulating concentration of 25(OH)D was associated with 7% (95%CI 4-11%) lower risk of any fracture and 20% (14-25%) lower risk of hip fracture, respectively. However, a meta-analysis of 11 vitamin D alone trials (34243 participants, 2843 with any fracture, 740 with hip fracture) demonstrated no beneficial effects on any fracture (Rate ratio [RR] 1.06, 0.98-1.14) or on hip fracture (1.14, 0.98-1.32), but most of these trials were seriously constrained by infrequent intermittent dosing regimens and insufficient doses of vitamin D, and an inadequate number of participants. Overall, 14 trials had a high risk of bias, 1 trial had an uncertain risk of bias, but only 2 trials had a low risk of bias. In contrast, a meta-analysis of somewhat better quality CaD trials demonstrated that daily supplementation with combined vitamin D and calcium reduced the risk of any fracture (7 trials, 58887 participants, 6433 with any fracture) by 7% (2-12%), and hip fracture (6 trials, 49282 participants, 730 with hip fracture) by 16% (3-28%), respectively.

Conclusion: The results of completed and available randomized trials of vitamin D alone for fracture prevention are not promising but are constrained by serious methodological problems. However, combined supplementation with vitamin D and calcium reduced the risk of hip fractures by one sixth. Further, more reliable trials are needed before recommending vitamin D and calcium for the prevention of hip fracture.

PE 3-23

Sarcopenic obesity negatively influences bone parameters in a group of premenopausal women

*Rizkallah M. [1], Hamoud E. [*2], Antoun A. [2], Maalouf G. [1], Bachour F. [1], El Hage R. [1]*

[1]Orthopedic surgery, Bellevue Medical center Hospital, Mansourieh, [2]Physical Education, Balamand University, El Kourah, Lebanon

Introduction: The close relation between lean body mass and bone metabolism cannot be overemphasized. The aim of this study was to compare bone mineral content (BMC), bone mineral density (BMD) and geometric indices of hip bone strength between a group of obese sarcopenic premenopausal women and a group obese premenopausal women with normal appendicular lean mass (ALM)/body mass index ratio (BMI).

Methods: This study included 53 young adult premenopausal women whose body mass index (BMI) > 35 kg/m^2. They were divided into two groups using international cut-offs for ALM/BMI (sarcopenic (n=26) vs non sarcopenic (n=27)). The ALM/BMI criterion of The Foundation for the National Institute of Health (FNIH) was used, and the value of < 0.512 for women was considered sarcopenia. Body composition and bone variables were measured by DXA. DXA measurements were completed for the whole body (WB), lumbar spine, total hip (TH) and femoral neck (FN). Geometric indices of femoral neck (FN) strength (cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z), strength index (SI) and buckling ratio (BR)) were calculated by DXA.

Results: Both groups were comparable for age, weight, BMI and fat mass. Height (164 vs 159 cm), lean mass (50.99 vs 45.56), skeletal muscle mass index (8.67 vs 7.85), ALM (23,51 vs 19,88) and the ratio ALM/BMI (0.56 vs 0.45) were significantly higher in obese women with normal ALM/BMI ratio compared to obese sarcopenic women. Fat mass percentage was significantly higher in obese sarcopenic women (55.4%) compared to obese women with normal ALM/BMI ratio (51.5%). WB BMC (2617 vs 2344), TH BMD (1.129 vs 1.005), FN BMD (1.010 vs 0.900), CSA (168 vs 148), CSMI (12.2 vs 10.2) and Z (722 vs 646) were significantly higher in obese women with normal ALM/BMI ratio compared to obese sarcopenic women. In the whole population (n=53), ALM and the ratio ALM/BMI were positively correlated to WB BMC, CSA, CSMI and Z.

Conclusion: The present study suggests that sarcopenic obesity negatively influences bone parameters in premenopausal women.

PE 3-24

Does the world hip trauma evaluation (.W.Hi.T.E.) provide a true representation of care provided to the general population?

*Murphy M. [*1], Moppett I. [1]*

[1]Anaesthetics, Nottingham University Hospitals Trust, Nottingham, United Kingdom

Introduction: The World Hip Trauma Evaluation (WHiTE) is a large-scale multicentre research database which seeks to improve our understanding of current practice and indicate factors which associate with improved outcomes through close observation of a large cohort from the hip fracture population.

Objectives: We evaluated to what extent the WHiTE database could be regarded as externally valid by comparing service characteristics of centres enrolled onto WHiTE with all other centres known to provide hip fracture surgery in the UK.

Methods: The National Hip Fracture Database (NHFD) is a mature and comprehensive registry of hip fracture care in the UK. We retrieved all data published in the annual NHFD annual Transparency Reports and used them to characterise centres which provide acute surgical care for traumatic hip fractures according to indices which denote service structure, service processes and service outcomes.

This dataset was then divided according to whether or not the reporting centre was enrolled onto the WHiTE programme at the time of data submission. These two groups were then compared both using both visually and statistically to determine whether there were significant observable differences between a WHiTE-enrolled centre and the wider UK health service.

Results: Structure of Care Centres enrolled onto the WHiTE programme had a significantly larger surgical workload than those centres not enrolled, (median 514 vs. 335 cases; p= <0.00), however there was no statistically significant difference observed in the proportion of centres which offer an Early Supported Discharge (ESD) service (0.75 vs. 0.54; p= 0.64).
Processes of Care We found a small but significant difference in the proportion of patients attaining the Best Practice Tariff in WHiTE-enrolled centres compared to those centres not enrolled (0. 69 vs 0.64; p=0.01), as well as in the proportion of patients receiving a perioperative medical review (0.95 vs. 0.91; p=0.00). We saw difference in the proportion of patients being admitted to an orthopaedic ward within 4 hours (median 0.37 vs. 0.44; p= 0.11), or in the proportion receiving their surgery within 48 hours of admission, (median 0.77 vs. 0.74; p=0.28).
Outcomes of Care No difference in 30-day mortality was observed between centres enrolled in the WHiTE protocol compared to those centres not enrolled (median 0.07 vs. 0.07; p= 0.12), or length of acute stay (median 15.9 vs. 16.2 days; p= 0.42).
Conclusion: The WHiTE cohort centres tend to be higher volume and demonstrate higher attainment of some markers of quality process compared to non-WHiTE centres. Recruitment of additional smaller lower volume centres may improve generalisability to the wider UK population

PE 3-25

Pre and post fracture vitamin d: variability linked to inflammation

*Tafaro L. [*1], Gallo M. [2], Giordano S. [2], Proietti A. [1], Benvenuto R. [1], Papandrea P. [3], Falaschi P. [2], Ferretti A. [3]*

[1]Medicina Clinica e molecolare, [2]Sapienza Università di Roma, Rome, Italy, [3]Scienze medico chirurgiche e medicina traslazionale, Sapienza Università di Roma, Rome, Italy

Introduction: Vitamin D is a fat-soluble hormone with pleiotropic effects, whose deficiency in the elderly contributes to the development of osteoporosis and sarcopenia, increasing the risk of fractures, falls and consequent morbidity and mortality. Studies show a very low level of vitamin D in patients with hip fractures but it has never been shown whether there is an influence of inflammatory stress linked to surgery in reducing these levels or whether it is linked only to pre-fracture conditions.
The aim of the study was to compare the circulating levels of 25-hydroxycholecalciferol, in the pre- and post-operative stages and to find a relation between the reduction of vitamin D levels and the inflammation markers in patients undergoing surgery for hip fracture.
Methods: We recruit hip fracture patients aged over 65. Were excluded from the study: inoperable patients, those with secondary fractures to neoplastic diseases, subjects suffering from severe renal and hepatic impairment, those with known infections and bone metabolism diseases (primary hyperparathyroidism, Paget) and those undergoing systemic chronic corticosteroid therapy.
Blood tests were performed for each patient at time zero (T0) and on the second post-operative day (T48), with the following parameters: blood count with formula, vitamin D (VIT D), PTH, PCR, albumin, D- Dimer, fibrinogen, ferritin, calcemia and creatinine. For each parameter have been evaluated: the variations, the significance of these and the possible correlations between them.
Results: Our sample is made up of 50 patients: 41 females and 9 males, mean age:82.25 ± 8.11 years.
The analysis of the blood tests carried out at time 0 and on the second post-operative day (T48) shows a statistically significant reduction (p <0.001) of post-operative VIT D values (11.37 ng / ml vs 9 , 4 ng / ml).
Finally, the evaluation of the relationship between VIT D and inflammation markers, measured respectively at T0 and T48, shows only an inverse correlation between VIT D levels and PCR (p = 0.044, r = - 0,289) which significantly increase (p <0.001) in the post-operative period (5.45 mg / dl vs 14 mg / dl).
Conclusion: In literature there is evidence of a link between VIT D levels and systemic inflammatory level, typical of subjects suffering from fragility fractures and surgically treated, probably due to the utilization of vitamin D storage during the anti-inflammatory reaction.
Our pilot study shows that the VIT D values, already deficient in most of our elderly patients, are further reduced after surgery. The relation with PCR could be explained by the evidence of a genetic link between vitamin D and PCR; in fact some polymorphisms (SNP) in the PCR gene predispose to a phenotype with high PCR values and reduced vitamin values.
By the importance of Vitamin D in the post-fracture and the high perioperative inflammatory level of elderly patients with hip fractures, a supplementation of VIT D should be prescribed.

PE 3-26

30-day mortality in elderly patients with a hip fracture using international scores-scale in two greek hospitals

*Drosos G. [*1], Kougioumtzis I. [2], Stefanou D. [3], Tottas S. [2], Valertzidis N. [4], Titsi Z. [1], Tilkeridis K. [2], Ververidis A. [2]*

[1]Orthopaedic Department, Democritus University of Thrace, University General Hospital of Alexandroupolis, Alexandroupolis, [2]Orthopaedic Department, Democritus University of Thrace, University General Hospital of Alexandroupolis, Alexandroupolis, [3]Orthopaedic Department, General Hospital of Kavala, Kavala, [4]Orthopaedic Department, General Hospital of Kavala, Kavala, Greece

Introduction: Hip fractures in the elderly are accompanied by increased morbidity and mortality.
The aim of this study was the predictive value of internationally used scales-scores, with regard to mortality within 30 days, in elderly patients with hip fracture in two Greek hospitals.
Methods: We studied 206 patients with hip fractures. The scales studied were the mental state (Abbreviated Mental Test Score, AMTS), the mobility state (New Mobility Score, NMS), the physical condition preoperatively (American Society of Anesthesiologists, ASA), the assessment of co-morbidity (Charleson Index), the risk of mortality (Nottingham Hip Fracture score, NHFS), the risk of mortality and mobility condition (Modified Nottingham Hip Fracture Score, mNHFS), the survival (Sernbo score) and the date of surgical rehabilitation.
Results: A total of 16 deaths (7.8%) were observed. In patients who died there was statistically significantly higher ASA (36%, p <0.001), Charlson (51%, p = 0.001), NHFS (18%, p = 0.008), mNHFS (19%), lower Sernbo (20%, p = 0.002), AMTS (23%, p = 0.026) and NMS (27%, p = 0.010) and a longer day of surgery (5th day vs. day 3, p = 0.055).
In multifactorial Logistic Regression ASA (αOR=2,66, p=0,010), Charlson (αOR=1,28, p=0,046) and NHFS (αOR=1,51, p=0,086) independent prognostic factors for mortality remained. The Receiver Operating Characteristic (ROC) analysis (curve) showed a very high predictive value of all the studied indicators (ASA: AUC=0,758, p=0,001; Charlson AUC=0,742, p=0,001; Sernbo: AUC=0,700, p=0,008; NHFS: AUC=0,696, p=0,009; NMS: AUC=0,687, p=0,013; mNHFS: AUC=0,683, p=0,015; AMTS: AUC=0,677, p=0,019).
Conclusion: ASA, Charlson and NHFS remained independent prognostic factors for mortality assessment. Based on the ROC analysis, ASA, Charlson and secondarily the Sernbo score are reliable mortality estimates for hip fractures in the elderly.

PE 3-27

The influence of the severity of obesity on bone mineral density in premenopausal women

*Hamoud E. [*1], Antoun A. [1], Rizkallah M. [2], Maalouf G. [2], Bachour F. [2], El Hage R. [2]*

[1]Physical Education, Balamand University, El Kourah, [2]Orthopedic surgery, Bellevue Medical center Hospital, Mansourieh, Lebanon

Introduction: Body mass index (BMI) is thought to interfere directly in bone metabolism process. Even though excess BMI is considered protective against bone fractures, some reports stated that obesity may induce osteoporosis. The aim of this study was to compare bone mineral content (BMC), bone mineral density (BMD) and geometric indices of hip bone strength among three groups of adult obese premenopausal women (severely obese, morbidly obese and super morbidly obese).
Methods: This study included 65 young adult premenopausal women whose BMI > 35 kg/m^2. They were divided into three groups using international cut-offs for BMI, group 1: 3545 = 13 women. Body composition and bone variables were measured by DXA. DXA measurements were completed for the whole body (WB), lumbar spine, total hip (TH) and

femoral neck (FN). Geometric indices of femoral neck (FN) strength (cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z), strength index (SI) and buckling ratio (BR)) were calculated by DXA.

Results: Results showed that age (30,8 vs 31,4 vs 31,4 years) and height (160,3 vs 162,1 vs 162,5 cms) were not significantly different among the three groups. WB BMC values were higher in super morbidly obese women (2705) compared to severely (2503) and morbidly obese women (2280) ($p<0.01$). WB BMD, L1-L4 BMD, TH BMD, FN BMD, CSA, CSMI, Z and BR values were not significantly different among the three groups ($p>005$). SI values were lower in super morbidly obese (0,769) compared to morbidly (1.061) and severely obese women (1.134) ($p<0.01$). In the whole population, body weight, BMI, lean mass, fat mass and trunk fat mass were positively correlated to WB BMC and negatively correlated to SI. Weight and lean mass were positively correlated to WB BMD and CSMI.

Conclusion: The present study suggests that the severity of obesity does not influence BMD values in premenopausal women.

PE 3-28

Factors associated with an increased risk of falling in fragility fracture patients: a cross-sectional observational study

*Rotondi N. [1], Beaton D. [1,2], Sujic R. [*1], Bogoch E. [1,3], Inrig T. [1], Linton D. [1], Weldon J. [4], Jain R. [4], Sale J. [1]*

[1]St. Michael's Hospital, [2]Institute for Work and Health, [3]University of Toronto, [4]Osteoporosis Canada, Toronto, Canada

Introduction: The majority of studies examining the risk factors for falling are based on older people living in the community; however, studies of falls in participants with prevalent fragility fractures are relatively scarce despite their high risk for falls and recurrent fractures. The purpose of the present study was to examine possible risk factors for falls in a large fragility fracture population using a provincial database. Specifically, we sought to report the prevalence of increased risk of falling among fragility fracture patients enrolled in an FLS, and to determine the characteristics associated with being at an increased risk of falling.

Methods: The study population consisted of fragility fracture patients 50 years of age or older who were screened at 35 FLS hospital fracture clinics over a 3.5 year period.The outcome was based on two questions measuring the risk of falling, both adapted from two of three screening items in the STEADI (Stopping Elderly Accidents, Deaths & Injuries) tool from the Centers for Disease Control and Prevention. Multivariable associations of sociodemographic, fracture-related, and health-related characteristics were evaluated using logistic regression.

Results: Overall, 9735 patients (45%) were found to be at increased risk of falling, and 12,089 (55%) were categorized as not being at increased risk of falling. In the multivariable logistic regression, being 80+ years of age (vs. 50-64 years of age), living in a nursing home, other residential facility or other living situation (vs. living with spouse, family member or roommate), having a mental or physical impairment (vs. none), and taking multiple medications, were all strongly associated with having an increased risk of falling.

Conclusion: We found that a large proportion (nearly 45%) of prevalent fragility fracture patients in a provincial multicentre FLS cohort was identified as being at an increased risk of falling. Living in a nursing home or similar facility, and taking 4 or more medications were the strongest independent risk factors for being at an increased risk of falling. These are potentially modifiable risk factors that should be considered when assessing falls risk in fragility fracture patients, and particularly when designing interventions for preventing subsequent falls in this population. Ongoing work to address the higher risk of falls in the fragility fracture population is warranted, with a particular eye to addressing the needs of more vulnerable patients.

PE 3-29

A new surgical technique for fragility fractures of the pelvis rommens classification type Ⅲa : femur internal rotation reduction method (firm)

*Okazaki S. [*1], Shirahama M. [1], Hashida R. [1], Matsuura M. [1], Nakama K. [1], Matsuse H. [1], Shiba N. [1]*

[1]Department of Orthopaedic Surgery, Kurume University School of Medicine, Kurume city, Fukuoka, Japan

Introduction: The number of patients with fragility fractures of the pelvis (FFPs) is increasing. Recently, open reduction and internal fixation is performed in the case with large dislocation of Rommens classification TypeⅢA, though percutaneous fixation is performed in the case with a little dislocation. It is the surgery for elderly patients, and the less invasive surgery is preferred for FFPs. We present a surgical technique of femur internal rotation reduction method (FIRM) for fragility fractures of the pelvis Rommens classification TypeⅢA.

Methods: FIRM is a reduction method to perform repositioning of the fragment with the lateral rotators by internally rotating the femur. In the procedure, the patient is in a prone position and the femur internally rotated. The obturator foramen and Teepee view on the fractured side will be reduced in the fluoroscope. In this way, the supra-acetabular bone canal is approximately straightened from the posterior superior iliac spine (PSIS) to the anterior inferior iliac spine (AIIS), which makes screw insertion possible. For internal fixation, two α9.0mm Expedium SAI screws (Depuy Synthes) are inserted in both sides from the PSIS to AIIS and are connected with two transverse rods.

Between October 2017 and July 2018, this treatment was performed in 7 patients with Rommens classification TypeαA. We retrospectively analyzed 6 patients whom we could follow up more than 6 months. All patients were women, the average age was 84.3 years. All patients fell from the standing position. This treatment was performed in a mean time of 4 days after the injury and 2 days after admission to our hospital.

Results: The mean operative time was 144 minutes and the mean blood loss was 198g. All 6 patients achieved bone union and regained their preinjury walking ability. A pressure ulcer occurred in one patient and was treated with bedside lavage and negative pressure wound therapy.

Conclusion: Internal fixation using FIRM is a minimum invasive internal fixation method for fragility fractures of the pelvis Rommens classification TypeⅢA. The patients underwent this treatment could gain early ambulation and regained their preinjury waking ability.

PE 3-30

A feasibility randomised controlled trial to compare regional versus general anaesthesia in reducing delirium in patients with hip fractures (regard)

*Yeung J. [*1], Couper K. [1], Kearney R. [1], Lall R. [1], Moppett I. [2], Jackson T. [3], Bell P. [1], Perkins G. [1]*

[1]Warwick Medical School, University of Warwick, Coventry, [2]University of Nottingham, Nottingham, [3]University of Birmingham, Birmingham, United Kingdom

Introduction: Patients with hip fractures have the highest risk of delirium due to physiological and psychological stress from injury, pain, analgesia and surgery. Post-operative delirium is an independent risk factor for higher mortality, poor long-term functional outcomes, institutionalisation, anxiety and depression. There is also evidence that delirium can increase the risk of developing dementia and cognitive dysfunction.

Patients requiring surgery for hip fracture will require either general anaesthesia (GA) or regional anaesthesia (RA). Previous systematic reviews suggest RA was associated with reduced risk of delirium, 30 day mortality and deep vein thrombosis. However, these studies are outdated, small and excluded patients with cognitive impairment.

The aim of the trial is to assess whether it is feasible to undertake a definitive trial to compare the effect of RA versus GA on incidence of post-operative delirium in patients with hip fractures.

Methods: This was a multi-centre feasibility randomised controlled trial funded by the NIHR and sponsored by University of Warwick. Adult (>65 years) patients with hip fracture requiring surgery was randomised in a 1:1 ratio to receive RA or GA. All

other clinical care was to the discretion of treating clinical team. Exclusion criteria were multiple trauma or planned concurrent surgery not amenable to spinal anaesthesia, contraindication to GA or RA, determination by the surgeon or anaesthetist that patient was not suitable for randomisation and patients not expected to survive beyond 48 hours.
Key features of study design were assessed by measuring the proportion of eligible patients who were successfully randomised in to the study. The secondary objectives were the incidence of post-operative delirium; the proportion of patients with complete 120 day follow-up and the efficiency of overall trial processes. A complementary qualitative study was conducted with semi-structured interviews with clinicians involved in the trial to identify facilitators and barriers to recruitment.
Results: Of 283 eligible patients, 100 (35.3%) were randomised from 4 NHS hospitals over 12 months (Sep2017-2018). 50 patients received GA (40/50 F, mean age 83.4±8.6)) and 48 received RA (38/48 F, mean age 84.2±8.8), 2 patients withdrew from study). Using 4AT score, 11/98 (11.2%), 13/97 (13.4%) and 15/72 (20.8%) were suspected of delirium on Day 1, 2 and 7 respectively. In face to face assessment, delirium was diagnosed in 19/70 (27.1%), 14/46 (30.5%) and 16/60 (26.7%) on Day 1, 2 and 7 respectively. 13 patients died within 120 days, 4 withdrew from follow-up and 46/81 (56.8%) completed 120 day follow-up assessment.
Semi-structured interviews with clinicians involved in study confirmed their willingness to randomise their patients and support for a future study.
Conclusion: It is feasible to conduct a randomised study to compare the effects of GA versus RA on incidence of post-operative delirium and follow patients up to 120 days.

PE 3-31

First year results of a new regional french hip fracture registry based on fragility fracture network database

*Bégué T. [*1], Poichotte A. [2], Loubignac F. [3]*

[1]Department of Orthopaedic and Trauma Surgery, University Paris Sud, Clamart, [2]Department of Orthopaedic and Trauma Surgery, Loire Vendee Ocean Hospital, Challans, [3]Department of Orthopaedic and Trauma Surgery, Hopital La Musse. CH Toulon, Toulon, France

Introduction: Datas coming from the French Healthcare Global system shows that around 80.000 proximal femoral fractures occur each year in this country. Additional criterias give the knowledge that 36% are extra-capsular and 64% intra-capsular. Nevertheless, there is very little understanding on the pre-op clinical aspects of the patients involved, and about the global follow-up. In addition, the spectrum of age distribution and management types in the different part of the country is unknown.
Methods: Based on the Database build up by the Fragility Fracture Network (FFN) and the plan Global Call for Action edited by the FFN, French Orthopedic Trauma Society (GETRAUM) has decided to build up a specific Hip Fracture registry with few criteria to be included to get an overview and help to fix some guidelines about management of those fractures. The first objective was to obtain a large amount of trauma surgeons involved, mainly in the Public hospital system.
Results: The first results of this new regional registry of Hip Fractures created in 2018, based on the FFN database is reported. More than 50 different hospitals from different districts have joined the first year of this program, that is protected by the CNIL and the GETRAUM (French Orthopedic Trauma Society) rules. The way this database has grown up is explained, with the difficulties encountered such as the problem of preexisting anti-thrombotic treatment for any type of co-morbidities, and its influence on the delay of treatment.
Conclusion: The first annual report will be exposed and discussed, to enlarge the number of hospitals and surgeons involved in this registry. This first report will help the GETRAUM ExCom to push some districts to enroll more cases based on the comparison of the official datas codes.

PE 3-32

Cartilage defect repair using agili-c implant in acl injured patients after 2 years follow up

*Lalic I. [*1], Dulic O. [1], Harhaji V. [1], Lalić N. [2]*

[1]Clinic for otrthopaedic surgery and traumatology, Clinical center of Vojvodina, Novi Sad, [2]Institute of Lung Diseases, Sr. Kamenica, Serbia

Introduction: To evaluate joint function, as assessed by patient questionnaires, following cartilage defect repair in patients with ACL injury.There are many factors which need to be thoroughly investigated for patients who have symptoms from chondral defects. Ligament tears of the knee can cause and accelerate chondral defects and may need to be reconstructed either before or at the same time as a cartilage resurfacing procedure to slow down the progression of arthritis.
Methods: Patients treated with Agili-C™ implant in ongoing studies in our institutions were evaluated using KOOS and IKDC questionnaires. The results of patients implanted with Agili-C™ and without ACL injury were compared to patients with previous ACL reconstruction and to patients with concomitant ACL repair. A total of 71 patients without ACL injury (CNTL), 27 patients with past ACL reconstruction (PAST) and 21 patients who underwent concomitant ACL reconstruction (CONC) were included in the study.
Results: Overall KOOS at baseline was similar for all groups: CNTL 48.3±17.1, PAST 48.2±10.8 and CONC 54.2±14.0 (n=119). The results at 6 months were: CNTL 64.5±21.3, PAST 61.7±19.0, CONC 72.3.±16.8 (n=111); results at 24 months are CNTL 91.4±7.0, PAST 85.3±14.5, CONC 86.1±11.3 (n=78). IKDC scores followed the same trend. At baseline CNTL 41.9.0±17.9, PAST 46.9±12.5 and CONC 43.9±16.2; at 6 months CNTL 54.0±21.4, PAST 56.4±18.5, CONC 67.2±19.3, and at 24 months CNTL 87.0±12.1, PAST 81.2±16.7, CONC 85.3±11.5. ANOVA at all time points was not significant (p>0.2).
Conclusion: The results at all time points are similar for all groups, indicating that articular surface repair using Agili-C™ implant is expected to yield a health benefit independent of the presence of prior or concomitant ACL insufficiency.

PE 3-33

Engaging patients and providers of healthcare to co-create an ehealth educational platform in translating best-practice outcomes for post-discharge hip fracture care: a mixed methods study

*Yadav L. [*1, 2], Gill T. [3], Visvanathan R. [1, 4], Taylor A. [2], Chehade M. [1, 2]*

[1]Center for Research Excellence in Frailty and Healthy Ageing, The University of Adelaide, [2]Orthopaedics and Trauma , Royal Adelaide Hospital , [3]School of Medicine, Faculty of Health and Medical Sciences , The University of Adelaide, [4]Aged and Extended Care, The Queen Elizabeth Hospital , Adelaide, Australia

Introduction: Older people with hip fractures often require long term care, post-hospital discharge. One of the crucial aspects is provision of quality health information to patients and their carers to support the continuity of care. If the patients are well informed about their health condition and caring needs, particularly post-hospital discharge into their community setting, this could help them to exercise healthy choices and in return foster recovery to improve quality of life. Further, as internet and mobile access reach to every household, it is possible to utilise this technology and build an educational platform where both patients and their providers of care can establish a credible information exchange process.
Methods: This study aims to engage patients, their carers and healthcare providers through mixed methods approach. Quantitative method will explore health literacy and ehealth literacy among older people with hip fractures admitted to the two tertiary care hospitals in Adelaide. Whereas, qualitative method will enable to understand the aspect of content and context required for the ehealth platform to be developed for delivery of quality health information. This study will be using theoretical frameworks to guide the process of design, development and conduct of the study in real-world setting. These are the National Institute for Health and Care Excellence (NICE) guideline on hip

fracture management; World Health Organization's guideline on community-level interventions to manage declines in intrinsic capacity through an integrated care approach for older people (WHO-ICOPE); Health Behaviour Change Support Systems (HBCSS); and integrated- Promoting Action on Research Implementation in Health Services (i-PARIHS) The study has been approved by the Human Research Ethics Committee of Central Adelaide Local Health Network and the University of Adelaide Human Research Ethics Committee.

Results: Approximately, 100 participants will be recruited in the study, 50 from each site, and the data will be collected over a period of 6 months. A structured survey questionnaire has been developed using validated 14-item health literacy scale and electronic health literacy scale. Frailty status of the participants will be assessed through a validated Modified Fried Frailty Phenotype. The last section of the questionnaire consists of information collected as minimum dataset around hospital hip fracture care and management. The qualitative component of this phase of the study will consists of In-depth interviews and Focus group discussions conducted with healthcare providers from different disciplines, patients, their carers, and aged care providers.

Conclusion: As the global penetration of mobile devices achieves universal access, it is timely to upgrade and optimize supporting health system technologies and pathways of information provision. There is scope for improvement and health systems are beginning to focus their technological development around patient-centered approaches

Prevention of new Fractures

PE 4-1

Barriers to oral bisphosphonate initiation after hip fracture – lessons from an orthogeriatric hip fracture program in Singapore

Goh K. S. [*1]

[1]*Geriatric Medicine, Changi General Hospital, Singapore, Singapore*

Introduction: Anti-resorptive treatment is a mainstay of secondary prevention of osteoporotic fractures; oral bisphosphonates (BPs) being the commonest prescribed treatment in Singapore. Initiation of oral BPs involves patient education and careful consideration of adverse effects. Moreover, there have been concerns regarding BPs affecting fracture healing. This study aims to examine the factors influencing the initiation of oral bisphosphonate therapy, after surgical repair of hip fracture in the elderly.

Methods: 296 patients age ≥65 consecutively admitted to a community hospital after surgical fixation of hip fracture from 2016-2017 were included in this prospective study. They were part of a comprehensive hip fracture pathway transitioning from acute orthopaedic ward to community hospital; incorporating best practice elements for acute care, rehabilitation and secondary prevention via a fracture liaison service. In this protocol, calcium and vitamin D supplementation along with oral BP treatment were initiated within 28 days of surgery by doctors after assessing patients' suitability. Patients deemed suitable by the doctor were educated by a fracture liaison nurse. Reasons for non-initiation of oral BP treatment were recorded, and these patients were referred to specialist clinics for parenteral BP or denosumab. Logistic regression was performed to examine the factors associated with non-initiation of oral BPs, adjusting for age and gender.

Results: Mean age of subjects was 80.1±8.3 years. Median creatinine clearance (CrCl) was 46.1 ml/min (IQR 34.3-59.8) by Cockroft-Gault equation. 64.2% of subjects were not started on oral BPs; they tended to be older, have non-weight bearing status, lower premorbid New Mobility Score (NMS) and lower CrCl (all $p<0.05$). Log-transformed non-weight bearing status and log transformed CrCl were significantly associated with non-initiation of bisphosphonates in the multivariable model: odds ratio 4.49 (95%CI 1.69-11.95; p=0.003); 0.06 (95%CI 0.02-0.16; $p<0.001$) respectively. This was consistent with the actual recorded reasons for non-initiation: chronic kidney disease stage 4 or 5 (43.7%); non-weight bearing status (18.8%) and patient refusal (11.6%).

Conclusion: Chronic kidney disease is prevalent in elderly hip fracture patients, with an impact on secondary prevention as evidence for safety and efficacy of BPs is minimal in advanced CKD. Poorer premorbid functional status, as measured by the NMS, affects use of oral BPs as this subgroup of elderly patients are likely frailer, with complex comorbidities and have poorer rehabilitation outcomes. The results of this study provide much insight into challenges and limitations of using oral BPs in the older, frailer elderly and hence provide impetus to enhancing the fracture liaison service by consideration of use of denosumab in eligible patients. Concomitantly, clinicians should acknowledge that that secondary prevention with anti-resorptives may not be clinically beneficial in a certain subgroup of patients.

PE 4-2

Reporting vertebral fractures can prevent future fragility fractures.

Jeyabaladevan S. [*1], *Rhodes A.* [1]

[1]*Radiology, Kingston Hospital NHS Trust, Surrey, United Kingdom*

Introduction: Background to the audit:

Vertebral fractures are the most common osteoporotic fracture with an incidence of 12% in women aged 50–79 and 20% in >80s (1). Vertebral fracture is a powerful predictor of further osteoporotic fracture with RR of 2.4 for hip fractures and 5.4 for further vertebral fractures (2).

Over 55% of women with hip fractures have evidence of prior vertebral fractures, yet up to 70% of vertebral fractures remain undiagnosed (3), missing the opportunity to intervene and prevent future hips fractures. 6 -12 months of treatment can reduce the risk of hip by 50-80% (4).

A recent study of patients with hip fracture who had evidence of vertebral fracture on prior imaging, found only 46% of the vertebral fractures had been reported but even fewer had been acted on by the referring clinician (5).

Standard: All vertebral fractures identified on CT should be reported using the specific words "vertebral fracture" with the recommendation for the patient to be referred to a Fracture Liaison Service (FLS) for further assessment of bone health and appropriate treatment (6)

Indicator: Vertebral fracture identification and description in CT reports.

Target: 100% of CT reports describing a vertebral fracture use the words "vertebral fracture" and recommend refer the local FLS.

Methods: Methodology:

Audit Period: Review of CT examinations, that included the spine and reports, between 2-18 of November 2018

Population: 220 patients Age: >50yrs

Results: Results of 1st audit round: 29/220 (13%) studies showed vertebral fractures.

18/29 reports (58%) discussed vertebral fractures in the body of the report. Only 12/18 (66.7%) used the word "fracture".

Conclusion: 1st action plan:

8. Present findings at local Radiology audit meeting.
9. Encourage the use of 'Vertebral Fracture' in reports and set up FLS as an alert code.

A simple initiative from the radiology department will enable a better quality of life for patients.

PE 4-3

Antiosteoporotic treatment assessment in the spanish national hip fracture registry (rnfc). Profile of the patient treated and factors associated with the prescription.

Condorhuamán Alvarado P. Y. [*1], *Alarcón-Alarcón T.* [1, 2], *Sáez-López P.* [2, 3], *Ojeda-Thies C.* [4], *Gomez-Campelo P.* [2], *Navarro-Castellanos L.* [2, 5], *Otero-Puime Á.* [6], *González-Montalvo J. I.* [1, 2]

[1]*Geriatrics, Hospital Universitario La Paz,* [2]*IdiPAZ Instituto de Investigación Hospital Universitario La Paz,* [3]*Geriatrics, Hospital Universitario Fundación Alcorcón,* [4]*Orthopaedic Trauma, Hospital Universitario 12 de Octubre,* [5]*Registro Nacional de Fracturas de Cadera ,* [6]*Universidad Autónoma de Madrid, Madrid, Spain*

Introduction: The Spanish National Hip Fracture Registry (Registro Nacional de Fractura de Cadera, RNFC) is a database of hip fracture patients admitted to Spanish hospitals. One of its objectives includes to ascertain the situation of the healthcare for hip fracture (HF) in Spain.

Objectives:

1) To know the frequency of antiosteoporotic treatment (AOT) prescription at discharge after a HF and the patients' characteristics associated with that prescription in the RNFC.
2) To evaluate if there are differences in the profile of treated and untreated patients according to the type of hospital (high versus low treatment rate).
3) To analyze if there are differences between patients who are admitted to hospitals with a high treatment rate and those admitted to hospitals with a low treatment rate.

Methods: The RNFC included patients ≥75 years old. Patients admitted from January to October, 2017, in 54 hospitals registered through the Spanish version of the minimum data set proposed by the Fragility Fracture Network were included. The frequency of AOT (antiresorptives or osteoforming drugs) prescription at discharge was analyzed. Demographic variables, baseline functional status (modified Functional Ambulation Classification scale), cognitive situation (by Short Portable Mental Status Questionnaire), prior taking of AOT and type of fracture (intracapsular/intertrochanteric/subtrochanteric) were assessed. Hospitals were classificated by the volume of cases attended (> or ≤100 cases per year) and by the AOT prescription rate (> or ≤of the average of prescription). These variables were compared globally in the set of hospitals and separately according to the AOT prescription rate. The characteristics of patients admitted in hospitals with high versus low AOT rate were compared too. A multivariate analysis was ruled out among the variables with significance p <0.05 in the bivariate among all patients treated and untreated with AOT at discharge.

Results: 6,814 patients were included. The mean age was 86.5 (±5.5) years and 76.3% were female. AOT was prescribed at discharge in 36.7% (range: 0-93.9%). After the multivariate analysis AOT was more frequently prescribed in younger, community-dwelling, previously taking AOT, with better functional and cognitive status, discharged from hospitals with a larger volume patients (all with p<0.01). These differences remained similar when comparing separately hospitals with high or low prescription rates. There were no clinically relevant differences in the profiles of patients admitted to hospitals with high versus low AOT rate.

Conclusion: There was wide clinical variability in the prescription of AOT among different hospitals. AOT was most frequently prescribed in HF patients with a better general situation. Being discharged from a hospital with a larger volume of cases increases the chance of being treated. This results help to a better knowledge of the profile of patients discharged on secondary prevention of HF.

PE 4-4

Knowledge, perception and practices for osteoporosis and fracture prevention among health-care providers in a teaching hospital in odisha, eastern india

*Rath S. [*1], Rath S. [2], Thakur B. [2], Jena A. [2]*

[1]Orthopaedics, Kalinga Institute of Medical Science, Bhubaneswar, india, [2]Research & Publication, KIMS, Bhubaneswar, India

Introduction: A study on hip fracture care in three tertiary care hospitals in Delhi informed on the absence of osteoporosis prevention practices. The current investigation was prompted by the lack of awareness of health-care providers [HCP] on bone health and fracture prevention. Understanding the facilitators and barriers to knowledge diffusion of best practices will guide interventions and policies initiatives towards improving bone health. Knowledge diffusion of best practices requires a multimodal approach using behavioural change strategies.

Aim: To assess knowledge, attitude and practices for bone health, osteoporosis and fracture prevention among various health care providers in a tertiary care hospital and identify factors for intervention design to improve bone health in a local context.

Objective:

10. 1.To develop and validate a 'Knowledge, Attitude and Practice' (KAP) methodology questionnaire to determine contemporary perceptions and practices of HCPs on bone health, and
11. Use the questionnaire to assess knowledge, perception, attitude and practices among HCP in a teaching hospital.
12. Methods: A KAP questionnaire will be developed in two phases.

Phase-I : Identify items for KAP questionnaire

In-depth interview among the various health care providers (Physician, orthopaedic surgeon, physiotherapist, nurses and hospital administrators) with open-ended questions on their knowledge and practice for bone health is being recorded by one co-author with qualitative research experience. Response to the open ended questions will be assessed through well defined qualitative methods to identify unique ideas which will further be sub-grouped into broader categories and themes through iterative processes. A minimum of five of each category of health care provider and two hospital administrators will be included for in-depth interview in this phase of the study. The interviews will be carried out in English.

Phase-II: Prepare KAP questionnaire and reliability assessment

All the items in the draft questionnaire will be modified into different knowledge, attitude and practice domains. Fifty health professionals with various backgrounds will be recruited for reliability assessment (internal consistency) in this phase. The reliability coefficient Cronbach's alpha (α) will be measured for internal consistency and a value of more than 0.7 will be considered as good test-retest reliability.

Results: The study is being conducted and results from phase I and II will be presented along with the observations on perceived barriers and facilitators to best practice knowledge diffusion.

Conclusion: Knowledge diffusion of best practices requires a systematic identification of contemporary perceptions and practices, facilitators and barriers to best practice implementation. These findings will inform on appropriate interventions like education, audit, health systems strengthening and policy to enable implementation of best practices for bone health in the elderly.

PE 4-5

Fracture liaison service in queen elizabeth hospital – first year review

*Tam S. M. R. [1], Law S. C. [*1], Tiu K. L. [1], Lee K. B. [1], Wong K. I. [1], Li W. [1]*

[1]Oc-T, Queen Elizabeth Hospital, Hong Kong, Hong Kong

Introduction: Fragility Hip Fracture (FHF) patients have 4 times higher risk to sustain a secondary hip fracture in the next 3 years, which resulted in poorer outcomes and increased mortality (CUHK Community Fall Prevention Campaign, 2018). An integrated FHF service and clinical pathway have been implemented in Orthopaedics and Traumatology (O&T) department since 2015, but secondary fracture prevention was not well addressed. Therefore, our department started a pilot secondary fracture prevention program on FHF patients in 2017. Concurrently, Fracture Liaison Service (FLS) was introduced by Hospital Authority to provide quality FHF care and secondary fracture prevention for patients with fragility fracture (FF). Queen Elizabeth Hospital (QEH), being one of the three pioneer hospitals, has adopted FLS in late 2017 for FF service enhancement.

FLS in QEH: The initial target group of FLS is focused on FHF patients. Fracture Liaison Nurse (FLN) ensures FHF patients to have a smooth patient journey during hospitalization, coordinates multidisciplinary team (MDT) service and applies "3 I" protocol for osteoporosis screening and care. The FLN and O&T surgeons discuss with eligible patients and their caregivers about anti-osteoporotic treatment and prescribe medication if appropriate. FLS not only focus on prescription of anti-osteoporotic treatment but also reinforcing drug compliance and promoting rehabilitation. Multidisciplinary team (MDT) members provide education including bone health, nutrition, exercise and home safety. In addition, each discipline performs independent assessment to identify patients' potential problem(s) and gives relevant advice. Effectiveness of anti-osteoporotic treatment is closely monitored by portable DXA machine and DXA scan. Phone follow-ups are done to remind drug compliance, lifestyle modification and observe any complication of the treatment.

Objective: To evaluate Fracture Liaison Service after the first year of introduction.

Methods: A retrospective review of all new Fragility Hip Fracture admissions to Orthopaedics and Traumatology department and patients follow up in FF clinic in 2018.

Results: 800 newly admitted FHF patients (age ranged from 65 to 103) were recruited in this review. All of them received osteoporosis screening and care. Among those 800 patients, 23.38% (187) were eligible to receive anti-osteoporotic treatment and 83.96% (157) of them started the treatment.

In FF clinic, 91.67% (77/84) of FF patients had 1-year follow-up. All of them received MDT service and expressed satisfaction on such service by patient satisfactory survey. They all had good drug compliance and no complication of treatment.

Conclusion: FLS in QEH provides quality FHF care and secondary fracture prevention for FF patients. Although there was no significant evidence of decreasing secondary fracture in this first year report, we have demonstrated FLS is a feasible service model with encouraging results.

PE 4-6

Are proximal humerus fractures predictive of a future neck of femur fracture?

Adam J. R. [*1], *Ammori M.* [1], *Isah I.* [1], *Jeyam M.* [1], *Butt U.* [1]

[1]*Salford Royal NHS Foundation Trust, Manchester, United Kingdom*

Introduction: Proximal humerus fractures are the third most common fragility fracture, after hip and distal radius fractures. The purpose of this study is to establish whether having a proximal humerus fracture is predictive of a future neck of femur fracture.

Methods: This was a retrospective study reviewing all patients who sustained a proximal humerus fracture between 1st January 2007 and 31st December 2011, at our trust. Electronic patient record system was used to collect data and radiographs were analysed using the PACS system. Patient records were also reviewed for evidence of a future neck of femur fracture.

Results: In total there were 286 proximal humerus fractures. 193 of these were sustained in the > 65 year age group. 21 of these 193 patients (10.9%) went on to sustain a neck of femur (NOF) fracture, on average, 21 months after their proximal humerus fracture. The average age of this group was 78 years old, with twice as many females being affected than males. Of note, 8 (4.15%) of these patients developed a NOF fracture within one year – giving an incidence of almost five-times greater than the general age-matched population (Hospital Episode Statistics data).

Conclusion: Patients with proximal humerus fractures, over 65 years, are considerably more likely to develop a neck of femur fractures, when compared with general age-matched population. A third of patients who developed a NOF fracture presented within 1 year of their proximal humerus fracture. These patients should be identified and managed accordingly for prevention of further fragility fractures.

PE 4-7

Does routine bone mineral density measurement in coeliac disease patients lead to treatment recommendations? A perspective from royal national hospital for rheumatic diseases, bath

Jamal M. S. [*1], *Hardcastle S.* [1], *Ahmed T.* [1]

[1]*Rheumatology, Royal National Hospital for Rheumatic diseases, Bath, United Kingdom*

Introduction: Coeliac disease is a common cause of secondary osteoporosis multifactorial pathophysiology. The current guidelines regarding optimal interval for bone mineral density measurement in coeliac patients are not clear and are based on physician assessment. NICE guidelines recommend against routine BMD measurement in absence of major osteoporosis risk factors. We looked at our cohort of patients referred for BMD measurement to our service and assess our compliance with local and national guidelines.

Methods: The data of 165 patients were analysed who were referred for bone mineral density measurement through direct access pathway to RNHRD Bath osteoporosis service over 24 months (2016-2018). DEXA images and reports were accessed through PACS. Electronic patient record system was used for demographic characteristics. Patient filled forms were used to gather information about previous risk factors, medications, smoking and alcohol history. FRAX calculator was used to calculate risk of fractures and NOGG recommendations for intervention.

Results: Data from 160 patients was analysed. Median height and weight were 164.5cm and 70.9 kilogram respectively. More than 80% of patients were below local intervention threshold (20% risk of major fracture and 5% for hip fracture). In 74% of patients no treatment recommendation was made. In 68% patients no follow up scans were recommended. 48% had no other risk factor for osteoporosis apart from coeliac disease. Off these (8%) were recommended to have bisphosphonates. No patient with isolated coeliac disease below 55 years of age was prescribed bisphosphonates. 12.5% had BMI <20 and treatment recommendation was made in only one patient. 16 patients (10%) were above the treatment threshold as per the NOGG recommendation. Our treatment interventions coincide with NOGG recommendations in majority of patients.

Conclusion: Majority of patients with coeliac disease can be managed with strict compliance with gluten free diet and life style interventions. Routine bone mineral density measurements should not be undertaken in patients with coeliac disease below 55 years unless there are major risk factors for osteoporosis and prior history of fragility fractures. Local recommendations have been made for all such cases to be discussed with the Rheumatology team before requesting BMD measurements. Streamlining the referral pathways for the primary and secondary care physicians can lead to reduction of burden on the osteoporosis service.

PE 4-8

Prevalence of vitamin d deficiency in elderly hip fracture patients in a singapore tertiary hospital

Espeleta W. D. V. [*1], *Goh K. S.* [1], *Sigaya K. V.* [1]

[1]*Geriatrics, Changi General Hospital, Singapore, Singapore*

Introduction: Vitamin D deficiency is highly prevalent in the elderly and achieving adequate Vitamin D status is vital in fall prevention and fracture risk reduction. Existing studies demonstrate high prevalence of Vitamin D deficiency in elderly patients with fragility fractures. Hip fractures and fall-related injuries constitute a major global health issue in older people. Singapore is a multicultural country with a tropical climate, with increasing hip fracture numbers nationally. The aim of this study is to identify the prevalence of Vitamin D deficiency amongst elderly hip fracture patients, as well as the associated risk factors.

Methods: This is a cross-sectional study of 192 elderly patients in a tertiary hospital in Singapore admitted with hip fracture under the acute orthopaedic unit and co-managed with geriatricians in a multi-disciplinary integrated care pathway. Data on demographic factors and clinical characteristics were collected. Serum 25-hydroxyvitamin D levels (25(OH) D) were measured using electrochemiluminescence immunoassay. Vitamin D deficiency is defined as 25(OH)D level <20 ng/mL; insufficiency 20-30 ng/mL; severe deficiency <10 ng/mL ; normal level >30 ng/mL. Logistic regression was used to assess the association between patient characteristics and 25(OH)D deficiency.

Results: The mean age was 81.4 +/- 8.1; 33% were males; 79.1% Chinese and 18.0% Malay. Patients who had history of previous fracture comprised of 23.7%. The distribution of 25(OH)D levels was as follows: <10 ng/mL, 18.8%; 10-19.9 ng/mL, 26%; 20-29.9 ng/mL, 27.1% and >30 ng/mL, 28.1%. Mean serum 25(OH)D level was 23.04 ng/mL (SD 11.95). Majority of them had 25(OH)D insufficiency (26.9 %) and deficiency (24%). Only 41% of the participants had existing supplementation and for those on supplementation, only 53.7% had adequate 25(OH) D levels. Participants who were on medications that

could possibly lower 25(OH)D levels constituted 28.4%, and 14.4% were on existing antiresorptive treatment. Significant risk factors for 25(OH)D deficiency were male gender (OR, 0.40; 95% CI, 0.18-0.87; p = 0.021) and Malay ethnicity (OR, 11.68; 95% CI, 1.52-89.76; p = 0.018). Absence of pre-existing 25(OH)D supplementation was also noted to be a risk factor (OR, 0.51; 95% CI, 0.27-0.96; p = 0.036). Co-morbidities (Charlson Co-morbidity index), renal function (eGFR) and premorbid function (Parker mobility score and Modified Barthel Index) were not associated with 25(OH)D deficiency in this study.

Conclusion: Vitamin D deficiency is common in hip fracture patients. It is important to develop effective strategies to improve 25(OH)D levels, particularly in the Malay population. Pre-existing 25(OH)D-containing supplementation may confer a protective effect from deficiency. From a secondary prevention standpoint, 25(OH)D deficiency has implications on secondary prevention of fractures because levels need to be replete before starting parenteral anti-resorptives such as zolendronic acid and denosumab.

PE 4-9

Secondary fracture prevention activity by "the yagoto liaison committee"

*Matsuda T. *[1], Nakamura T. [1], Kondo A. [1], Kuroda A. [1], Adachi H. [1], Teramoto T. [2], Hosoe H. [3], Ando T. [4], Sato K. [5]*

[1]Department of Rehabilitation , [2]Orthopedics, Teramoto Liaison Clinic, [3]Department of Rehabilitation, [4]Orthopedics, [5]Director, Japanese Red Cross Nagoya Daini Hospital, Nagoya City, Japan

Introduction: Japanese Red Cross Nagoya Daini Hospital (also known as Yagoto Red Cross Hospital: YRCH) is an acute care hospital located in the Yagoto area on the eastside of Nagoya City. Teramoto Liaison Clinic (TLC) is an orthopedic hospital located about 2 miles from YRCH. In 2003, YRCH launched Yagoto Orthopedic Medical Collaboration Association (the Yagoto Liaison Committee) with the aim of making smooth inter-hospital cooperation of femoral neck fracture patients from YRCH to nearby hospitals and facilities in this area. 78 hospitals and facilities (including TLC) participate in the Yagoto Liaison Committee, and engage in treatment of all fragility fractures as well as femoral neck fractures. Currently, the importance of fracture liaison service (FLS) for preventing secondary fracture is advocated worldwide. The Yagoto Liaison Committee also performs FLS in various ways, using the cooperation system that has been developed up to now. One of those methods is an activity designed to prevent re-fracture of fragility fracture patients - who transferred from YRCH to TLC - for at least one year after their original fracture.The objective of this study was to investigate and examine the results of fracture prevention activities for inpatients who transferred from YRCH to TLC.

Methods: Subjects were 60 patients (at least 60 years old, 16 males, 44 females, mean age 83.0±20.0) with fragility fracture (19 femoral neck fractures, 12 lower limb fractures, 16 vertebral fractures, 6 pelvic fractures, 7 upper limb fractures) who changed transferred from YRCH to TLC, between January 2015 to December 2017. While admitted to YRCH and TLC, subjects were given exercise therapy, medication, and nutrition instruction for fall prevention and osteoporosis prevention. Unified instruction was provided at seminars held at each hospital, the contents being based on a pamphlet produced by YRCH and entitled "How to Prevent Falls and Osteoporosis." After being discharged, subjects continue their exercise therapy, medication, and nutrition instruction, and are encouraged to attend this seminar. A medical examination or questionnaire confirmed the presence or absence of a re-fracture within one year after the injury.

Results: 3 subjects had a secondary fracture. (2 subjects with femoral neck fracture, 1 subject with vertebral fracture)

Conclusion: The following are the merits by performing FLS in inter-hospital: 1) Unified guidance can be given to patients while hospitalized, and, 2) The number of unknowns (in regards to the patient's' condition) after discharge can be reduced. FLS by cooperation with other facilities requires time and effort, but continuing this activity may be one method the Yagoto Liaison Committee can greatly contribute to fracture prevention in elderly people.

PE 4-10

Call to action to close the gap in secondary prevention of osteoporotic fractures in spain

*Blanch J. *[1], Pérez Castrillón J. [2], Casado E. [3], Carbonell C. [4,5], Bastida Calvo J. [6,7], Canals L. [8], Lizán L. [9,10]*

[1]Department of Rheumatology, Hospital del Mar, Barcelona, [2]Department of Internal Medicine, Hospital Universitario "Rio Hortega", Valladolid, [3]Department of Rheumatology, Hospital Universitari Parc Tauli (UAB), Sabadell, [4]Catalan Health Institute (ICS), [5]University Barcelona, Barcelona, [6]Family Medicine, Marín Health Centre, Pontevedra, [7]National Coordinator of the Osteoporosis Group, Spanish Society for General and Family Physicians, Madrid, [8]Amgen, Barcelona, [9]Outcomes´10 S.L., [10]Universitat Jaume I, Castellón, Spain

Introduction: Despite the high morbidity and mortality associated with fragility fractures, a significant care gap exists in the management of patients at risk of such fractures. Moreover, the risk of future fractures increases significantly following a first fracture. It is therefore necessary to make a "call to action" to the health care community to improve secondary fracture prevention care.

Methods: A literature review was conducted on current gaps in secondary prevention of fragility fractures in Spain. Based on this review, a multidisciplinary Task Force (comprised of 17 experts in bone metabolism from Spanish societies involved in osteoporosis) developed a Delphi questionnaire regarding barriers to effective secondary fracture prevention. The final questionnaire was proof-checked by a Scientific Committee formed by five osteoporosis experts from the Task Force.

One hundred and two physicians from different specialities in Spain, including Rheumatology, Internal Medicine, Endocrinology, Geriatrics, Family Medicine, Gynaecology, Traumatology and Rehabilitation, will be invited to participate in the Delphi questionnaire. The results presented here concern the development of the Delphi questionnaire.

Results: The literature review identified five main barriers to secondary fracture prevention in Spain:

1) lack of public/state awareness regarding fragility fractures;
2) absence of systematic identification of fractured patients;
3) poor documentation of previous fractures;
4) pharmacological undertreatment and low adherence, and
5) variability in patient follow-up. Based on these barriers, the Task Force developed a Delphi questionnaire which included 20 items related to the following topics of secondary prevention: application of prevention strategies, existence and promotion of educational campaigns/ specific policies, provision of patient information, availability of specific resources for fractured patients, content and submission of the clinical report of fractured patients, completion of fracture registers, homogeneity of clinical practice guidelines, establishment of treatment strategies, registry of treatment adherence, improvement of patient follow-up, use of patient-reported outcomes.

Each item was presented on a 7-point Likert scale (1=completely disagree to 7=completely agree) and assessed from three perspectives:

1) current situation, 2) desired and 3) predicted (probability of achievement).

Conclusion: The results from a multidisciplinary Delphi questionnaire will provide insights into current barriers for secondary prevention of fragility fractures in Spain. Moreover, these data could help shape strategies for optimal osteoporosis diagnosis and fragility fracture prevention.

PE 4-11

Bone health in cancer patients: presumed fragility and lack of prevention.

*Rizkallah M. *[1], Bachour F. [1], El khoury M. [1], Sebaaly A. [1], Rassi J. [1], El hage R. [2], Hammoud E. [2], Antoun A. [2], Maalouf G. [1]*

[1]Orthopedic surgery, Bellevue Medical center Hospital, Mansourieh, [2]Physical Education, University of Balamand, Al kurah, Lebanon

Introduction: Various mechanisms are responsible for bone loss in cancer patients. Hormonal

treatments, chemotherapy regimens, cachexia and lack of adequate nutrition support, disuse atrophy can lead to reduced bone mineral density in these patients. Despite many studies showing this mineral reduction, sparse cross sectional studies showed a possibility of increased risk of fracture in cancer patients. This study aims to assess fall and fracture risk in cancer patients, together with measures taken to prevent bone fragility in them.

Methods: This is a retrospective study in which cancer patients aged 50 years and above admitted to our hospital during the month of January 2019 were included. Patients with blood cell cancers, with primary bone tumors and with bone metastasis are excluded. These patients were compared to a cohort of age and sex matched patients admitted to our hospital during the same period for other medical issues (digestive, cardiac, pulmonary diseases), without known cancer. Patients in both groups were compared for the history of fall and fracture in the last two years, for their Calcium and vitamin D supplementation and for the realization of DXA scan.

Results: Study population reached 184 patients. Each group included 92 patients with 62 females and 30 males. Mean age was 63 years [50; 85]. Around 22% of patients in the cancer group had a history of a fall in the last two years compared to 44% in the non-cancer group (p=0.001). Around 4% of cancer patients had a history of fracture compared to 26% in the non-cancer group (p<0.001). There were 20 % and 36 % of patients taking calcium and vitamin D supplementation in the cancer group vs 38 % and 60 % of patients taking them respectively in the non-cancer group (p=0.008 for Calcium; p=0.004 for vitamin D). Around 5% of cancer patients had undergone DXA scan in the last two years compared to 22% of non-cancer patients (p<0.001).

Conclusion: Despite predicted bone fragility, cancer patients had significantly less incidental fractures when compared to non-cancer patients. This is probably due to their general health alteration making displacement more difficult, less frequent, and always supported. This was reflected by the reduced incidence in falls in cancer patients. Measures to prevent bone loss seem neglected in cancer patients. Action is needed by caregivers to raise awareness on bone fragility prevention in cancer patients as these patients seem negligent of their bone health.

PE 4-12

Facilitating safe zoledronate infusion for patients with osteoporosis using data from a hospital-wide electronic alert zoledronate database

*Vojtekova K. *[1], Nizamis T. [1], Ong T. [1], Marshall L. [2], Spurling A. [3], Sahota O. [1]*

[1]Department for Healthcare of Older People, [2]Department of Trauma & Orthopaedics, [3]Pharmacy department, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Introduction: An electronic hospital alert for zoledronate (ZOL) was introduced due to ZOL's increased use in hospital and to facilitate better information sharing of osteoporosis treatment between primary and secondary care. Here we report how this database was utilised to identify ZOL administration practices to ensure safe prescribing and follow-up.

Methods: Internal consensus of minimum safety standards for ZOL administration included, documenting ZOL indication; blood tests (calcium, renal function, vitamin D) performed; creatinine clearance (CrCl) calculated; and subsequent bone health plan documented in hospital discharge summary. Baseline data was collected on these pre-determined standards for 6 months beginning 1/9/2017. After a series of quality improvement strategies which included educational events, embedding this into junior doctor induction and pharmacist support, this was re-audited for 6 months from 1/7/2018.

Results: The audit was performed in 57 patients in the first cycle and 55 patients in the re-audit. Comparing both audit cycles, the proportion of gender and distribution of age were not statistically different (female, 61% vs 61%; age, years; 82.5(7.3) vs 85.1(6.9), p=0.06). There were more patients with a diagnosis of osteoporosis in the second cycle (65%) compared to the first (56%). 47% and 49% respectively were on bisphosphonates on admission. In the re-audit, indication for ZOL included non-compliance with oral bisphosphonate (60%), side effects with oral treatment (32%), acute fracture (4%) and perceived higher fracture risk requiring parenteral treatment (4%). Median time to administration was similar in both cycles, ie day 6 of their hospital admission (range: 1-58 days and 1-24 days in the first and second cycle respectively). There was improvement across the 4 standards. Indication for ZOL was documented in 100% of patients. Baseline audit vs re-audit, blood tests completed, 58% vs 75%; CrCl calculated, 74% vs 93%; bone health plan in discharge summary, 78% vs 92%. In both cycles, almost similar number of patients with low calcium (<2.20mmol/L) 4 vs 2 patients; 25-OHD (<35nmol/L) 11 vs 11 patients, and CrCl (<35ml/min) 2 vs 4 patients, received ZOL. No adverse events were reported. 39% (22/57) of patients after the first audit cycle died within 18months of administration.

Conclusion: There was improvement across the pre-determined ZOL administration standards. However, ZOL was still administered in some patients despite blood tests being less than the lower reference range. Further emphasis of safe ZOL prescribing is still required. Significant proportion of patients received ZOL within the last 18months of life. These 2 audits have demonstrated that the introduction of a hospital-wide electronic alert allows creation of a database to safely monitor prescribing practices for ZOL for osteoporosis.

PE 4-13

Changes in potentially inappropriate prescribing following hospitalisations for falls and fractures in older adults in ireland

*Walsh M. E. *[1], Boland F. [1], Moriarty F. [1], Fahey T. [1]*

[1]HRB Centre for Primary Care Research, Royal College of Surgeons in Ireland, Dublin, Ireland

Introduction: In Ireland, falls from a low height are now the leading cause of major trauma, surpassing road traffic accidents. Approximately 5% of falls in older adults result in serious consequences including fractures. Guidelines recommend that falls that are severe enough to require hospitalisation should trigger a multi-factorial risk assessment, including a review of medication, with the aim of preventing future falls and fractures. The aim of this before-and-after cohort study was to explore patterns of relevant potentially inappropriate prescribing in older people with fall and fracture related hospitalisations.

Methods: Data on older adults with hospitalisations for falls, fractures and syncope between 2012 and 2016 were collected from 44 General Practices in Ireland. Fall and fracture related prescribing was defined from the Screening Tool for Older Persons' Prescriptions (sedatives and vasodilators) and the Screening Tool to Alert to Right Treatment (vitamin D). Prevalence of prescriptions were estimated from general practice and hospital discharge records. Mixed-effects logistic regression was conducted to compare the 12-month pre- and post-hospitalisation periods.

Results: Overall, 927 individuals (68% female, average age 81.2 (SD=8.6)) were included. The diagnosis for 45% was a fracture, 28% had syncope, and 27% had a fall without a fracture or syncope. After adjustment for covariates and practice clustering effects, both vitamin D and sedatives had higher odds of prescription post-hospitalisation (adjusted Odds Ratio (aOR)=4.47 (95% confidence interval (CI)=2.09-9.54) and aOR=1.75 (95% CI=1.29- 2.39), respectively. The majority of those on vitamin D prior to hospitalisation continued to be prescribed post hospitalisation (88%), while only 30% of patients were newly prescribed vitamin D. While 16% of those on sedatives were deprescribed, 20% of those not on sedatives had new initiation. With adjustments for age and sex, having a fracture was associated with new initiation of vitamin D (aOR=2.81 (95% CI=1.76-4.46)) and having syncope was associated with continuing on vasodilators (aOR=1.99 (95% CI=1.06-3.74)). No factors were associated with new sedative initiation.

Conclusion: Potentially inappropriate prescribing relevant to falls and fractures is frequently observed in older adults who have a history of hospitalised falls and it continues after discharge. Future detailed work is needed to explore specific prescribing practices during hospitalisations for falls and fractures to identify areas for improvement

and to investigate why sedative prescriptions may be initiated. Research should evaluate whether deprescribing interventions should be adapted for this population to address specific psychological consequences of falls and fractures. Further research is also required to assess whether integration of fall-related primary and secondary care can alter long-term prescribing patterns and prevent subsequent falls and fractures in this population.

PE 4-14

The orthogeriatric prevention service improves the automatic capture and outcomes among functionally resilient older persons

*Baroni M. [*1], PRENNI V. [2], Parretti L. [3], Bubba V. [3], Comanducci C. [3], Caironi G. [3], Caraffa A. [4], Mecocci P. [3], Antinolfi P. [5], Rinonapoli G. [5], Boccardi V. [5], Ruggiero C. [5]*

[1]Medicine, University of Perugia, [2]Medicine, Institute of Geriatrics and Gerontology, [3]Medicine, "S. Maria della Misericordia" teaching hospital, [4]Surgical department, Orthopedics and Traumatology Unit, [5]University of Perugia, "S. Maria della Misericordia" teaching hospital, Perugia, Italy

Introduction: Hip fractures are associated with high mortality (20-25% by the year), severe and permanent disability (80% of survivors are dependent on at least one basic activity of daily life). The prevention of re-fractures in high-risk individuals, such as patients with a previous femur fracture, may help to improve the functional recovery process and, by reducing the recurrence of falls and fractures, promotes the maintenance of the maximum level of functional autonomy. Numerous organizational models have been developed in order to offer the most appropriate diagnostic and therapeutic pathway to such high risk persons. The aim of this study is to evaluate the effectiveness of an orthogeriatric outpatient service in the prevention of re-fracture and health-related outcomes.

Methods: observational study conducted on 762 over-65 persons with hip fracture between February 2016 and February 2017. All patients received at discharge an outpatient visit at the orthogeriatric outpatient service. The visit was scheduled via a centralized server and carried out within 30-40 days after the hip fracture. 271 persons reached the orthogeriatric service (cases) and 283 received usual care (controls). Cases received pharmacological and non-pharmacological therapeutic indications. A 3, 6 and 12 months from outpatient visits, a telephone follow-up was conducted for both groups. The percentage of patients who receive therapeutic indications aimed at preventing falls and re-fractures, those who adhere to these indications at follow-up and those who develop complications, including falls, re-fractures and use of social and health services were estimated.

Results: 79% women and 21% men, with a mean age of 84 years, which preserved a good level of functional autonomy before the fracture (71% ADL>4), despite of previous falls and fractures (42%).Compared to controls, 97% of cases started vitamin D and diet integration of calcium, while 66% were on the most suitable drugs for fracture prevention. Cases were more likely to be disabled at three months, while less likely at 12 months, with mortality reduced by almost half, lower rate of re-fractures and lower use of health-care services. Cases were more adherent to calcium/vitamin D supplementation and anti-fracture therapy than controls at 3, 6 and 12 months. Cases received more appropriate prescriptions of antifractures treatments than controls, with persons functionally independent showing a high rate of adherence.

Conclusion: The ortho-geriatric outpatient service has the potential to identify and manage clinical and care needs of frail older adults at high risk of falls, fractures, and adverse events. It is necessary to better validate this model of care and verify its effectiveness for fracture prevention.

PE 4-15

Experiences from a nurse led follow up after hip fractures in a geriatric outpatient clinic

*Martinsen M. I. [*1], Engh E. [2], Hylen Ranhoff A. [2]*

[1]Surgical, [2]Medical dep, Diakonhjemmet hospital, Oslo, Norway

Introduction: Background: Previous studies have shown that older patients with hip fracture seldom are assessed for osteoporosis. To improve secondary prevention for these patients, we established an outpatient clinic for follow up inspired by the idea of Fracture Liaison Service. The aim of this study is to study characteristics of patients referred to this clinic 3-4 months after surgery.

Methods: Material and methods: From 01.09.2015 - 31.12.2017 210 patients were referred to the after fracture follow up, called "AF". Inclusion criteria was hip fracture, age 65+ years and home dwelling. Data was obtained from a quality register where demographic and medical information are registered during admission by an interdisciplinary team. When they met at the AF, all patients were systematically assessed by a specialist nurse about walking aids, ADL function and medication. BMI was registered of all patients. Patients 65-75 years, and some of the not frail older than 75, were offered DXA measurement of bone mineral density. All patients were advised about fall prevention and nutrition. A geriatrician (AHR) was consulted for advice about medication.

Results: 140 patients (67% of referred) met at the AF. 70 patients did not meet; 29 had no need for the consultation, 7 were referred to DXA at another hospital, 8 had died, 8 lived in long term care and 17 gave no cause for not meeting. Of the 140 who met, 106 were women and 36 men. Mean age was 80 years (65-98). 79 (56 %) had fallen at home, while 61 (44%) had fallen outdoors. 70 patients were offered DXA test. Of these 41 (59%) were diagnosed with osteoporosis, 27 (39%) with osteopenia. After 3 months we found that 126 patients (90%) were living at home, while 12 (10%) were living permanently in a nursing home. 89 patients (64%) had no need of home service after 3 months.

Before the fracture 102 patients (73%) were walking independently. After 3 months only 37 (26%) could walk without any aid. The most common walking aid was walker and crutches. Of those walking independently pre-fracture, 31(30%) were using a walker and 29 (28%) were using crutches.

Nutritional status (BMI) was measured on both admission in hospital and after 3 months. On admission 23 patients (20%) had BMI < 20 and 90 (80%) $\geq$ 20. After 3 months 32 (30%) had BMI <20 and 74 (70%) had BMI $\geq$20.

Conclusion: The patients selected for the follow up are probably healthier than the majority of hip fracture patients. This might explain why so many lived at home without any assistance after 3 months. However, many of the patients who met were still in need for a walking aid and several had experienced weight loss. A nurse led AF outpatient clinic is necessary for patients with undiagnosed osteoporosis to get medication. Important as well is that these patients get advice about preventing future falls and appropriate diet.

PE 4-16

Use of antiosteoporotic medication among hip fracture patients

*Martinsen M. I. [*1], Rudolph A. [1], Hylen Ranhoff A. [2]*

[1]Surgical, [2]medical, Diakonhjemmet hospital, Oslo, Norway

Introduction: Objectives: There has been an increased focus on osteoporosis and prevention of fragility fractures in the resent years. The aim of this study is to describe the use of antiosteoporotic medications among hip fracture patients on admission and to describe the treatment patients were recommended at discharge. In 2017 a procedure on osteoporosis treatment of hip fracture patients were introduced. According to the procedure all hip fracture patients with acceptable kidney function (eGFR>35ml/min) should be offered zoledronic acid infusion a day before discharge. The objective with this study was to study to which degree the procedure were implemented.

Methods: This is a quality study. Data was obtained from a quality register where demographic and medical information are collected by an interdisciplinary team. Data on use of osteoporosis medication were obtained from medical charts.

Results: 950 patients, 693 women and 257 men aged 40-103 years (mean 83) were included from 01.01.2017 - 31.12.2018. On admission 186 (20%) patients 171 women and 21 men were using a medication for osteoporosis. The most common medication was calsium with vitamin D, 122

patients (63%) were using this medication, 22 (11%) were using denosumab, 21 (11%) alendronate and calsium, 11 (6%) alendronate and 10 (5%) were using zoledronic acid. The patients using medication were older mean age 84 vs 82 years (p=0.004), had more chronic diseases 2.4 vs 2.0 (p=0.001) and were more often discharge to a nursing home, 46 % vs 36%.

At discharge 682 (72%), 523 women and 158 men were prescribed with antiosteoporotic medication. Calcium with vitamin D was the most common medication 295 (43%) were prescribed with this medication, 313 (46%) were given zoledronic acid before discharge, 56 (8 %) alendronate and calsium and continued with 16 (2%) denosumab.

22 patients died in hospital and 243 patients were discharged without any medication. Patients discharged without any prescription had more chronic diseases mean 2.5 vs 1.9 p=0.001 and were more often discharged to longterm care facilities 44% vs 14%. There were no significant difference in age between patients discharge with or without treatment mean age 83 vs 82 years (p=0.104).

Conclusion: Although using medications for osteoporosis 186 (20%) patients got a hip fracture. These patients were older and had more chronic diseases. However 80% of the patients did not use any medications prior to the fracture, showing the importance capturing the patients admitted with fractures. 295 (43%) of the patients were discharged with only calsium with vitamin D. This shows that the procedure was not fully implemented and needs following up.

PE 4-17

Grip strength in men and women aged 50-79 years is associated with non-vertebral osteoporotic fracture during 15 years follow-up. The tromsø study 1994-95

*Ranhoff A. H. [*1,2], Søgaard A.-J. [2], Magnus J. [3], Bjørnerem Å. [4], Holvik K. [2], Emaus N. [4], Meyer H. [2], Strand B. H. [2]*

[1]Department of Medicine, Diakonhjemmet Hospital, [2]Norwegian Institute of Public Health, [3]University of Oslo, Oslo, [4]University of Tromsø, Tromsø, Norway

Introduction: Osteosarcopenia is a disorder where sarcopenia and osteoporosis is present in the same patient. The prevalence is mostly unknown at population level, but shown to be common in hip fracture patients. We aimed to explore whether low grip strength as an indicator of sarcopenia was associated with increased risk of non-vertebral osteoporotic fracture in the population-based Tromsø Study 1994-95.

Methods: Grip strength (bar) was measured by a Martin Vigorimeter and fractures were retrieved from the x-ray archives at the University Hospital of North Norway between 1994 and 2010. At baseline, weight and height were measured, whereas information on the other covariates were obtained through self-reported questionnaires. Cox regression was used to estimate the hazard ratio (HR) of fracture in age- and gender-specific quintiles of grip-strength, and per 1 SD lower grip strength. Similar analyses were done solely for hip fractures. Adjustments were made for age, height, body mass index (BMI), marital status, education, smoking, physical activity, use of alcohol, self-perceived health and self-reported diseases.

Results: In 2,891 men and 4,002 women aged 50-79 years, 1,099 osteoporotic fractures, including 393 hip fractures, were sustained during median 15 years follow-up. Risk of osteoporotic fracture increased with declining grip strength: Hazard ratios per SD decline was 1.22 (95% CI 1.05-1.43) in men and 1.09 (95% CI 1.01-1.18) in women. HR for fracture in lower vs. upper quartile was 1.58 (95% CI 1.02-2.45) in men and 1.28 (95% CI 1.03-1.59) in women. The association was most pronounced in men aged 50-64 years with HR=3.39 (95% CI 1.76-6.53) in the lowest compared to the upper quintile.

Conclusion: The risk of osteoporotic fracture increased with declining grip-strength in both genders, particularly in men aged 50-64 years.

PE 4-18

Care trajectories of subjects with fragility fractures in france – the epifract study

*Briot K. [*1], Grange L. [2], Cortet B. [3], Feron J.-M. [4], Coulomb A. [5], Chauvin P. [6], Alliot-Launois F. [7], Sellami R. [8], Touboul C. [8], Vincent B. [9], Joubert J.-M. [9], Launois R. [10]*

[1]Service de Rhumatologie, Hôpital Cochin, Paris, [2]Service de Rhumatologie, CHU Grenoble Alpes, Hôpital Sud, Echirolles, [3]EA 4490, Service de Rhumatologie, CHU Lille, Lille, [4]Service de Chirurgie Orthopédique, HUEP Saint Antoine, Sorbonne Université, [5]Coopération Santé, [6]INSERM, Institut Pierre Louis d'Epidémiologie et de Santé Publique (UMRS 1136), Department of Social Epidemiology, Sorbonne Université, [7]AFLAR - Association Française de Lutte Anti-Rhumatismale, Paris, [8]Kantar Health, Gentilly, [9]UCB Pharma, Colombes, [10]Réseau d'évaluation en économie de la santé, Paris, France

Introduction: To describe the care trajectories of subjects with fragility fractures identified in a representative general population of adults aged fifty years and over in France.

Methods: A postal questionnaire was sent to 15,000 individuals aged ≥50 years extracted from a representative panel of the French population in April-May 2018, in order to identify subjects with a history of fragility fracture. These individuals were members of the METASKOPE panel, a permanent sample of 20,000 households constituted on a voluntary basis to answer regular questionnaires related to health or other topics of interest. Subjects were asked whether they had experienced a fracture in the previous 3 years and, if so, how many. The study population consisted of all respondents declaring that they had experienced a single fragility fracture in the previous three years. Information was collected regarding diagnosis, hospitalisations, physician visits and treatment related to the fractures.

Results: The response rate was 92.8%. Of the 13,914 subjects returning a questionnaire, 464 (3.3%) reported a fragility fracture (total 495 fractures) of whom 436 reported a single fragility fracture. These constituted the study population. The most frequent reported fracture locations were forearm/wrist, ankle, proximal humerus and ribs. The mean age of the population reporting a single fracture was 68.7 ± 10.3 years. 12.2% of this sample had undergone bone densitometry (DXA) prior to the fracture and 11.9% had received a diagnosis of osteoporosis from a physician. Following fracture, a further 17.9% underwent DXA and 8.5% received a diagnosis of osteoporosis. 74.3% of fractures were initially managed in an emergency department and 29.6% led to immediate hospitalisation. The hospitalisation stay was <5 days in 58.4% of cases. Prior to fracture, 3.5% received a specific anti-osteoporotic treatment, 10.4% received vitamin D and 6.6% received calcium supplementation. After the fracture, these figures rose to 10.6%, 41.8% and 16.2% respectively. 56.2% of patients had a follow-up visit to their general practitioner.

Limitations of the study include the unknown reliability of self-report for medical variables and the lack of clinical ascertainment of the information collected. In addition, the study sample was limited to people living at home. Elderly people living in residential homes or nursing homes may follow different care trajectories to independent individuals living at home.

Conclusion: The rate of DXA screening following fragility fractures in subjects over fifty is very low. Most patients with fragility fractures did not receive a diagnosis of osteoporosis. The proportion of patients treated with a specific anti-osteoporotic treatment after a fracture is also alarmingly low even if half of them met their general practitioner after the fracture. Practice guidelines are not being adhered to in everyday clinical practice in France.

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PE 4-19

Patient and public involvement: paper 3. The patient voice in their prevention of fragility re-fracture care journey

*Speerin R. [*1]*

[1]Nursing, University of Western Sydney, Sydney, Australia

Introduction: The model of care for re-fracture prevention in NSW Australia was developed in 2010 and updated in 2018. Central to the model of care is the person with a fragility fracture as a key partner in their healthcare. Strategies to ensure

their voice is heard is the use of Patient Reported Measures (outcomes and experience) (PRM), with the clinical service delivered using behaviour change methodology.

Methods: Objective: To share strategies used in NSW Australia that aim to include the person with a fragility fracture as a key and active partner in the delivery of their healthcare that aims to prevent the next fracture.

Following the launch of the model of care in February 2011 to all public funded healthcare services in NSW Australia, the following activities occurred to meet the goal of people with a fragility fracture being encouraged and supported to be active partners in their healthcare:

13. Training in behaviour change methodology offered to all clinical team members who provide fracture prevention services
14. Support to understand the value of PRMs in clinical care through workshops
15. Trial of the use of PRMs

Results: Anecdotal reports from clinical teams reveal enhanced activation of people they see concerning their re-fracture prevention care needs.

Formal evaluation of the use of PRMs in fracture liaison services reveals the value in clinical decision-making and enhanced patient involvement in these decisions. However, they also reveal the increased time to use PRMs.

Conclusion: There are many benefits to the use of PRMs in clinical practice. When combined with behaviour change methods for delivery of clinical services, clinical teams and people receiving the services discover improved adherence to agreed activities to prevent the next fracture. However there are barriers to the use of PRMs that health systems need to address. Electronic delivery devices need to be in place for both patients and clinical teams use. These devices will capture and analyse the data, as well provide real-time feedback. Real-time data feedback on individual's outcomes allows them to be used for clinical use and deciding upon agreed care plans at the point of care. Collated data over time supports quality improvement of re-fracture prevention services.

PE 4-20

Use of smart belt hip protection can impact mobility, fear of falling, and functional metrics in those at high risk of falling.

Tarbert R. *[1]

[1]*Active Protective Technologies, Inc, Fort Washington, United States*

Introduction: Falls in the older adult population is an epidemic that leads to approximately 3 million emergency room visits, & 300,000 hospital admissions due to hip fracture in the United States alone. Active Protective Technologies has produced a 'smart' hip protection belt aimed at resolving the acceptance and workflow issues associated with passive hip pads. The belt monitors user activities, provides analysis, and communicates wirelessly to caregivers. The belt can detect a hip-impacting fall, which automatically activates a contoured airbag around the hips before the user contacts the ground, and then sends a wireless alert. This presentation will share the implementation of smart belt hip protection in care settings for older adults identified as being high risk for falling.

Methods: Facility staff identified residents who would be appropriate candidates including: high risk of falling, goal of mobility, & willing to participate. The wearers or their POA's signed a user agreement and baseline data of distance over surface of ambulation, fear of falling (via the short FES-I) and age were obtained upon initiation of the belt wear. Upon discharge of the smart belt wear, the metrics of distance over surface and concern of falling were again repeated for comparison. Of those who were offered the smart belt during their stay and refused the wear, the same metrics were taken for consideration. The average age of the short-term care participants was 76 years old and the length of stay in the short-term rehab setting was 3 weeks. Participants who did not have a goal of mobility or were living with moderate to severe cognitive impairments were excluded from participating.

Results: Among 68 patients, Distance Over Surface gradually increased for both users and non-users of the belt during their short-term rehabilitation stay. However, the greatest gains occurred to users of the belt, who we were walking 50% farther at discharge than those who opted not to use the belt. Users of the hip protection belt saw a 22% improvement in Short FES-I score (decrease in their fear of falling) during their stay. Results of a singular long- term care user (age 94) included: improved Short FES-I by one point, doubled Distance Over Surface ambulation in the rehab setting, & resumption of previously achieved Self Selected Walking Speed of 1.1 m/sec.

Conclusion: Integration of a smart belt hip protection technology into the short-term and long-term care of older adults at high risk of falling can impact mobility, fear of falling and functional metrics. Use of the belt with short-term rehabilitation patients was directly correlated with improved mobility upon discharge. Improving the amount of mobility a patient is participating in while undergoing rehabilitation can improve rehabilitation outcomes, functional performance as well as reduce falls and reduce risk of rehospitalization.

PE 4-21

The effectiveness of bone health services in an outpatient parkinsons disease clinic

Hillarious A. *[1]

[1]*Health care of Older People , Nottingham University Hospitals , nottingham , United Kingdom*

Introduction: The evaluation of Parkinsons Disease (PD) patients in the outpatient setting allows the opportunity to assess the individual risk of falls and subsequent fractures. Multifactorial falls risk assessment in PD clinic allows for falls specific intervention and may contribute to overall decrease in falls risk and decrease in fragility fractures.

Methods: A retrospective analysis of patients seen in clinic led either by Health care of the Older People (HCOP) team and by Neurology team with a diagnosis or treated for PD or PD plus syndromes and were over 65. The clinic letters for the patients seen in clinic over three consecutive months were reviewed for assessment of falls, FRAX score , BMD, and any radiological imaging for fragility fractures

Results: A total of 295 patients were evaluated, off these 223 were seen by Neurology team in clinic and 73 were seen by HCOP team. The male to female ratio 1.75:1. Amongst those seen 73% were asked about falls in the past, and 40% reported falls in the preceding year. 83% of those patients who had a known diagnosis of osteoporosis were asked about falls. The number of patients who had fractures was 15%. Of these most common reported fractures were hip 36% and spine 32% followed by humeral fractures 10%. Amongst those patients with fragility fractures only 50% were reported to have a bone health plan and 63% had a prior BMD test, Under 5% of patients seen in clinic had FRAX score calculated. 82% of patients seen in HCOP clinic for PD had a previous fragility fracture had a bone health plan as opposed to 38% of those seen by the PD Neurologist clinical service. The incidence of fragility fracture was 18% in patients seen in HCOP and 15% of those patients seen by Neurologist team.

Conclusion: The majority of patients were not asked about falls or did not have risk stratification with FRAX calculation regardless of whether they had previous falls, this was consistent across the HCOP and neurology clinic.

As is expected Hip fracture was the most common fragility fractures noted in this population group followed closely by Spine fractures. Only half of those patients with previous fragility fractures had a bone health plan, Although patients with previous fragility fracture seen in a HCOP clinic for PD was more likely to have bone health plan implemented than if seen in Neurologist service. this can be improved by ensuring these patients have a FRAX in clinic, and if necessary BMD testing. As hip and spine fractures can lead to adverse outcomes like increased mortality, poor mobility and increased length of hospital stay, our aim should be to reduce these outcomes by improving preventative measures in clinic.

Recommendations: Fall assessment should be done for all patients in clinic along bone health assessment for patients after risk assessment as per NICE/NOGG guidance

PE 4-22

The background factors on hip fracture patients; previous history of fractures and osteoporosis treatment

*Sueyoshi T. [*1], Yasuda T. [1]*

[1]Orthopedic Surgery, Kobe City Medical Center, Kobe, Japan

Introduction: As the population is rapidly aging in Japan, the treatment of osteoporosis and the prevention of fractures among the elderly are urgent need. Although the risk of a fragile fracture has been acknowledged, the number of hip, forearm and spinal compression fractures is increasing. The purpose of the study is to elucidate the backgrounds of hip fracture patients treated in our institution.

Methods: 144 hip fracture patients from January 2015 to December 2017 were reviewed retrospectively. Patients under the age of 69 were excluded because the study was intended for osteoporotic fractures. The patient demographics, the history of fragile fractures and osteoporosis treatment were investigated

Results: There were 114 females and 30 males. The mean age at surgery was 84.5 [70, 101]. Upon history taking, 25 patients (17.4%) had a history of previous osteoporotic fractures. However, the x-ray and CT scans revealed 38 patients (26.4%) had unaware previous fractures such as spinal compression fractures or pubic bone fractures. 8 of 25 patients who were aware of their previous fractures had osteoporosis treatment such as bisphosphonates or SERM. On the other hand, 6 of 38 patients who were unaware had osteoporosis treatment.

Conclusion: The study demonstrated many elderly patients were unaware of their fractures. A number of different kinds of osteoporosis treatment are available in Japan, but substantial elderly people may be still at the risk of preventable fractures. The medication should be encouraged to prevent the second or subsequent fractures.

PE 4-23

Coordination of fracture liaison services (fls) with primary care in Spain: development of a best practice framework

*Prieto-Alhambra D. [*1], Naranjo A. [2], Ojeda S. [2], Giner M. [3], Canals L. [4], Balcells-Oliver M. [4], Cancio J. [5], Duaso E. [6], Mora-Fernández J. [7], Pablos C. [8], González A. [8], Lladó B. [9], Olmo F. [10], Montoya M. [10], Menéndez A. [11]*

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS), University Oxford, Oxford, United Kingdom, [2]Department of Rheumatology, Doctor Negrin University Hospital, Las Palmas de Gran Canaria, [3]Bone Metabolist Unit, Department of Internal Medicine, "Virgen Macarena" University Hospital, Sevilla, [4]Amgen, Barcelona, [5]Geriatrics Service , Centre Sociosanitari El Carmen, Badalona, [6]Geriatrics Service, Igualada Hospital, Barcelona, [7]Geriatrics Service, Coordinator FLS Hospital Clinico San Carlos, Madrid, [8]Geriatrics Service, Complejo Asistencial Universitario Salamanca, Salamanca, [9]Fracture liaison Service, Hospital Son Llatzer, Mallorca, [10]Fracture liaison Service, "Virgen Macarena" University Hospital, Sevilla, [11]Fracture liaison Service, Hospital Vital-Buylla, Asturias, Spain

Introduction: Fracture Liaison Services (FLS) are secondary fracture prevention hospital services for the management of osteoporotic patients. Effective coordination between FLS and Primary Care (PC) is necessary to ensure long-term continuity of care in patients with fragility fractures.

Methods: For the development of the best practice framework, five phases were followed: 1) Establishment of a scientific committee comprising three physicians: 2) Selection of seven Spanish health areas (administrative districts comprising a group of PC centers and the referral hospital), each with an FLS referral physician (champion); 3) Selection of a minimum of two PC centers per area and one case manager (FLS-PC coordinator) per center; 4) Task Force meeting, hosted by the Spanish Society of Bone and Mineral Metabolism Research (SEIOMM) to standardize recommendations and performance indicators for the coordination FLS-PC; and 5) Development of a best practice document.

Results: Four main standards were agreed upon:

1) Promotion of FLS-PC communication (ways proposed);
2) Homogenization of the content of the clinical report of the fractured patient (minimum data to include and ways to make the report accessible to PC);
3) Treatment adherence (frequency, channels used and registration); and
4) Improvement of patient follow-up (ways and training plan).

Performance indicators of FLS-PC coordination were:

1) Clinical reports received in PC from FLS, number and type of contacts established between FLS and PC;
2) Number and type of fractures received in PC from FLS, number of patients with treatment initiation, route and frequency of administration of the treatment;
3) Phone calls to patients to verify treatment initiation, percentage of adherent patients, channels used to assess adherence; and
4) Training sessions received in PC.

Conclusion: Implementation of the recommendations proposed in this best practice framework may improve FLS-PC coordination and thus optimize follow-up of patients with fragility fracture identified in FLS. Performance indicators will allow us to benchmark FLS and to identify improvement strategies.

PE 4-24

The experience of three years fracture liaison service for hip fracture patients

*Yamamoto N. [*1,2], Takahashi H. [1,2]*

[1]Department of orthpedic surgery, Niigata rehabilitation hospital, [2]Niigata bone science institute, Niigata, Japan

Introduction: Japan is one of most aging country in the world. Estimated hip fracture number is over 200,000 annually, and increasing past 25 years. We developed new approach for hip fracture patients coordinated by nurse osteoporosis manager who was certificated by Japan Osteoporosis Society. The purpose of this study is to verify the effects of fracture liaison service of hip fracture patients for 3 years in Japan.

Methods: Fracture liaison service was implemented on October 2013. We had treated 350 patients who had hip fracture until now. From the beginning a hundred consecutive hip fracture patients were admitted Niigata rehabilitation hospital, 88 patients accepted our liaison service. The One-Stop Notebook was used for multidisciplinary approach of FLS.

Results: At discharge from hospital, 97% patients were received osteoporosis medications, and 86.4% patients were already undergoing the nurse-care insurance. During 3 years from hospital discharge, mortality rate was 6.0 % at 1 year, 15.7% at 2 year, 25.0% at 3 year. The adherence rate of osteoporosis medication was 77.8 % at 1 year, 72.5 % at 2 year, 70.5% at 3 year.

Conclusion: In 2015, the Japan osteoporosis Society initiated an osteoporosis manager certificated system for the osteoporosis liaison service model of care who are expected to coordinate the multidisciplinary approach to establish a fracture liaison service. But only a very small proportion of Japanese hospitals have the useful system of osteoporosis manager activities. Furthermore most of hip fracture patients were under needed nursing care after fracture. Another fractures might make further serious ADL disability. The collaboration between medical care and nursing care are essential for secondary fracture prevention in Japan. Our fracture liaison service contributed high persistency of osteoporosis medication and low mortality for 3 years after discharge . The osteoporosis manager plays a key role in successful liaison service for secondary prevention of hip fracture.

PE 4-25

Low cost fracture liaison services at stavanger university hospital

*Djuv A. [*1], Veggeland T. [2]*

[1]Orthopedic Department, [2]Stavanger University Hospital, Stavanger, Norway

Introduction: In 2015 the Norwegian Orthopaedic Association launched new guidelines of secondary prevention of fragility fractures. Stavanger University Hospital (SUH) is the only hospital in the region providing fracture treatment to 370. 000 inhabitants. Our main aim was to establish a Fracture Liaison service to implement the guidelines at SUH and tailor them to the available resources.

The secondary aims were to offer at least 80% of our in -hospital hip fracture patients secondary prevention and refer at least 40% to DXA from the Outpatient fracture Clinic (OC).

Methods: A working group (WG) made a tailored low cost FLS algorithm both fitting to outpatient and in-hospital fracture patients. An endocrinologist, a pharmacist, a radiologist, two orthopaedic surgeons and one general practitioner (GP), took part in the WG. Information (meetings, websites) were given to the orthopaedic department, the local GPs, in addition to meeting with the hospital laboratory service, the secretary service and the Osteoporosis Association in Stavanger. Information booklets to the patients and posters with the algorithm were available at all working stations in the orthopaedic department and in the OC. A notification from the Fracture registry in Stavanger (FReS) was added to pop-up when entering the fracture-codes on patients with age >50 years at the Outpatient Clinic. The patients´ GP received the DXA result.

Results: In 2018 1.632 long bone fractures among patients >50 years were registered. 736 (45%) of these fractures were treated non-operatively at our OC. 46% of these were admitted to DXA scanning. The male: female ratio was 1:4 and 88% attended their scheduled appointment. The DXA results showed that 45% had normal BMD, 39% had osteopenia and 16% had osteoporosis. Over half (54%) of those admitted to DXA had a fracture in the distal radius, 25% in the proximal humerus and 9% in the ankle, the rest had other fractures. SUH treated 408 hip fractures >50 years of age in 2018. The mean age was 80.6 years, 59% were female and nearly 30% of them had received treatment for another fracture less than two years before. 85% had no osteoporosis diagnosed or treatment before the hip fracture event. 76% of the hip fracture patients were given treatment according to the FLS algorithm.

Conclusion: With the use of local adjustments of the guidelines provided by the Norwegian Orthopaedic Associations for secondary prevention, we managed to give nearly 80% of the hip fractures secondary prevention and refer 46% of the outpatients fracture clinic patients to DXA. These results are close to the referral rate from the NoFRACT study (47%). The main challenge in outpatient fracture clinic is the high turnover of staff and keep them updated. In addition, some patients refuse referral to DXA. The notification from FReS when entering a new fracture in the registry, is a low cost solution and may decrease the number of "lost patients" to DXA screening in the outpatient fracture clinic with further improvements.

PE 4-26

Preventing falls in orthogeriatric patients by changing their therapeutic profiles

*Lobo T. [1], Oliveira R. [1], Marques L. [2], Pereira A. [*3]*

[1]Pharmacist, [2]Internal Medicine, [3]Orthopaedic Surgery, Hospital Beatriz Ângelo, Loures, Portugal

Introduction: Elderly people nowadays are poly-medicated due to their multiple comorbidities. The risks of polypharmacy can be higher than the benefits. Some medicines, labeled *Fall risk increasing drugs*, such as benzodiazepines, antidepressants, antipsychotics, are among the major causes of falls, originating hip fractures in senior people. Thus, in order to prevent unnecessary falls and their consequences, there is an urgent need to review patients' therapeutic profiles and to adapt it to the real needs of each patient. The Orthogeriatric Unit of Hospital Beatriz Ângelo (HBA) was created to provide better care for these patients.

The main objective is characterization of the medication profile of patients with over 65 years old, who were admitted to the hospital with a hip fracture and analysis of therapeutic interventions to prevent occurrence of new falls.

Methods: Observational retrospective cohort study of patients over 65 years admitted in the Emergency Service of the HBA with a hip fracture, between the 1st of January 2019 and the 31st of March 2019. These patients were admitted in the Orthogeriatric Unit during hospitalization and scheduled to follow up appointments. Their medication profile was obtained via the digital medical record and the national platform of healthcare. Descriptive statistics was used to summarize the data.

Results: A total of 97 patients met the criteria. Seventy three percent were women (n=68). The median age was 84 years. Three died during their stay in the hospital, of causes not related to falls, and were excluded. The average length of stay was 11,1 days. In 28% (n=26), inappropriate medicines were appointed as the most likely cause of the fall. During hospitalization, a total of 188 drugs were deprescribed and 300 were initiated. In average, per patient, 2,02 drugs were discontinued and 3,23 were started.

Of the 94 patients, 20 already attended follow up appointment by the general practitioner, around 1 month after discharge. From these, 30% (n=6) restarted the inappropriate drugs that were deprescribed.

Conclusion: It was possible to conclude that the majority of patients had inappropriate drugs in their therapeutic profile. Although, only 28% of the patients had medicines as precipitant factor for the fall, almost every patient had 1 or more *fall risk increasing drugs*. Therefore, these drugs were discontinued to prevent new falls.

A high percentage of patients restarted the deprescribed drugs. Consequently, there is a need to find a better strategy to prevent this occurrence.

PE 4-27

The decisive determining factors for mortality associated with fragility fractures of the proximal humerus

*Rajeev A. [*1], Mcentee L. [1], Chakravarthy J. [1]*

[1]Trauma and Orthopaedics, QUEEN ELIZABETH HOSPITAL, Gateshead, United Kingdom

Introduction: Fragility fractures of the proximal humerus is a common fractures in elderly .But it is often overlooked compared to that of hip fractures in elderly .Proximal humerus fractures are 3 to 4 times more common in elderly women than men. The incidence increases with age, 70% occurring in patients over 70 years of age. Proximal humerus fractures are associated disability and impaired quality of life. . The long term sequelae of these fractures are impaired shoulder function, decreased independence, and increased risk for mortality.

The aim of this study is to look at the 30 day and one year mortality after fractures of the proximal humerus in patients above 65 years of age and identifying the predictive factors associated with mortality

Methods: A retrospective review of all the proximal humerus fractures above the age of 65 years admitted to our unit for a period from May 2013 to June 2018 was carried out. Patient demographics including age, sex, and dominance of hand, social circumstances, and co-morbidities were documented. The fracture pattern was classified according to the Neer`s classification. The treatment modality for each patient was defined in to conservative and operative groups. In the operative groups the number of patients who have undergone Reverse shoulder replacements, hemiarthroplasty, open reduction and internal fixation and intramedullary nailing were noted. The 30 day and one year mortality for conservative and operative groups were calculated.

Results: The total number of patients was 303 .The average age group was 80.02 (Range 65-99).There were 239 females and 64 males.213 patients had conservative management .In the operative group 45 had ORIF,29 had reverse shoulder arthroplasty,8 hemiarthroplasty and 8 intramedullary nailing. The overall mortality at the end of 30 days was 4.62 and at one year was 14.2%. Females with age above 80 years with more than one co-morbidities prolonged inpatient stay and patients who had two part fractures(86%,p< 0.001) were associated with high mortality at one year. The patients who had conservative management had higher mortality of 17.4%.

Conclusion: In our study the30 day and one year mortality rate in fragility fractures of the proximal humerus fractures was only marginally lower than the hip fractures .But is higher than other fragility fractures in upper limb (3.64%).The factors associated with high mortality are females above 80 years with more than one co-morbidities and a two part fracture pattern.

PE 4-28

Geriatric fracture liaison service (fls) of post-hip fracture care. Geriatrics nursing role.

*Condorhuamán Alvarado P. Y. [*1], Déniz-González V. [1], Martín Maestre I. [1], Moral-Cuesta D. [1], Matovelle-Ochoa P. [1], Alarcón-Alarcón T. [1,2], González-Montalvo J. I. [1,2]*

[1]Geriatrics, Hospital Universitario La Paz, [2]Instituto de Investigación Biomédica del Hospital Universitario La Paz (IdiPAZ), Madrid, Spain

Introduction: The care of patients with hip fracture (HF) in a Fracture Liaison Service (FLS) is a fundamental strategy to optimize secondary prevention. The multidisciplinary team work is a characteristic of this unit, being the nursing role of great importance in the integral assessment. Currently, there is limited information on the profile of HF patients attended in a FLS.

Objectives: To describe the profile of patients attended, the activity and the workload dedicated by geriatrics nursing in a geriatric FLS of HF.

Methods: A descriptive study was carried out in a university hospital. HF patients discharged from orthogeriatric unit and attended in a FLS in 2018 were included. Geriatrics nurse led Comprehensive Geriatric Assessment (CGA) to evaluate functional status (Functional Ambulation Classification –FAC- scale and Barthel index –BI- for activities of daily living –ADL-), cognitive situation (Short Portable Mental Status Questionnaire –SPMSQ-), severity of pain (verbal descriptor scale –VDS-), anthropometric measures (height, weight and Body Mass Index –BMI-), frailty (Short Physical Performance Battery –SPPB-) and hand grip strength by hydraulic dynamometer. Multicomponent exercise was explained. Time spent by nursing in patients' assessment was timed in a sample of patients.

Results: One hundred and eleven patients were included. The mean age was 86.03 (±6.9) years, 72.97% were female and 81.08% community-dwelling. Patients had impaired mobility (FAC ≤3: 22.52%), moderate to severe impairment in ADL (BI <60: 18.01%), cognitive impairment (SPMSQ ≥3: 38,74%), underweight (BMI <22kg/m2: 18.45%), moderate to severe walking pain (VDS ≥1/5: 36.94%), were frailty (SPPB <9: 82.14% in male and 72% in female) and presented muscle weakness (hand grip strength <23kg: 64.29% in male and <13kg: 19.23% in female). Multicomponent exercise (strength, endurance, and balance) was explained to 95.5%. The time [average (range)] spent was 5'58" (2'52"–7'24") in CGA, 0'22" (0'08"–0'32") in hand grip strength measuring, 4'05" (1'59"– 6'39") in SPPB performance and 1'02" (0'20"–1'45") in weight and height measurement. The average of time was 10'45" (5'59"-14'43") in all nursing assessment and 3'48" (2'15"-5'01") in exercise explanation.

Conclusion: The geriatrics nursing assessment in a FLS of HF patients provides essential information on the complexity of patients attended in it, found out significant percentages of walk, ADL and cognitive impairment, walking pain, frailty and muscle weakness; all this information allows to improve the management of patients by mean of a multidimensional approach. The time spent was around 11 minutes by case. The instruction in the performance of a physical exercise plan represents an additional time of 4 minutes. These results may be of interest for the services that consider to implement nursing staff in FLS programs for HF patients.

Changing Policy

PE 5-1

National hip fracture database Japan project: First report.

*Yamamoto N. [*1], Matsushita T. [2], Sawaguchi T. [3]*

[1]Department of orthpedic surgery, Niigata rehabilitation hospital, Niigata, [2]Department of orthpedic surgery, Minamitouhoku hospital, Koriyama, [3]Department of orthpedic surgery, Toyama city hospital, Toyama, Japan

Introduction: FFN-Japan had announced the project of national hip fracture database of in order to create the national audit system in Japan on August 2017. We report here the one year results of our database from beginning.

Methods: FFN minimum common dataset of hip fracture was translated in Japanese. Ethics committee of Niigata University and Fukushima medical university approved this project, and 10 hospitals are joining this projects. Data registration had started on August 2017. Until January 2019, we had analyzed all data from hospitals. Main data include Physician / Geriatrician involvement, time to surgery, first day mobilization, and alive at 30 days.

Results: 709 cases were collected from 10 hospitals. 56% patients were received preoperative medical care by physician. Geriatric assessment were involved only 5% because geriatrician worked in only one hospital, 43% patients were received hip fracture surgery within 36 hours. After surgery, 35% patients were able to be mobilized by the first day from operation. Aged over 80 patients were 73% and over 90 were 26%. The 30-days mortality was very low, only 0.5% in total cases. Eight hospitals indicated no death in 30-days at hospital stay. Osteoporosis medication rate was 20% at fracture, it went up to 50% before discharge.

Conclusion: FFN-J are going to create the national hip fracture database and develop the best practice tariff in Japan. This is first database of hip fracture Japan. We can understand the characteristics of Japanese hip fracture patients and medical care system. Hip fracture patients were more aged, less early operation, few geriatric involvement, but good mortality.

PE 5-2

A trial to capture the patients who have "unrecognized vertebral fracture" in chest/ abdominal computed tomography, preparing for near future when artificial intelligence supports image diagnosis

*Honda T. [*1]*

[1]Rehabilitation, KAGAWA PREFECTURAL CENTRAL HOSPITAL, Takamatsu City, Japan

Introduction: Our hospital is a regional central hospital with 530 beds, and 13000 patients/year are being hospitalized. Three rehabilitation doctors including me cover all wards and about 4000 patients/year. According to my pilot study, about 80% of the patients in our hospital have undergone chest and/or abdominal CT scan. If we investigate the CT images paying attention to spinal column, we can detect vertebral fracture (VF) in 40% of middle aged or elderly inpatients. While Fracture Liaison Service (FLS) is already functioning at orthopedic wards, there are many patients left in other wards without consideration about osteoporosis even if they have VF(s). In addition, artificial intelligence will support image diagnosis and find numerous VF(s) from CT data in near future.

Methods: I prescribed rehabilitation for 1600 inpatients from Sep. 2017 to Nov. 2018. Among them, I recommended treatment of osteoporosis to the patients who had VF(s). I requested medication for the patients to the practitioners depending on each situation.

Results: There were 291 patients, including 121 male patients (74.0±7.8y.o.) and 170 female patients (74.1±9.5y.o.). Many of them had multiple risk factors of fragility fracture. Family doctors had already begun medication of osteoporosis for 59 patients, so guidance of exercise for fall prevention was performed for them. For 27 patients who transferred to hospitals equipped with DXA apparatus, I requested examination and treatment to doctors of these hospitals. For 9 patients, I leave medication to doctors in charge in our hospital. For 100 patients, I initiated medication mainly using bisphosphonates. Among them, I introduced 30 patients to practitioners, while I am continuing medication for 70 patients on the same day when the patients came to meet their doctors in charge. Only 3 patients dropped out from my treatment. For 44 patients, I advised physical exercise and recommended DXA again at a year later. Medication was avoided in 14 patients because of dental mal-condition, renal failure, advanced cancer, or super -advanced age. Medication was refused by 6 patients, and it was postponed for 9 patients because of the priority of chemotherapy. Errors on schedule control increased from the time when the number of the target patients amounts beyond 200. I sometimes call the patients to come to meet me, but 24 patients were left uncontacted.

Conclusion: I could seek out many patients who were in need for treatment of osteoporosis. And many of them were good target of the treatment

from the point of cost-effectiveness. Most of them were ready to accept my recommendation. The practitioners have potential to collaborate with regional central hospitals in treatment of osteoporosis. On the other hand, despite what was expected, I felt the limit of the personal trial. It is necessary to prepare multidisciplinary service in all wards to lead the patients into adequate treatment for osteoporosis without exception.

PE 5-3

Improving the hip fracture mortality review process in wales: implementing a national proforma.

*Pathmanaban P. *[1], SCAIFE J. [1], ROGERS J. [1]*

[1]ORTHOGERIATRICS, ABM HEALTH BOARD, SWANSEA, United Kingdom

Introduction: Hip fractures are one of the leading causes of mortality within the elderly population. The latest National Hip Fracture Database (NHFD) Annual Report has demonstrated a steady decrease in 30 day mortality in England whilst no such change has been recorded in Wales. In order to try to improve care in Wales going forward, it is important to understand where care of patients who died did not meet Key Performance Indicators set down by the NHFD. At present there is no standardised process for the stage 1 Mortality Review to establish whether appropriate care was administered. We propose a short, standardised stage 1 proforma to be used throughout Wales in order to ensure that all hip fracture mortality cases are investigated appropriately and Stage 2 reviews are performed where concern arises. This process should highlight areas of deficiency locally and nationally so that resources can be targeted appropriately.

Methods: An A4 proforma was created based on five of the key performance indicators outlined in the NHFD. Discharge to previous residence by 120 days was excluded as not relevant to assessment of 30 day mortality. The circumstances of the patients death was added to the assessment as the index trigger for the review.

The key performance indicators used were:

1) Prompt Orthogeriatric review
2) Prompt surgery
3) NICE compliant surgery
4) Prompt mobilisation
5) Absence of Delirium post surgery
6) Circumstances of Mortality

Results: The Proforma passed through a number of iterations and will be presented to the Welsh Frailty Network meeting before being accepted for introduction on an All Wales basis. We present the final document as a template for Stage 1 Mortality Assessment in Wales and a proposed standard for others to replicate.

Conclusion: The NHFD mandates the capture of a large data set on the management of frail elderly patients across the UK who have succumbed to a hip fracture. National standards provide a benchmark of expectation for quality of care. A standardised simple Stage 1 Mortality Review proforma, to capture information pertaining to the care preceding the patient's death may facilitate a better review process enabling shortcomings to be objectively identified. This is one step towards improving mortality data following a hip fracture in Wales.

PE 5-4

Hip fracture incidence and mortality not improved after bone and joint decade in thailand

*Yuktanandana P. *[1,2]*

[1]Orthopaedics, CHULALONGKORN UNIVERSITY, [2]Orthopaedics, King Chulalongkorn Memorial hospital, Bangkok, Thailand

Introduction: Bone and Joint Decade (BJD) was declared by WHO to be the first 10 years of 21st century during 2000 to 2010. The purpose of the Decade is to improve the health-related quality of life of people with bone and joint diseases and injuries worldwide. In Thailand, Bone and Joint Decade work with the Thai Osteoarthritis foundation to improve patient care and prevention of osteoarthritis and work with the Thai osteoporosis foundation to prevent fragility fracture and increase awareness of osteoporosis. Hip fracture is a major concern for fragility fracture which lead to high mortality and severe morbidity.

Methods: Department of orthopaedics, King Chulalongkorn Memorial hospital follow the policy from the Thai osteoporosis foundation and launched our campaign in taking care of patients with hip fracture and prevention of re-fracture by open up a hip fracture clinic to follow up patients with hip fracture and start osteoporosis treatment. During 2000 to 2012, we followed 786 patients with hip fracture and identify the mortality from the national registry data, department of national registration, Ministry of Interior Affair

Results: The over all mortality at the end of 2018 is 57.61%. Patients who fracture their hips during each year in this Bone and Joint Decade had over all mortality from 39-66%. At one year, 81.30% survived, while three years survival is 64.26% and 5 years survival is 43.13%. There was only 10.42% of hip fracture patients survived after 10 years follow up.

In 1997, incidence of hip fracture in male age over 65 years is 77/100,000 population while in female age 65 years up hip fracture incidence is 148/100,000 population. In the year 2006, the incidence of hip fracture in male age 65 years is 78/100000 population while in female age 65 years is 158/100,000 population. Then the incidence of hip fracture which is the end point of osteoporosis was not improved.

Conclusion: Bone and Joint decade campaign might not be able to reduce the mortality and incidence of hip fracture in Thailand. We may need other active measure to prevent fragility fracture and reduce mortality of hip fracture such as Fracture Liaison service. The Ministry of Public Health in Thailand declared the National policy to prevent re-fracture in patient with hip fracture in 2017. This year we are going to launch a new policy to prevention fall in elderly which might be more effective in reducing hip fracture and prevention mortality in the elderly population.

Rehabilitation after Fracture

PE 6-1

High-intensity versus low-intensity strength and balance training in the early phase after hip fracture

*Beckmann M. [1], Rollag Aas E. *[2]*

[1]Department of Medical Research, Baerum Hospital, Vestre Viken, Drammen, [2]Røyken kommune, Bråset Bo og Omsorgssenter, 3440 Røyken, Norway

Introduction: Hip fractures are associated with frailty and permanent disability, weight loss, sarcopenia, including the risk of new falls and other fargile fractures. Research on exercise interventions after hip fracture may focuse on different intensities, and several of these studies indicate that high intensity strength training provides better effect on outcome measures such as physical function, compared to moderate or low intensity exercise. The efficay of interventions in the early recovery phase (within three months after hip fracture surgery) has been more poorly studied compared to studies with evaluation of prolonged outpatient intervention. The aim of this study is to compare a high intensity strenght and balance program with a low intensity strenght and balance program in the early phase after hip fracture and to evaluate which program has the best effect on physical function.

Methods: This is a randomised controll trial. One hundred eldery patients over 65 years with hip fracture were randomly assigned to high intensive strenght and balance training (HI) or to low intensive strenght and balance training (LI). Primary outcome is Short Physical Perfromance Battery (SPPB), secondary outcomes are 6 minutes walk test, numeric pain rate scale and mini mental status evaluation (MMSE). The intervention took place in a short term stay/rehabilitation stay after hospital discharge. Functional exercises according to the HIFE program were conducted 5 days a week for two weeks.

Results: Both groups had a statistically significant improvement after two weeks of training with high and low intensive strength and balance training in SPPB, 6 minute walking test and numerical pain rate

scale. HI had an improvement of 1.9 points in SPPB and LI had an improvement of 2.4 points in SPPB. The group who trained with HI also had a significant improvement in MMSE (p = 0.005), while in LI there was no significant improvement (p = 0.118). There are no significant differences between the groups in terms of SPPB, 6 minute walking test and numeric pain scale.

Conclusion: High intensive and low intensive strenght and balance training is feasible and both intensities are safe and effective to improve physical function in the early phase after hip fracture.

PE 6-2

Fighting in the shadow after a hip fracture- a longitudinal interview study

*Gesar G. M. [*1], Hommel A. [2], Bååth C. [3]*

[1]School of Education, Health and Social Studies, Dalarna University, Falun, [2]Department of Care Science, Faculty of Health and Society, Malmö, [3]Department of Health Science, University & Council, Värmland, Karlstad, Sweden

Introduction: Older patients with hip fractures are among the frailest and sickest groups of patients in the hospital. In addition to complex medical problems and comorbidities, they have to overcome the additional physiological challenges posed by the hip-fracture, as the subsequent surgery. The recovery process is complicated, and support of both physical, psychological and psychosocial challenges is highly needed. However, people with hip fracture is not a homogeneous group; although some of them are healthy people. It is essential to integrate the patient´s perspective into the healthcare process, and therefore we performed two studies that together bring forth a longitudinal qualitative study. Objectives: To explore how previously independently living older adults perceive their capacity to regain pre-fracture functions in the acute phase following hip fracture surgery and how they adapted to daily life four months later.

Methods: An exploratory inductive qualitative longitudinal design. Individual interviews were conducted two to five days' post hip surgery and follow-up interviews four months later. Inclusion criteria: 65 years or older, Swedish speaking, independent living at the time of injury, and with no cognitive impairment. Data were analysed using manifest inductive content analysis.

Results: One main category describes the informants' perception of their capacity to regain pre-fracture function in the acute phase: *Ending up in a new situation with or without control.* From being convinced of regaining recovery at admission, this changed into having no faith in regaining pre-fracture function and independent living. This transition occurred as they adapted to the routines in the acute hospital setting and became passive. At four months, one overarching category describes how the informants adapted to daily life: *Hip-fracture, an interruption that has consequences for everyday life.* Physical restraints affected the informants psychologically and, as a consequence, the psychological effects influenced their physical recovery. Some informants had given up, and some described they vacillated between to continue fighting for independence or to surrender. Some handled the situation to regain everyday life with self-esteem and power. Generating a strong driving force and determination was seen as a necessary basis for recovery.

Conclusion: Findings imply that the ward-culture entails passivity and insecurity in the recovery process. It is essential to retain patients' inner driving force to maintain pre-fracture functions. Sustaining a hip fracture affects self-image in physical, psychological, and psychosocial aspects. Thus, it is most urgent to prevent or delay disability in pre-frail older people. These studies contribute knowledge as to why previously healthy independently living older adults do or do not recover after hip fracture surgery.

PE 6-3

Hip fracture in patients with parkinson's disease – how does this clinical challenge affect outcome?

*Evans L. A. [1], Havelock W. [*1], Johansen A. [1], Mohamed B. [1], Thomas C. [1]*

[1]Cardiff & Vale University Health Board, Cardiff, United Kingdom

Introduction: People with Parkinson's disease (PD) have a higher incidence of hip fracture, attributable to the increased risk of falls and osteoporosis. PD presents additional challenges in the peri-operative period; 'nil-by-mouth' status potentially leading to missed PD medication doses, delirium and other non-motor symptoms and motor 'off' times that may affect early mobilisation. We set out to examine whether these challenges compromised outcome for patients with PD presenting to our hip fracture service.

Methods: We examined the records of 2,679 patients on a clinical database for our local geriatrician led movement disorder service. We cross-referenced these cases with 5,414 admissions with hip fracture from the National Hip Fracture Database (NHFD) between 2008 - 2018, and with supplementary data from our teaching hospital's clinical portal.

Results: Within the NHFD dataset we identified 139 people (2.6%) with a movement disorder. After excluding 53 with other movement disorders we found that 1.6% of all patients presenting with hip fracture had PD. Patients with PD had a mean age of 80 years, and 45 (52.3%) were male; *cf.* 83 years and just 25.9% for the whole hip fracture population. Contrary to our expectations, median trust length of stay (LOS) was not substantially different at 37.0 days for patients with and 36.8 for those without PD. Both groups had like percentages of return to original residence, 73.3 and 73.2 respectively. The 30 day mortality for those with PD was 5.8%; slightly, but not statistically significantly (p=0.41) lower than the 8.4% figure for the whole hip fracture cohort over this period.

Conclusion: Hip fracture is a common complication of PD and may be expected to be associated with negative outcomes. However, our data shows no increase in LOS, no change in residence to higher levels of care, and no increase in 30 day mortality. This suggests that our orthopaedic, orthogeriatric and movement disorder teams are working together effectively to minimise the peri-operative risks associated with PD. Factors contributing to this success may include early physiotherapy, the 'get it on time' campaign ensuring regular PD medication dosing and the accessibility of specialist review. Whilst the outcomes in PD are comparable to that of the general population, there is still considerable morbidity and mortality associated with hip fracture. We found that patients presenting to our clinic with a new diagnosis of PD had a 5-year risk of hip fracture of 1.6%, reinforcing the need to offer bone health assessment and primary fracture prevention to all people with PD.

PE 6-4

Impact of cognitive impairment and other prognostic factors on rehabilitation outcomes after hip fracture surgery in a singapore community hospital

*Goh K. S. [*1]*

[1]Geriatric Medicine, Changi General Hospital , Singapore, Singapore

Introduction: Hip fractures lead to significant morbidity and disability in the elderly. Rehabilitation is integral to outcomes, yet challenging given the heterogenous profile of the elderly population. In Singapore, the majority of hip fracture patients undergo rehabilitation in a community hospital after surgery. The aim of this study was to determine the impact of factors such as cognitive impairment and post-operative complications on predicting early functional gains after hip fracture surgery, as measured by the De Morton Mobility Index (DEMMI) and Modified Barthel Index (MBI).

Methods: 176 patients ≥65 years old, admitted consecutively to a community hospital for rehabilitation post-surgery for a single fragility hip fracture, were prospectively recruited as part of an integrated ortho-geriatric hip fracture care pathway, transitioning from acute orthopaedic unit to community hospital. Variables including premorbid function, weight bearing status, pain, post-operative medical complications, depression and cognitive status (Mini-Mental State Examination – MMSE) were studied. MBI and DEMMI were measured on admission and following 15 physiotherapy (PT) and 15 occupational therapy (OT) sessions.

Results: Mean age was 80.6 (SD 7.2), with MBI and DEMMI on admission 43.0±15.3 and 22.2±11.4 respectively. Majority had moderate or severe

cognitive impairment (MMSE 0-10: 17.1%; MMSE 11-20: 50.6%), 64.3% developed 0-1 post-operative medical complications. There was significant improvement in MBI and DEMMI after 15 PT and 15 OT sessions (mean change +13.6 and +14.7; p<0.001). Performing multivariable linear regression analysis with DEMMI as outcome, the number of post-op medical complications was associated with poor post rehabilitation DEMMI (-1.23 per complication, CI -2.45 to 0.0, p=0.05) whilst higher premorbid Parker Mobility Index and full weight bearing status were associated with higher DEMMI (+0.93, CI 0.38 to 1.47; +8.31, CI 4.31 to 12.33 p<0.001). Furthermore, compared with patients with MMSE≥20, those with moderate cognitive impairment (MMSE 11-20) and severe cognitive impairment (MMSE 0-10) had lower MBI outcomes (-14.43, CI -20.17 to -8.69 and -33.88, CI -41.32 to -26.44; p<0.001) and DEMMI outcomes (+8.65, CI -11.99 to -5.31 and -16.51, CI -20.83 to-12.18; p<0.001). Depression and pain were not significantly associated with functional outcomes.

Conclusion: These results provide guidance to the interdisciplinary team in prognosticating functional recovery in hip fracture patients. The presence of medical complications negatively impacts mobility outcomes, reflecting a limiting effect on rehabilitation progress, highlighting a need for quality improvement measures to minimise these complications. Furthermore, cognitive impairment strongly predicted poor mobility and global functional recovery. Future studies need to determine how to best adapt rehabilitation processes to better address these challenges in the cognitively-impaired elderly, hence optimizing their outcomes.

PE 6-5

Fixed but not cured – examining the quality of the end of life care provided to hip fracture patients

Palfrey H. L. [*1], *Johansen A.* [2], *Brooks D.* [3], *Havelock W.* [2]

[1]*Trauma and Othopaedics,* [2]*Orthogeriatrics,* [3]*Geriatrics, Cardiff and Vale University Health Board, Cardiff, United Kingdom*

Introduction: Despite the success of modern anaesthetics and orthopaedic surgery around 7% of hip fracture patients still die in the month after injury. End of life care (EOLC) is a key aspect of the support orthopaedic and orthogeriatric teams should be able to provide. Hip fracture poses specific challenges; surgical fixation and nerve blocks having a key role. We set out to examine the EOLC that this patient cohort needs, so we can try and improve the care we offer.

Methods: We reviewed the notes of consecutive patients admitted from January 2018 who died of a hip fracture; recording over 300 aspects of the care they experienced. We used the structured tool developed by the National Audit of Care at the End of Life (NACEL) so our findings could be set against its results.

Results: None of the 15 patients had an advanced care plan in place before admission. The possibility they might die was recognised by the clinical team in all but one case. Imminent death was recognised in 67% and an individualised care plan was in place for 60%. EOLC was provided by the orthopaedic and orthogeriatric team, and none were reviewed by the hospital palliative care team.

At the time of their death, 47% of patients were still receiving routine blood tests, 73% were still having their vital signs recorded, 47% were receiving oxygen and 47% receiving antibiotics. A 'Do not attempt CPR' decision was in place for 93%. Resuscitation was attempted in just one patient.

Recording of some aspects of care was poor; just 40% of patients had their hydration assessed, 33% were documented as being supported to drink, and 60% had their nutrition assessed. There was no evidence the needs of the nominated person were asked about in any case. At the time of their death only 53% had sc. 'anticipatory medication' prescribed for pain, 60% for agitation, 53% for dyspnoea, 60% for nausea and 40% for secretions. No case had evidence the side effects of such medications were discussed.

Conclusion: In 2018 the National Hip Fracture Database found (NHFD) found that 74% of people who died after hip fracture had been managed following appropriate discussion of their care priorities with the patient, their family and their carers.

Joint orthopaedic and orthogeriatric led assessments play a key role in determining individualised care plans for these patients; especially in the face of significant uncertainty. However, our work demonstrated that whilst potential death was often recognised, full measures were not always implemented.

In particular, we found that some aspects of EOLC were poorly documented, and we suggest that in future the NHFD might add details to its examination of EOLC; perhaps by questioning whether 'anticipatory' sc. medications for pain and nausea were available to these patients.

PE 6-6

Effect of structured exercise interventions in the early phase to improve physical function after hip fracture – a systematic review and meta-analysis

Beckmann M. [*1], *Bruun-Olsen V.* [1], *Pripp A. H.* [2], *Bergland A.* [2], *Smith T.* [3], *Heiberg K. E.* [1]

[1]*Department of Medical Research, Baerum Hospital, Vestre Viken, Drammen,* [2]*OsloMet - Oslo Metropolitan University, Oslo, Norway,* [3]*Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, UK., Oxford, United Kingdom*

Introduction: Structured exercise after hip fracture aims to improve physical function, such as walking, muscle strength, balance, and mobility. Prior systematic reviews have examined the effects of structured exercise performed during a prolonged time-span after surgery, and have shown inconclusive results. Systematic reviews of structured exercise programs performed in the early phase, i.e. started within the first three months after hip fracture, is lacking. The aim of this systematic review was to examine the evidence on the overall effects of structured exercise performed in the early phase after hip fracture.

Methods: We systematically searched MEDLINE via Ovid, The Cochrane Library, Embase, Cinahl, Pedro and AMED (to December 2018). Randomised controlled trials (RCTs) of exercise interventions aimed to improve physical function in the early phase after hip fracture, were eligible. Primary outcome was physical function included: walking ability, walking speed, balance, strength, mobility, and endurance. A meta-analysis was conducted to examine the effect of early exercise interventions and a meta-regression to examine the impact of study characteristics. PEDro appraisal tool was used as a quality assessment in included studies.

Results: **:** Nine studies (669 patients) were included. Studies were of high quality with low risk of bias. A statistically significant overall improvement in physical function was found in favor of structured exercise programs (Standardised mean difference (SMD) 1.07; 95% CI 0.44 - 1.70; p<0.001). The meta-regression demonstrated no statistically significant association between study characteristics and structured exercise programs (p>0.05).

Conclusion: The evidence indicates that structured exercise performed in the early phase improved physical function. It remains unclear what type of structured exercise is superior for this population in this phase.

PE 6-7

Translation, interrater reliability and validity of the spanish version of the new mobility score (nms-e)

Ariza-Vega P. [*1,2], *Ortiz-Piña M.* [3], *Prieto-Moreno R.* [4], *Mora-Traverso M.* [2], *Ashe M. C.* [5,6], *Kristensen M. T.* [7,8]

[1]*Department of Physical Medicine and Rehabilitation, Virgen de las Nieves University Hospital,* [2]*Department of Physiotherapy, University of Granada,* [3]*Vista Nevada Nursing Home for older adults,* [4]*Department of Physical Education and Sport, University of Granada, Granada, Spain,* [5]*Department of Family Practice, University of British Columbia,* [6]*Centre for Hip Health and Mobility, Vancouver, Canada,* [7]*Physical Medicine and Rehabilitation Research-Copenhagen (PMR-C),* [8]*Departments of Physiotherapy and Orthopedics, Hvidovre University Hospital, Copenhagen, Denmark*

Introduction: The New Mobility Score [NMS, developed by Parker and Palmer (1993), and updated by Kristensen and Kehlet (2012)] is an easy to administer self-report measure of functional ability, and used worldwide mainly as a hip fracture (HF) score. An official Spanish NMS is currently not available, but is essential given the more than 100 million people worldwide who speak Spanish, and notably because of the high rate of hip fracture in Spain. Therefore, we translated the updated NMS

into Spanish (NMS -E) and examined the interrater reliability and validity of this version in patients with HF in Spain.

Methods: Translation of the NMS from English into Spanish followed international guidelines including approval of a back-translated version. Reliability was examined in 60 consecutive patients with HF with a median age of 81.6 (SD 6.8) years; 46 women, 45 living in their own home, and 40 with a cervical femoral neck fracture. Two occupational therapists independently scored each of the 3 NMS activities (indoor, outdoor, and walking during shopping) from 0 to 3, providing a total NMS score from 0 (no walking ability) - 9 (independent) points. Relative reliability was evaluated using Intraclass Correlation Coefficients ($ICC_{2,1}$), known-groups validity was evaluated in relation to residential status, while concurrent validity was evaluated in relation to cognitive status (Pfeiffer Test, 0-10 points). Absolute reliability was established using the standard error of measurement (SEM) and the minimal detectable change (MDC). The systematic between-rater bias was assessed using a paired t-test.

Results: The total pre-fracture NMS score assessed by the two raters, within the first post-surgery week, reached an average (SD) of 3.3 (1.9) NMS points, and with no systematic between-rater bias. The ICC was ≥ 0.98 for the total NMS and the three NMS activities; the corresponding observed agreement was 98%, while the SEM and the MDC for the total NMS (0-9) were 0.28 and 0.78 points, respectively. NMS scores were 3.3 (1.8) for patients from nursing homes versus 6.5 (2.6) for patients living at home ($p<0.001$), while the overall correlation with the Pfeiffer Test was $r = -0.700$ ($p<0.001$).

Conclusion: We found excellent interrater reliability and low measurement error for the NMS-E for assessing pre-fracture functional level of patients with a HF in Spain. We further established the known-groups and concurrent validity of the NMS-E. We suggest that the NMS-E is a relevant and easy to use instrument to assess pre-injury functional level for patients with hip fracture in Spanish speaking countries.

PE 6-8

The functional outcomes of fragility fracture intensive rehabilitation management (firm) in sarcopenic patients after hip fracture and predictors for independent ambulation: a 6 month of follow-up

Lim S.-K. [*1], *Lim J.-Y.* [2]

[1]*Physical Medicine and Rehabilitation, Gyeongsang National University Changwon Hospital, Gyeongsang National University School of Medicine, Changwon,* [2]*Physical Medicine and Rehabilitation, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Seongnam, Korea, Republic Of*

Introduction: To compare the change of functional levels for 6 months in both sarcopenia and non sarcopenia patients after hip fracture (HF) surgery followed by fragility fracture integrated rehabilitation management (FIRM), and to identify variables influencing independent ambulation at 6 months after HF.

Methods: A prospective observational study was conducted with 80 patients older than 65 years of age who had undergone surgery for HF and followed by multidisciplinary rehabilitation. Sarcopenia was defined according to the Asian Working Group for Sarcopenia criteria. Functional outcomes were measured at rehabilitation admission, at discharge, at 3 months and 6 months after surgery. Main measures were ambulatory function (KOVAL, Functional Ambulatory Category (FAC) and the possibility of independent ambulation (IA) at 6 months after surgery. Other secondary functional outcomes for mobility, balance and fall risk, cognitive function, mood, activities of daily living, frailty and handgrip strength were measured.

Results: Thirty-five patients (43.8%) satisfied the criteria for sarcopenia. KOVAL and FAC improved in all time course by significant time main effect ($p<0.001$). There were no significant group by time interaction (KOVAL: $p=0.889$, FAC: $p=0.702$), and no group main effect ($p=0.162$) in KOVAL, which means no significant difference in the time course of improvement between groups. Other secondary functional outcomes showed similar improvement patterns in both groups, either. There was no significant difference on the final functional status (6 months) after FIRM compared to non-sarcopenia group in all functional measures. IA before fracture (OR: 4.055) and age (≥80 years) (OR: 0.313) were independent predictors and Sarcopenia was not a predictor for the possibility of IA at 6-months after surgery.

Conclusion: We found that FIRM was effective for functional recovery in older patients with fragility HF even with sarcopenia. Sarcopenia did not affect the possibility of independent ambulation at 6-months after surgery for patients after FIRM. These findings will provide evidence for strong need for comprehensive and integrated rehabilitation management in fragility fracture care to increase functional recovery in patients with sarcopenia.

PE 6-9

Hip fracture rehabilitation for elderly with hip fracture

Røpke A. [*1]

[1]*Department of Sports Science and Clinical Biomechanics Tel., University of Southern Denmark, Odense, Denmark*

Introduction: In 2017, 6.679 elderly with hip fracture (HF) were hospitalised in Denmark and approximately 5-600 are admitted at Herlev and Gentofte Hospital each year. Considering the increase in the number of elderly this is expected to rise. Despite positive surgical outcomes, one-quarter dies within a year after surgery, around eight percent are readmitted to hospital, and just one-third regain their pre-fracture level of physical functioning and ADL ability. After hip fracture, the loss of independence, and further decrease in activity of daily living (ADL) ability often persists beyond three months after surgery. This increases the risk of social isolation, depression and thus a decrease in quality of life. Therefore, an inter-sectorial rehabilitation intervention aiming at reducing the decrease in ADL ability is crucial in elderly with hip fracture.

The aim is to develop an add on Rehabilitation Programme for elderly with hip fractures (HIP-REP), focusing on enabling elderly with hip fracture to safely and independently perform ADL, and thereby enhance their health-related QoL.

Methods: Through qualitative action research study using research circles (RC) this study gather information and knowledge about rehabilitation from the perspectives of the elderly with hip fracture, their relatives and the healthcare personnel (HCP) across sectors. This study is based on the assumption that a HIP-REP developed in collaboration with users and HCP will show the largest potential for implementation and patient satisfaction. Two separate RC were used to gather data for this study. The first RC consisted of elderly with recent HF rehabilitation experience and their relatives; the second RC consisted of HCP.

Results: The RC provided understanding of the elderly's and HCP's experiences and needs concerning a future HIP-REP and three programme theories were developed: 1. Challenge the elderly with daily tasks, 2. Support and introduce strategies to enhance the elderly to safely and independently perform daily ADL tasks, 3. Co-ordination and collaboration of services and sectors delivering rehabilitation.

Conclusion: An intervention to enhance usual rehabilitation was developed to target the theories comprising; an ADL component consisting of five additional therapy sessions, a folder collecting information and the elderly's goalsetting during HIP-REP.

PE 6-10

Unequal opportunities for post-acute rehabilitation care for hip fracture due to regional variation in estonia

Prommik P. [*1,2], *Kolk H.* [1,2], *Pääsuke M.* [3], *Märtson A.* [1,2]

[1]*Department of Traumatology and Orthopaedics, University of Tartu,* [2]*Traumatology and Orthopaedics Clinic, Tartu University Hospital,* [3]*Institute of Sport Sciences and Physiotherapy, University of Tartu, Tartu, Estonia*

Introduction: Physical therapy (PT) as part of rehabilitation plays a crucial role in hip fracture (HF) recovery. All HF patients should be guaranteed access to PT; however, regional differences in HF treatment can lead to unequal opportunities. There are 15 counties in Estonia where over 99% of post-

acute PT for HF is provided during hospital care. The aim of this study was to compare the use of PT services by HF patients during post-acute care throughout the counties of Estonia.

Methods: A retrospective cohort study was conducted using validated population-wide data from the Estonian Health Insurance Fund. The study included individuals 50 years of age and older, diagnosed with HF in accordance with the International Classification of Diseases code S72.0-2 between January 1, 2009, and September 30, 2017. The data on patients' hospitalisations and PT use were obtained for post-acute care. Post-acute care was limited to the subacute phase which is defined as the period after acute care up to three months after surgery or HF diagnosis. The study was approved by the Research Ethics Committee of the University of Tartu and the Estonian Data Protection Inspectorate. A multinomial logistic regression analysis was used to compare the use of PT services throughout the counties. The county where Tartu University Hospital is located was used as reference.

Results: A total number of 6,273 patients received hospital care during the subacute phase (post-acute care). The median age of patients was 81 years (50-101) and 76% (4,731) of them were female. Half of the patients, 51% (3,176), had an intracapsular fracture and median Charlson comorbidity score was 2 (0-14). The median length of total subacute inpatient care was 26 days (1-90) and ranged from 19 to 35 days throughout the counties ($p < 0.001$). The median amount of time spent on PT during subacute care was 2.5 hours (SD 0-169) and ranged from 0 to 5 hours throughout the counties ($p < 0.001$). Four in ten patients, 41% (2,577), did not receive PT during post-acute care, and this estimate varied from 14% to 58% throughout the counties ($p < 0.001$). The odds ratio for not receiving PT during post-acute care ranged from 0.22 to 3.14 throughout the counties, compared to the reference value. Regional differences were as follows (compared to the reference values): in 7 counties, patients are 1.7-4.5 times more likely to receive PT; in 3 counties, patients are 1.7-3.1 times less likely to receive PT; and the remaining 4 counties showed no difference.

Conclusion: There is substantial variation in the utilization of PT during post-acute care throughout the counties of Estonia. Regional variability of post-acute care may not allow some HF patients to undergo the necessary rehabilitation. The results of this study indicate the limitations of HF post-acute care in Estonia: limited access to rehabilitation settings across the counties or a lack of systematic use of the whole pathway approach.

PE 6-11

The true timed up and go test time and factors influencing performances of patients with hip fracture 60 years or older when discharged from a specialized acute hip fracture unit

Kristensen M. T. [*1]

[1]*Physical Medicine and Rehabilitation Research - Copenhagen (PMR-C), Departments of Physical Therapy and Orthopedic Surgery, Hvidovre University Hospital, Copenhagen, Denmark*

Introduction: The Timed Up and Go (TUG) test is extensively used to evaluate functional mobility in elderly people and different patient groups. For patients with hip fracture, the TUG has proven reliable when using a standardized walking aid and the fastest of three timed TUG-trials. Still, it is considered important to further evaluate which factors influence TUG times in interpreting results. The aim of this study was therefore to examine the influence of individual factors on TUG times in patients with hip fracture upon acute hospital discharge.

Methods: A total of 186 consecutive patients (127 women) with hip fracture, 60 years or older, and able to perform the TUG at the time of discharge from a specialized orthopaedic hip fracture unit, were included in the study. Five of these patients presented as extreme outliers in regression analysis (TUG times ranging from 60-180 seconds and with residuals > 3) leaving 181 patients (122 women) with a mean (SD) age of 78.1 (9.1) years for final analyses. Fifty-one patients had a low prefracture functional level (evaluated with the New Mobility Score [NMS, 0-9 points]), 25 had a low health status evaluated with the ASA-grade and 70 had a trochanteric hip fracture. The TUG was performed three times with a rollator (standardized aid), as fast as safely possible, within a mean of 10.2 (5.3) post-surgery days. Up to a 1-minute rest was given after the 1st and 2nd TUG trial. Multivariable linear regression analysis (enter method) was used to investigate the factors influencing TUG-times.

Results: The fastest of the three timed TUG trials reached a mean of 25.6 (11.0) seconds for the 181 patients. Multivariable linear regression analysis showed that greater age (B = 0.28; 2.8 [95CI%, 1.4 - 4.4] seconds more per decade older), a low prefracture functional level (NMS < 7 points) (B = 7.1; 7.1 [95CI%, 3.9 - 10.2] seconds more than a high functional level), having a trochanteric fracture (B = 6.7; 6.7 [95CI%, 3.7 - 9.6] seconds more than those with a cervical femoral fracture), were independently associated with using more time for performing the TUG, when adjusted for the sex and health status (ASA-grade) of patients. The model was statistically stable (no outliers, data points were independent [Durbin-Watson = 2.0] and residuals were normally distributed).

Conclusion: The ability of the standardized TUG test to reflect the age, the pre-fracture function and the fracture type of patients with hip fracture further qualifies the TUG for use in this patient group, as these are well-established factors influencing performances at this time point after fracture. Therefore, clinicians and researchers who use the TUG in patients with hip fracture should take these factors into consideration when interpreting their TUG test results.

PE 6-12

The irish hip fracture database 2017 – a focus on physiotherapy and function

Fitzgerald M. [*1], *Callanan E.* [2], *Cunningham C.* [3], *Blake C.* [3], *Brent L.* [4], *Ahern E.* [5], *Hurson C.* [6]

[1]*Physiotherapy , Tallaght University Hospital ,* [2]*Physiotherapy, Merlin Park University Hospital ,* [3]*Physiotherapy, University College Dublin ,* [4]*National Office of Clinical Audit, Dublin ,* [5]*Gerontology, St Luke's General Hospital , Kilkenny,* [6]*Trauma and Orthopaedics, St Vincent's University Hospital , Dublin , Ireland*

Introduction: A key factor in improving hip fracture outcome is the implementation of national hip fracture databases, which allow health services to monitor care standards. National databases often lack information regarding physiotherapy service provision and functional outcomes. This impairs the ability of health services to profile functional outcomes, assess barriers to rehabilitation and evaluate the impact of organisation improvements in hip fracture care on functional outcome. New rehabilitation focussed data-fields were added to the Irish Hip Fracture Database (IHFD) on 1st January 2016 to provide information regarding hip fracture physiotherapy service provision and functional outcome across all acute trauma orthopaedic units in Ireland.

Methods: The IHFD is a clinically-led, national web based audit of hip fracture casemix, care and outcomes. The IHFD has been recording data since 2012. Data is collected through the hospital inpatient enquiry (HIPE) portal in collaboration with the Healthcare Pricing Office (HPO). The National Office of Clinical Audit (NOCA) provides operation governance for the IHFD. The second year of data collection for rehabilitation-focussed data-fields commenced on 1st January 2017. The rehabilitation data-fields include:

- Day one postoperative physiotherapy assessment: Yes/No
- Day one postoperative mobilisation: Yes/No
- Pre-fracture function:New Mobility Score (NMS)
- Function on first postoperative day and acute hospital discharge:Cumulated Ambulatory Score (CAS)

Results: The 2017 IHFD report comprises data from 3,497 hip fracture patients in Ireland from all 16

acute trauma orthopaedic units. This represents 95% coverage of all hip fractures in Ireland in 2017. The New Mobility Score (NMS) was captured for 85% (n=2979) of patients, with 47% having high pre-fracture function (NMS 7-9). 77% (n=2693) of patients mobilised on the first postoperative day, 73% (n=2,438) by a physiotherapist. CAS was captured for 50% (n=1662) of patients on the first postoperative day and 39% (n=1464) of patients on acute hospital discharge. Of those patients, 96% required assistance in their basic mobility (CAS<=3) on the first postoperative day, with 18% achieving independence (CAS=6) on discharge. Direct discharge home from the acute hospital was achieved in 22% (n=760) of patients. 73% (n=463) of patients discharged directly home had high pre-fracture mobility (NMS 7-9) compared to 40% (n=941) for those discharged to other locations.

Conclusion: These new data enable profiling of both physiotherapy service provision and functional outcome post hip fracture in Ireland. While the second year of IHFD rehabilitation-focussed data has increased data coverage in most areas, improved data quality is needed. With continued commitment to data quality and extension of the data collection timeframes beyond the acute hospital setting, identification of barriers to rehabilitation and evaluation of the impact of service improvements in hip fracture care on functional outcome is possible.

PE 6-13

Vitamin d status and other prognostic factors influencing functional outcomes at three months among elderly hip fracture patients in a singapore tertiary hospital

Sigaya K. V. [*1], *Espeleta W.* [1], *Goh K. S.* [1], *Aw Yang W. S.* [2], *Lam K. Y. A.* [3], *Tay X. Y.* [3]

[1]*Geriatric Medicine,* [2]*Case Management,* [3]*Pharmacy, Changi General Hospital, Singapore, Singapore*

Introduction: Vitamin D deficiency is prevalent among the elderly. It is associated with poor physical performance, impaired balance, falls and fractures. Majority of hip fracture patients do not regain their pre-fracture mobility after recovering from a hip fracture. The study aimed to assess the association of 25-hydroxyvitamin D(25(OH)D) levels and other prognostic factors with 3-month functional outcomes in elderly patients who have undergone surgical repair for hip fracture.

Methods: A prospective study of 180 patients admitted consecutively for hip fracture surgery under the Orthopaedics Department and co-managed by geriatricians under the Multidisciplinary Orthogeriatric Hip Fracture Pathway in a major tertiary hospital in Singapore was performed from 2015 to 2016. Data on patient demographics, length of stay(LOS), 25(OH)D levels, renal function(eGFR), American Society of Anaesthesia(ASA) Score and Charlson comorbidity index were collected. Vitamin D levels were defined as follows: >30ng/ml, normal; 20ng/ml to <30ng/ml, insufficiency; 19.9ng/ml to 10ng/ml, deficiency; <10ng/ml, severe deficiency. The pre-fracture and 3-months post-fracture Parker Mobility Score(PMS) and Modified Barthel Index(MBI) scores were also collected. Vitamin D was measured using the Roche Cobas system. Statistical analysis was performed using multivariable linear regression.

Results: The characteristics of the 180 patients studied were as follows: age 81.4±8.1 years, 33% were males, LOS 12.1±10.6 days, pre-fracture PMS 5.5±3.1 and MBI 76.2±23.2, 3-month post-fracture PMS 3.3±2.6 and MBI 74.1±26.2. The distribution of 25(OH)D levels was as follows: normal, 28.1%; insufficiency, 27.1%; deficiency, 26%; severe deficiency, 18.8%. Insufficiency and deficiency in 25(OH)D were significantly associated with lower PMS at 3 months (α-2.15; 95% CI -3.25 to -1.05; p<0.001) in the multivariable analysis. Prolonged LOS(-0.06; 95% CI -0.09 to -0.02; p=0.002) and low eGFR (0.05; 95% CI 0.01 to 0.08, p=0.019) were significantly associated with lower PMS at 3 months. Prolonged LOS(-0.56; 95% CI -0.97 to -0.15; p=0.009) was also associated with lower MBI at 3 months. Low pre-fracture PMS (0.44; 95% CI 0.21 to 0.68; p=0.001) and premorbid ASA scores of ≥2 (ASA 2: -4.11; 95% CI -7.55 to -0.67, p=0.020, ASA 3: -6.25; 95% CI -9.57 to -2.93; p<0.001, ASA 4: -8.00; 95% CI -12.61 to -3.39; p=0.001) were associated with lower PMS at 3 months post-fracture.

Conclusion: Low 25(OH)D levels, prolonged LOS, impaired renal function and poor pre-fracture mobility were associated with adverse functional outcomes at 3 months post-fracture. Vitamin D is usually lower in patients with impaired renal function and can affect physical performance and mobility. It also contributes to frailty with subsequent increased risk of prolonged LOS. This study highlights the importance of screening and repletion of 25(OH) D since it has a major impact on risk of falls and fractures, physical performance and functional recovery after rehabilitation.

PE 6-14

Multifactorial intervention for hip and pelvic fracture patients with mild to moderate cognitive impairment: results of a dual-centre randomised controlled trial

Dautel A. [*1], *Hauer K.* [2], *Schäufele M.* [3], *Gross M.* [1], *Eckert T.* [2], *Hendlmeier I.* [3], *Abel B.* [2], *Pomiersky R.* [3], *Gugenhan J.* [1], *Büchele G.* [4], *Schulz C.* [5], *Becker C.* [1], *Pfeiffer K.* [1]

[1]*Department of Clinical Gerontology and Geriatric Rehabilitation, Robert-Bosch-Hospital, Stuttgart,* [2]*Department of Geriatric Research, Apaglesion Bethanien Hospital, Heidelberg,* [3]*Faculty of Social Sciences, University of Mannheim, Mannheim,* [4]*Institute of Epidemiology and Medical Biometry, Ulm University, Ulm,* [5]*Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

Introduction: A hip or pelvic fracture is a major fall-related injury which often causes a decline in mobility performance and physical activity. Over 40 % of hip fracture patients are cognitively impaired or have dementia which results in poorer rehabilitation outcomes than in those without cognitive impairment. In this vulnerable subgroup of patients, there is lacking evidence on the best practices supporting recovery after discharge from inpatient rehabilitation back home.

The main aim of this study was to investigate the effects of a transitional care intervention after inpatient rehabilitation on physical activity and functional performance in a sample of cognitively impaired patients with hip or pelvic fracture.

Methods: A dual-centre, randomised controlled trial compared a multifactorial intervention with usual care as control condition. The four-month intervention consisted of (a) an individually tailored, progressive home exercise program and physical activity promotion delivered by professional instructors supported by lay instructors (two times a week) and (b) a comprehensive care counselling approach addressing unmet care needs and pleasurable activities. Primary outcome parameters were physical activity, measured as daily walking duration with an accelerometer based activity monitor (activPAL™) over 72 hours, and functional performance, assessed with the Short Physical Performance Battery sum scores. Secondary outcome parameters were fear of falling, fall related self-efficacy, falls, quality of life, depression and activities of daily living. Data were collected at the end of rehabilitation, pre- intervention at the patient's home (baseline), after four months (post-intervention), and after seven months (follow-up).

Results: Two hundred thirty-nine community-dwellers (mean age 84,9 ± 6.0, range 65-102) with a hip or pelvic fracture and mild to moderate cognitive impairment (MMSE, mean 22,8 ± 2,67, range 17-26) were recruited at the end of inpatient rehabilitation. The delivery of the multifactorial intervention for this target group was feasible and patient feedbacks were very positive. Data analyses are currently being carried out. Primary and secondary endpoints will be presented and discussed.

Conclusion: It is expected that the findings will show the benefit of a multifactorial intervention as add-on to usual care which addresses mobility issues and the need for added support and resources (also for relatives).

The study belongs to a series of projects for the prevention and rehabilitation of osteoporotic fractures in disadvantaged populations in Germany (PROFinD2). Aim of these projects is the implementation of evidence-based programs in standard care.

PE 6-15

Safe discharge for hip fracture patients to nursing homes

*Claville L. U. E. [*1], Andersen L. [1], Dall-Hansen D. [1], Fredholm L. [2], Grejsen H. [1], Viberg B. [1]*

[1]Department of Orthopaedic Surgery and Traumatology, [2]Department of Geriatrics, Lillebaelt Hospital, University Hospital of Southern Denmark, Kolding, Denmark

Introduction: Patients with hip fractures (HFx) are frail due to high age and often high rate of comorbidities. The 1-year mortality is threefold that of age-matched patients without HFx. Nearly ¼ of community-dwelling patients admitted with HFx is discharged to nursing home facilities (NH), and these patients are even frailer. An audit suggested a 30-days mortality rate more than two times higher for NH patients than for community-dwellers, and that close to every readmission within 30 days of discharge to NH could be prevented.

The aim of this study is to investigate whether an enhanced interdisciplinary cooperation between orthogeriatric ward, municipality and NH, will reduce the readmission rate and mortality within 30 days for HFx patients discharged to NH.

Methods: In this quasi-randomized controlled trial, HFx patients discharged to NH were allocated to intervention or control arms based on which of 5 municipalities discharged to. Intervention group received multifaceted care with a tailored treatment plan. NHs followed a safety program 14 days after discharge assessing vital signs, weight, level of pain, daily intake of fluids, signs of constipation, hours of mobilization, and intake of high-protein beverages. Patients were assessed by skilled acute team nurses on planned and acute visits, capable of giving IV fluids on predefined prescriptions, measuring CRP and haemoglobin with the possibility of giving IV antibiotics at NH or readmitting patients to blood transfusion treatment. Control participant received usual care. Primary outcomes were readmission and 30-days mortality rates. Demographics on the study population are listed as a median (range). Fischers exact test is used for group comparison.

Results: From January 2018 to March 2019 a total of 104 patients were included, 39 allocated to intervention and 65 to control. There were 64% females in the intervention group and 68% in the control group with a median age of 85 (65-99) and 87 (65-100) respectively. Within 30 days, 7% (3/39) were readmitted in the intervention group due to infection (1/39) and delirium (2/39). There were 34% (22/65) readmission in the control group (p=0.002), primarily due to infections (8/65), dehydration (4/65), delirium (2/65), and dyspnea (2/65). Within the intervention group, 9 patients received IV fluids and/or IV antibiotics at the NH, presumably preventing readmission. Mortality within 30 days of discharge in the intervention group was 13% compared to 17% in the control group (p=0.780). Days of hospitalization in the intervention group was 3 (0-14) and 4 (0-18) in the control group, and the number of contacts from NH to orthogeriatric ward were 1 (0-6) and 0 (0-4) respectively.

Conclusion: The results suggest that the interdisciplinary intervention is effective in reducing readmission in NH patients within 30 days of discharge following HFx, without causing a major additional workload on orthogeriatric ward.

PE 6-16

Predictive factors for independent ambulation after hip fracture surgery

*Beom J. [*1], Lee S. Y. [2], Oh S. H. [3], Kim B. R. [4], Ha Y.-C. [5], Lim J.-Y. [6]*

[1]Department of Physical Medicine and Rehabilitation, Chung-Ang University Hospital, Chung-Ang University College of Medicine, [2]Department of Rehabilitation Medicine, Seoul National University College of Medicine, SMG-SNU Boramae Medical Center, [3]Department of Physical Medicine and Rehabilitation, Chung-Ang University Hospital, Seoul, [4]Department of Rehabilitation Medicine, Jeju National University Hospital, Jeju, [5]Department of Orthopaedic Surgery, Chung-Ang University Hospital, Chung-Ang University College of Medicine, [6]Department of Rehabilitation Medicine, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Seoul, Korea, Republic Of

Introduction: There can be various factors that predict functional improvement after hip fracture, which is not determined. Therefore, we investigated the predictive factors for independent ambulation in the elderly after hip fracture surgery.

Methods: Ninety-two patients aged 65 years and more who underwent fragility hip fracture surgery at three university hospitals were enrolled in the prospective clinical trial. Age, gender, KOVAL stage, Functional Ambulatory Category (FAC), modified Rivermead mobility index (MRMI), Berg balance scale (BBS), mini-mental state examination (MMSE-K), geriatric depression scale (GDS), EQ-5D, modified Barthel index (MBI), Korean instrumental activities of daily living (K-IADL), K-FRAIL, and hand grip strength (HGS) were evaluated. KOVAL 1 to 3 stage and FAC 4 to 5 score were classified as independent ambulation, whereas KOVAL 4 to 7 stage and FAC 0 to 3 score as dependent ambulation.

Results: Among 92 patients, 46 patients can walk independently 3 months after surgery. In univariate analysis, pre-fracture KOVAL stage or FAC score, MRMI, BBS, MBI, K-IADL, and HGS were significant parameters. In multivariate logistic regression analysis, low pre-fracture KOVAL stage (OR=2.228) and high pre-fracture FAC score (OR=3.351) revealed high probability for independent ambulation 3 months after surgery.

Conclusion: Ambulatory function assessed by KOVAL or FAC before fragility hip fracture may be the strongest predictive factor for independent ambulation after hip fracture surgery. A future study with larger sample size will be needed for definite conclusion.

PE 6-17

The impact of anemic condition on mobility outcome of patients after hip fracture

*Lee J.-M. [*1], Lim J.-Y. [1]*

[1]Physical Medicine and Rehabilitation, Seoul National University Bundang Hospital, Seongnam-si, Gyeonggi-do, Korea, Republic Of

Introduction: The influence of anemia on the functional outcome after hip fracture surgery has been controversial. However, anemic condition can make post-operative delirium and decrease the physical functions. We therefore conducted a prospective study to investigate the correlations between pre-operative laboratory findings and mobility outcome of patients after hip fracture surgery at postoperative 6 months.

Methods: Fifty one hip fracture patients aged 65 years or over who underwent surgery and rehabilitation were followed up in one university hospital. Laboratory findings (Hemoglobin; Hb, HbA1c, total protein, albumin, C-reactive protein; CRP) were evaluated before surgery and mobility outcome (KOVAL) was measured before surgery (pre-KOVAL) and at 6 months after surgery (post-KOVAL). We defined anemia as a Hb level below 13 g/dL in men and below 12 g/dL in women.

Results: Results: Among 51 patients, 30 patients (59%) were found to have anemia on first to three preoperative day. Anemic group was significantly associated with post-KOVAL (anemic group: 4.03±1.97 vs. non anemic group: 2.95±2.01, p=0.05). But, the other laboratory data were not associated with mobility outcome. A multivariate analysis integrating age, sex, weight and pre- and post-KOVAL showed that anemia before surgery led to marginally significant changes in post-KOVAL [OR 1.323 (0.982-1.783) P = 0.066].

Conclusion: We have identified anemia on pre-operative day had a detrimental impact on mobility outcome of patients at 6 months after hip fracture surgery. This result provides evidence for precise clinical reasoning in these specific patient group.

PE 6-18

Progressive functional exercise versus best practice advice for adults aged 50 years or over after ankle fracture: design of a pilot multicentre randomised controlled trial in the united kingdom

*Keene D. J. [*1], Costa M. [1], Tutton E. [1], Hopewell S. [2], Barber V. [2], Dutton S. [2], Redmond A. [3], Willett K. [1], Lamb S. [1]*

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, [2]Centre for Statistics in Medicine, University of Oxford, Oxford, [3]Leeds Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds, Leeds, United Kingdom

Introduction: Ankle fractures result in significant morbidity in adults, with prognosis worsening with increasing age. Previous trials have not found evidence supporting supervised physiotherapy sessions, but these studies have not focused on older adults or tailored the exercise interventions

to the complex needs of this patient group. The Ankle Fracture Treatment: Enhancing Rehabilitation (AFTER) study is a pilot randomised controlled trial to assess feasibility of a later definitive trial comparing best-practice advice with progressive functional exercise for adults aged 50 years and over after ankle fracture.

Methods: AFTER is a multicentre pilot randomised controlled trial with an embedded qualitative study. At least 48 participants aged 50 years and over with an ankle fracture requiring surgical management, or non-operative management by immobilisation for at least 4 weeks, will be recruited from five National Health Service hospitals in the United Kingdom. An embedded qualitative study will include one-to-one interviews with up to 20 participants and a therapist focus group.

Participants will be allocated 1:1 via a central web-based randomisation system to: i) best-practice advice (one session of face-to-face self-management advice delivered by a physiotherapist) or ii) progressive functional exercise (up to six sessions of individual face-to-face physiotherapy). The interventions were informed by a stakeholder meeting of clinical experts and patient and public representatives.

The main objectives are to assess: (i) patient engagement with the trial, measured by the participation rate; (ii) establish whether the interventions are acceptable to participants and therapists, assessed by intervention adherence levels, participant interviews, and the therapist focus group; (iii) participant retention in the trial, measured by the proportion of participants providing outcome data at 6 months; (iv) acceptability of measuring outcomes at 3 and 6-month follow-up.

Results: As of March 2019, 40 participants have been recruited over 6 months.

Conclusion: The development of the study and interventions, updates on study recruitment, and initial feedback from intervention monitoring and participant interviews, will be presented.

PE 6-19

The transition from hospital care to home in the perspective of the elderly and their caregiver after femoral fracture

Domingos A. T. [*1], *Guerra R.* [1]

[1]*Federal University of São Paulo, São Paulo, Brazil*

Introduction: The World Health Organization (WHO) estimates that in the period 1950 to 2025, the group of the elderly, population aged sixty and over in Brazil, should have increased by fifteen times. One of the acute events, which is directly related to the worsening of the quality of life of the elderly, is the fracture of the femur. In Brazil it is estimated that an average of 36,200 cases per year occur in the elderly. Even more worrisome is the fact that about 5% of those hospitalized for this reason still die in hospital admission, and a third in the first year after the fracture. Therefore, the objective was to understand the process of home adaptation of the elderly with femoral fracture, and their caregivers, who received hospital discharge guidelines.

Methods: It was an observational research with a qualitative-quantitative. It used a functional independence scale, daily life activity and drug adherence.The interviews were categorized and analyzed according to the content.

Results: The universe was 56 elderly patients with a femoral fracture from March to November 2018. A total of 37 elderly and their caregivers could not be included, most of them had advanced dementia and were unable to respond to the questionnaires, and 35% have died while still in hospital. The sample consisted of 19 elderly people and their caregivers, and 7 elderly were excluded during the study, three due to having died at home, and four refused home follow-up.

The mean age was 78 years. As for sex, 25% were men. As for caregivers, only one formal age. With an average age of 50 years, predominant family bond being the children, and the female sex with 66% of the total.

Regarding functionality, 16% were independent for activities of daily living after 4 months, and 14% remained bedridden.

In terms of drug adherence, 80% are poorly adherent, most of the time because they do not understand what they are using.

The mean age was 78 years. As for sex, 25% were men.As for caregivers, only one formal age. With an average age of 50 years, predominant family bond being the children, and the female sex with 66% of the total.Regarding functionality, 16% were independent for activities of daily living after 4 months, and 14% remained bedridden. In terms of drug adherence, 80% are poorly adherent, most of the time because they do not understand what they are using. When the level of understanding and execution of the discharge guidelines was evaluated, it is emphasized that even in the hospital environment, it is stated that it would be possible to apply the guidelines, and on arrival in the home emerged doubts, which were solved by the practice, since none of these subjects had home health team monitoring.

Conclusion: It is concluded that femoral fracture in Brazil is a public health problem. There is a need to create a support network for the elderly and their family after the femur fracture, as well as high guidelines and efficient transition care policy, with a focus on rehabilitation and disease prevention.

PE 6-20

Correlation between vitamin d deficiency and mobility outcome at 6months after surgery in elderly patients after hip fracture

Lee J.-M. [*1], *Lim J.-Y.* [1]

[1]*Physical Medicine and Rehabilitation, Seoul National University Bundang Hospital, Seongnam-si, Gyeonggi-do, Korea, Republic Of*

Introduction: Introduction: vitamin D is important for calcium homeostasis and muscle function. Vitamin D deficiency is thought to negatively associated with functional outcomes in elderly patients after hip fracture. However, many studies showed short-term outcome improvement. We therefore conducted a prospective study to investigate the association between serum calcifediol level and the mobility recovery at 6 months after hip fracture surgery and rehabilitation in elderly patients.

Methods: Method: Forty eight participants aged 65 years or over who underwent surgery and rehabilitation for hip fracture were followed up in one university hospital. Bone mineral density for osteoporosis detection was measured by dual-energy X-ray absorptiometry (DXA) and laboratory findings (vitamin D, Parathyroid hormone; PTH, total protein, albumin) were evaluated before hip surgery. Mobility outcome (KOVAL) was measured before surgery (pre-KOVAL), at rehabilitation discharge (2weeks after surgery, post-KOVAL) and at 6 months after surgery (6M-KOVAL). we classifies T scores as osteoporosis at or below -2.5 standard deviation and defined vitamin D deficiency as a serum calcifediol below 20 ng/mL and PTH deficiency as a PTH level below 15 pg/mL.

Results: Among 48 patients, 29 participants (60%) were found to have vitamin D deficiency on first to three preoperative day and 11 patients (23.4%) were evaluated as PTH deficiency. Thirty six patients (75%) had osteoporosis. Vitamin D deficiency group was significantly associated with 6M-KOVAL (deficiency group: 4.07±2.05 vs. non deficiency group: 2.63±1.74, p=0.015). However, PTH deficiency group was not significantly associated with 6M-KOVAL (deficiency group: 4.27±2.15 vs. non deficiency group: 3.33±1.97, p=0.150). In multivariate analysis integrating age, sex, weight, osteoporosis, pre-KOVAL, post-KOVAL and 6M-KOVAL, vitamin D deficiency before surgery was a significant risk factor for pre-KOVAL [OR 0.547 (0.309-0.968) P = 0.038] and 6M-KOVAL [OR 2.030 (1.205-3.420) P = 0.008].

Conclusion: We has demonstrated that vitamin D deficiency on pre-operative day was a independent risk factor for worse mobility outcome at 6 months after surgery in elderly patients although they underwent hip fracture operation and rehabilitation management. A sufficiently large sample size will be necessary to produce results of future studies.

Top 6 Poster Presentation

Thursday, 29 August 2019

FREE PAPER SESSION 7

TP 7-1

A team approach to hip fracture care

*Kelleher U. [1], Van Der Kamp S. [*2], Hurson C. [3]*

[1]Orthopaedics, [2]Rheumatology, St. Vincent's University Hospital, [3]Orthopaedics, St. Vincents University Hospital, Dublin, Ireland

Introduction: Hip fracture patients are typically frail, with complex medical and social issues. Nearly 60% are aged 80 and older (Irish Hip Fracture Database (IHFD) 2013). Improved standards of multidisciplinary care are required to optimise patient outcomes in this cohort. (BOAST), 2012).

Methods: Upon commencement of IHFD data collection in 2013, a 4-person Hip Fragility Fracture Group was established to tackle and coordinate improvements in hip fracture care and monitor compliance with the 6 Irish Hip Fracture Standards;

Standard (1): Admission to orthopaedic ward, or transfer to theatre within 4 hours of presentation to the Emergency Department (ED)

Standard (2): Surgery within 48 hours of presentation, and within normal working hours

Standard (3): Does not develop pressure ulcer

Standard (4): Assessment by Geriatrician during admission

Standard (5): Received Bone health assessment

Standard (6): Received a falls assessment prior to discharge

To date this group numbers over 20 members from differing specialities and disciplines. Through regular data analysis, changes to local policies and quality improvement projects have improved care for this fragile patient cohort.

Results: Through a team approach to hip fracture care compliance with the standards has improved in 2018, from 2013.

Standard (1): Admission to orthopaedic ward, or transfer to theatre within 4 hours of presentation to the Emergency Department (ED) has significantly increased from 2% to 22%.

Standard (2): Surgery within 48 hours of presentation, and within normal working hours has improved from 88% to 96%.

Standard (3): Does not develop pressure ulcer has slowly decreased from 5% to 3%. Participation with the national patient safety initiative in pressure ulcer prevention is ongoing.

Standard (4): Assessment by Geriatrician during admission. With the appointment of an Orthogeriatric team the number of assessments stands at 94%, from 0%.

Standard (5): The number of bone health assessments has significantly increased from 49% to 97%.

Standard (6): Received a falls assessment prior to discharge. In line with the geriatric assessments, the number of falls assessments has risen from 70% to 98%.

Conclusion: To recognise achievement of all six IHFD Standards a Best Practice tariff was commenced in 2018. The development of a hip fracture group is required to obtain this tariff, as the value of a hip fracture team is becoming more recognized as a driver for excellence in caring for this patient cohort. Furthermore, through the IHFD standards awareness of enhanced care has increased thus allowing benchmarking of departmental outcomes, through auditing.

The success of the hip fracture team was underpinned by a monthly, minuted meeting of all the participants that was essential for co-ordinating activities between the constituent members, identifying gaps in care, facilitating collegiality, and garnering support from hospital management.

TP 7-2

Variation in the quality of hip fracture care by day and time of presentation: a nationwide prospective cohort study from the national hip fracture database for england, wales and northern ireland

*Shah A. [*1], Matharu G. [1,2], Inman D. [3,4], Fagan E. [4], Johansen A. [4,5], Judge A. [1,6]*

[1]Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, [2]Musculoskeletal Research Unit, University of Bristol, Bristol, [3]Department of Orthopaedics, Northumbria Healthcare NHS Foundation Trust , Northumberland, [4]Care Quality Improvement Department, Royal College of Physicians, London, [5]Trauma Unit, University Hospital of Wales, Cardiff, [6]National Institute for Health Research Bristol Biomedical Research Centre , University of Bristol, Bristol, United Kingdom

Introduction: Several studies report poorer quality healthcare for patients presenting at weekends. However, recent evidence in acute stroke suggests that variation in healthcare quality is more complex than a "weekend-effect". We examined this effect among hip fracture patients, to provide hospitals with an accessible picture of variations in healthcare quality over a week.

Methods: This prospective cohort study used 2017 data from the National Hip Fracture Database, which records all fragility hip fractures in patients aged over 60-years in England, Wales and Northern Ireland. Our outcome was hip fracture surgery within 36 hours of presentation (national care quality indicator). Multivariable logistic regression was used to estimate the adjusted odds ratio for surgery within 36 hours for 42 four-hour time periods within the week.

Results: We studied 68,977 patients admitted to 177 hospitals. Overall, 70% received surgery within 36 hours at the national level, which varied between 14% and 95% at the individual hospital level. Patients admitted during Friday and Saturday were less likely to receive surgery within 36 hours compared with patients presenting on other days (Friday OR=0.75, CI=0.71-0.80; Saturday OR=0.68, CI=0.63-0.72). On any day, patients presenting during 16:00-23:59 were less likely to receive surgery within 36 hours compared with patients presenting at other times (16:00-19:59 odds ratio (OR)=0.79, 95% CI=0.75-0.83; 20:00-23:59 OR=0.93, CI=0.89-0.99).

Conclusion: The variation in provision of prompt hip fracture surgery was substantial between hospitals. This variation was complex, with evidence of both an "evening" and "weekend" effect. Investigation of weekly variation in hip fracture care is required, especially in poorly performing hospitals, to help implement strategies to reduce local variation in care quality throughout the week. We will share graphical representations of this variation ('heat maps') with individual units to help them understand the variation in their performance.

TP 7-3

Anticoagulation does not increase morbidity or mortality in patients undergoing acute operative hip fracture management

*D'Arcy M. [*1], Young S. [2], Zhu M. [3], Yuan L. [4], Clay H. [5]*

[1]Orthopaedics, Nelson Hospital, Nelson, [2]Orthopaedics, North Shore Hospital, [3]Orthopaedics, University of Auckland, Auckland, [4]Urology, Nelson Hospital, Nelson, [5]University of Auckland, Auckland, New Zealand

Introduction: Early operative management of hip fractures improves outcomes. The anticoagulated hip fracture, representing an increasing proportion of this population, presents a challenge when balancing operative risk and rapid treatment. This study aims to determine the effect of anticoagulation on morbidity and mortality of hip fractures undergoing acute surgery.

Methods: A retrospective analysis of patients over the age of 50 who had undergone operative management of a hip fracture from 1/1/16 to 31/12/17 at two tertiary centres was conducted. Pathological fractures were excluded. Patient demographics, management, and clinical outcomes of those with and without anticoagulation were compared. The primary endpoint was mortality at 6 weeks and 1 year. The secondary endpoint was early postoperative morbidity as indexed by transfusion rate and return to theatre.

Results: 1,048 patients were included in the study. Anticoagulated patients were older and exhibited higher ASA scores (p = <0.0001). Controlling for time to theatre, anticoagulation status did not result in

increased mortality at six weeks (p = 0.878) or twelve months (p = 0.102). Anticoagulated patients were however more likely to wait in excess of 24 hours for theatre (p = <0.0001). Increased time to theatre was associated with increased mortality (OR 1.67 for six week mortality, p = 0.02, OR 2.56 for twelve month mortality, p = <0.0001)

Transfusion rates were comparable with respect to time to theatre (p = 0.830) or anticoagulation status (p = 0.163). Return to theatre rate for early access to theatre (<24 hours) was 2.6% and for late access (>24 hours) was 3.3% in those anticoagulated, with no significant difference observed (p = 0.661).

Conclusion: The study concludes within the limitations of a retrospective analysis that anticoagulation is not independently a risk factor for mortality in the setting of a hip fracture proceeding for surgery. Anticoagulated patients access theatre later than those not, possibly as indicative of ongoing concern regarding anticoagulation and mortality risk. This paper would dispute the validity of this concern. Hip fractures should be expeditiously brought to theatre. This does not increase the likelihood of return to theatre or requirement for transfusion.

TP 7-4

Timed-up-and-go time is a predictor of hip fracture independent from bone mineral density and vitamin d in community dwelling old icelandic adults

*Ramel A. [1], Hjaltadottir I. [2], Launer L. [3], Harris T. [3], Caserotti P. [4], Cotch M. [5], Lang T. [6], Eiriksdottir G. [7], Siggeirsdottir K. [7], Gudnason V. [7], Sigurdsson G. [7], Steingrimsdottir L. [1], Halldorsson T. [1], Skuladottir S. S. [*8]*

[1]Food and nutrition, [2]Nursing, University of Iceland, Reykjavik, Iceland, [3]National Institute on Aging, Bethesda, United States, [4]Department of Sports Science and Clinical Biomechanics, University of Southern, Odense, Denmark, [5]National Institutes of Health, Bethesda, [6]University of California, San Francisco, United States, [7]Icelandic Heart Association Research Institute, [8]Food and nutrition, University of Iceland, Kopavogur, Iceland

Introduction: Hip fracture has serious consequences for old adults. The relationship between 25-hydroxy-vitamin D (25OHD), bone mineral density (BMD) and fracture risk has been described before. However, other risk factors might also contribute to hip fracture risk. The aim of the study was to investigate the longitudinal associations between physical function and incident hip fracture.

Methods: The longitudinal Age, Gene/Environment Susceptibility-Reykjavik Study recruited 5764 participants (mean age 77y at baseline) between 2002-2006 and followed them up until the year 2012. Extensive clinical measurements were conducted including DXA and CT-scans, functional tests (Timed-Up-and-Go = TUG (sec)), 25OHD analysis and medical history was collected.

Results: Four hundred and eighty six participants had hip fracture during the follow up period. The fracture group was significantly older (80 vs. 77y, p<0.001) and had lower 25OHD ((52.7 vs. 57.6 nmol/L, p<0.001). However, there were only minor differences in BMD between 25OHD categories, i.e., 25OHD <15 nmol/L = 203 mg/cm^3; 25OHD 30-50 nmol/L = 217.1 mg/cm^3, 25OHD >75 nmol/L = 212.7 mg/cm^3. Participants with incident fracture had longer TUG at baseline. After addjustment for 25OHD, age, sex, bone mineral density, TUG was a significant predictor of incident hip fracture (HR=1.38 for each additional second (95%CI 1.23-1.55).

Conclusion: Level of 25OHD and BMD explain only part of hip fracture risk in community dwelling old adults. TUG is an independent predictor of hip fracture risk and might serve as an simple screening tool to identify old adults at higher risk for hip fracture.

TP 7-5

Effects of a multi-component cognitive behavioral intervention for the treatment of fear of falling after hip fracture (fit-hip): a cluster randomized controlled trial

*Scheffers-Barnhoorn M. N. [*1], van Eijk M. [1], van Haastregt J. [2], Schols J. [3], van Balen R. [1], van Geloven N. [4], Kempen G. [2], Achterberg W. [1]*

[1]Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, [2]Department of Health Services Research and Care and Public Health Research Institute , [3]Department of Family Medicine and Care and Public Health Research Institute , Maastricht University, Maastricht, [4]Department of Medical Statistics and Bioinformatics, Leiden University Medical Center, Leiden, Netherlands

Introduction: Fear of falling is common after hip fracture and can impede functional recovery due to related activity restriction. At present there is no intervention available for hip fracture patients. The FIT-HIP intervention was designed to target fear of falling, and consequently to improve mobility.

Objectives: To evaluate the effect of the FIT-HIP intervention on fear of falling and mobility, in patients with fear of falling in geriatric rehabilitation (GR) after hip fracture.

Methods: This cluster randomized controlled trial was performed in 11 post-acute GR units in the Netherlands (2016-2017). Six clusters were assigned to the intervention group, five to the usual care group. We included 78 patients with hip fracture and fear of falling (aged ≥ 65 years; 39 per group). The FIT-HIP intervention is a multi-component cognitive behavioral intervention conducted by physiotherapists, embedded in usual care in GR. The FIT-HIP intervention was compared to usual care in GR. Fear of falling was assessed with the Falls Efficacy Scale International (FES-I); mobility with the Performance Oriented Mobility Assessment (POMA). Data were collected at baseline, discharge and 3 and 6 months post-discharge from GR. Primary endpoints were change scores at discharge. Linear mixed models were used to evaluate treatment effect.

Results: No significant between groups differences were observed for fear of falling and mobility. With the usual care group as reference, the FES-I estimated difference between mean change scores was 3.3 (95% CI -1.0; 7.5, p=0.13) at discharge from GR; -4.1 (95% CI -11.8; 3.6, p=0.29) after 3 months and -2.8 (95% CI -10.0; 4.4, p=0.44) after 6 months. POMA estimated difference was -0.3 (95% CI -6.5; 5.8, p=0.90).

Conclusion: The FIT-HIP intervention was not effective in reducing fear of falling. A possible explanation for this finding is that this study was not able to accurately identify and accordingly treat maladaptive fear of falling. Recent literature suggests that fear of falling shortly after hip fracture may to some extent be appropriate. In this context, anxiety may be an important factor which determines whether fear of falling becomes maladaptive. In order to adequately identify whether treatment for fear of falling is required, further research should focus on appropriate selection of the target group, i.e. differentiate between: i) fear of falling that can be considered a normal and adaptive response and ii) conditions when it is dysfunctional and disproportional. For current clinical practice, we recommend routine screening for fear of falling and anxiety at onset and evaluation of rehabilitation, in order to timely identify when fear of falling becomes maladaptive. Treatment with cognitive behavioral approaches is expected to be suitable for maladaptive fear of falling after hip fracture.

TP 7-6

Post-surgery infection and subsequent mortality among hip fracture patients: different methods for dealing with time-varying confounding in a danish population based cohort study, 2004-2016

*Risbo N. [1], Luta G. [1,2], Pedersen L. [1], Ehrenstein V. [1], Pedersen A. [*1]*

[1]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark, [2]Department of Biostatistics, Bioinformatics, and Biomathematics, Georgetown University Medical Center, Washington, DC, United States

Introduction: Complications and comorbidities affecting mortality, such as heart diseases and infections, are common after hip fracture surgery. As a result, when estimating the causal effect of infection on subsequent mortality, adjustment for baseline confounders alone may be insufficient. Thus

we compared different methods of handling time-varying exposure and confounding when estimating the effect of having a post-surgery hospital-treated infection on 1-year mortality in hip fracture patients.
Methods: In this nationwide cohort study using data from Danish registries, we included patients aged ≥65 years with a first-time hip fracture surgery in 2004-2016. Patients were classified as exposed after they had a record of a hospital-treated infection within 1-year after the surgery. With infection as a time-varying exposure, we calculated adjusted hazard ratios (aHR) for 1-year mortality with 95% confidence intervals (CI) using 1) Cox regression with baseline confounders only, 2) Cox regression with time-varying confounders, and 3) marginal structural models (MSM). Among the confounders were comorbidities and medications at baseline and during follow-up as time-dependent covariates.
Results: We included 81,704 patients with hip fracture surgery of whom 22,023 (27%) had a hospital-treated infection within 1 year after the surgery, including pneumonia (9,327 patients, 11%). The crude mortality rates per 100 person years among patients with and without infections were 69 and 29, respectively. The corresponding estimates for patients with and without pneumonia were 111 and 31. The aHRs for mortality for any infection (yes vs. no) were 2.71 (CI 2.64-2.79) when adjusting for baseline variables only, 2.55 (CI 2.48-2.63) after additionally adjusting for time-varying confounders, and 2.44 (CI 2.36-2.52) when using MSM. For pneumonia (yes vs. no), the aHRs corresponding to the three approaches were 3.51 (CI 3.39-3.63), 3.20 (CI 3.09-3.31), and 3.33 (CI 3.19-3.47), respectively.
Conclusion: Having a hospital-treated infection, particularly pneumonia, yielded an increased risk of 1-year mortality after hip fracture surgery. The aHRs were attenuated when accounting for time-varying confounding, supporting the notion that adjustment for baseline confounders alone may yield a biased estimate of the causal effect of infection on mortality in this setting.

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ABSTRACTS INDEX OF ABSTRACT AUTHORS

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IMPRINT

Scientific Organisation

FFN – Fragility Fracture Network
Central Office
Schaffhauserstr. 550
8052 Zurich, Switzerland

Editors

Congress Chair

Xavier Griffin

FFN President

Matthew Costa

MCI Deutschland GmbH

MCI | Germany – Berlin
Amira Hussein
Markgrafenstr. 56
10117 Berlin
T: +49 30 204590
F: +49 30 2045950
ffn-congress@mci-group.com

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Editorial Deadline

12. August 2019

All indications without engagement, subject to modifications.

WANTED.
ALL SKILLS ON THE CARE PATHWAY

The value of interprofessional collaboration

Wednesday 28 August, 13:00–14:00, East School

Let's come together to identify how interprofessional collaboration can complement our efforts to improve the effectiveness of our post-fracture care services

If you are here with colleagues, join us as a team to explore the impact of interprofessional relationships on health outcomes

NEEDED.
Improvements in the care pathway

VALUED.
The role of interprofessional collaboration

STRENGTHENED.
Working together towards the best care pathway

Julie Santy-Tomlinson
Adjunct Associate Professor in Orthopaedic Nursing, Odense University Hospitals and University of Southern Denmark, Denmark

Liz Anderson
Professor of Interprofessional Education, Lead for Patient Safety, CAIPE Fellow, University of Leicester, UK

Opinder Sahota
Professor of Ortho-Geriatric Medicine and Consultant Physician, Nottingham University Hospitals NHS Trust, UK

Inspired by patients.
Driven by science.