NHS
Cambridge University Hospitals
NHS Foundation Trust

International Conference on Falls and Postural Stability

Orthogeriatric Developments

Dr Madhavi Vindlacheruvu, Consultant Orthogeriatrician, Addenbrooke's Hospital, Cambridge, UK
Dr Terence Ong, Consultant Orthogeriatrician, Nottingham University Hospitals NHS Trust, Nottingham, UK

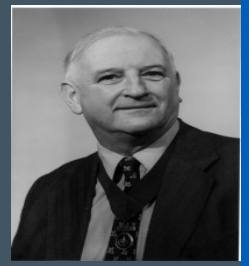
The Goal

- 'The primary role of a geriatrician is to meet and overcome breakdown in independent living among older people.'

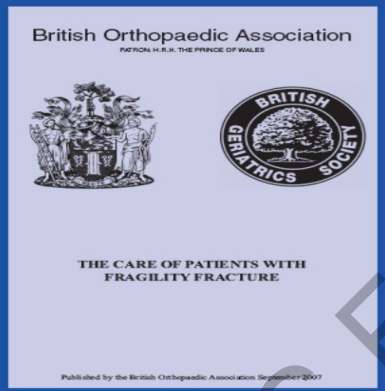
» Prof Sir John Grimley-Evans

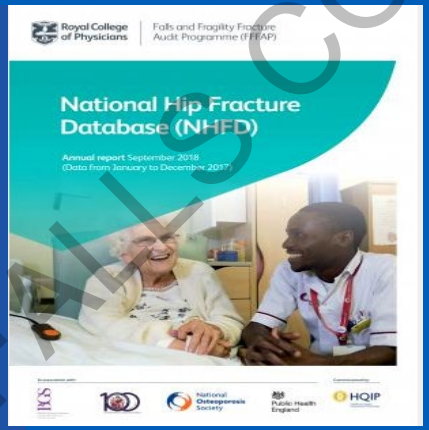
The Pioneer of Orthogeriatrics

- Bobby Irvine
  - Worked in Hastings with an orthopaedic surgeon, Michael Devas in 1957
  - Devas regarded himself as a “humble carpenter” and needed “physicians to tell him what was wrong with the patients”
  - Established a world famous orthogeriatric unit
  - Operated on even the frailest patients
  - Mobilised them with physiotherapists
  - “The first step in rehabilitation is the first step”



The journey to date





- Multidisciplinary approach to the management of fragility fracture patients
- Reliable secondary prevention
  - Osteoporosis
  - Falls
- Chronic disease model
- Quality assurance
  - The NHFD
  - The FLS-DB

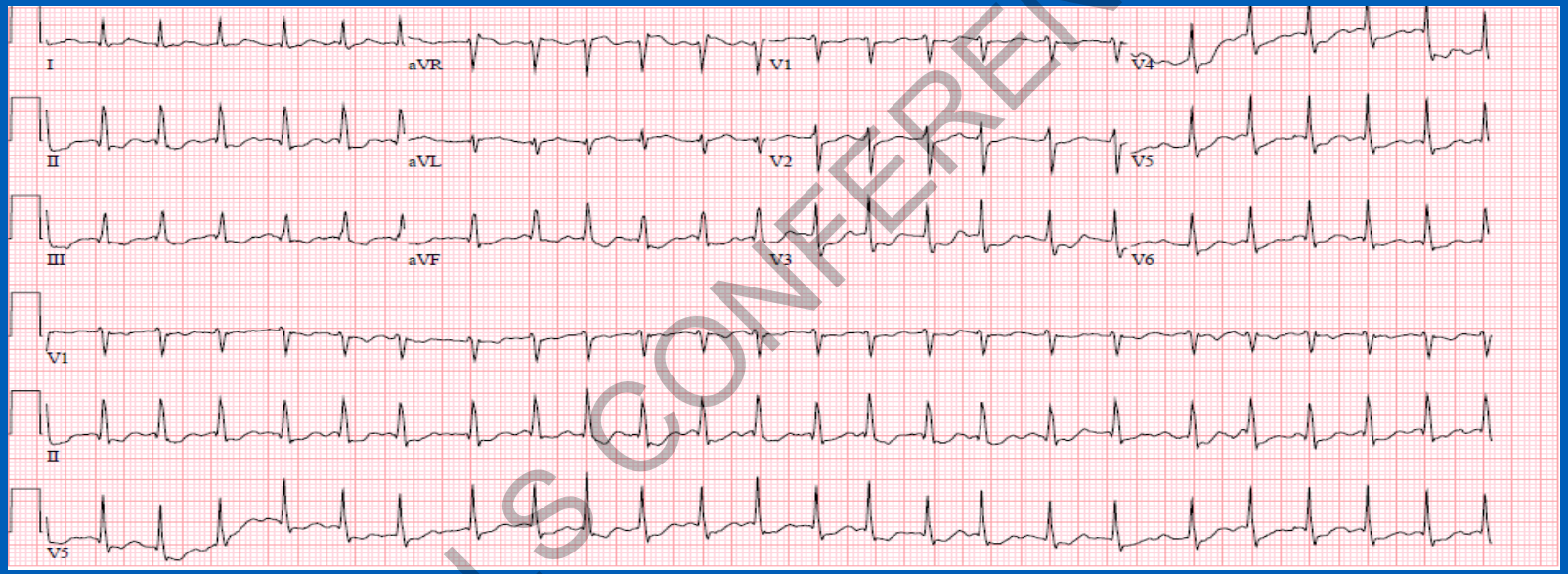
Key Themes

- Awareness of atypical/ non-specific presentation of acute illness in old age.
- Whole person approach to older people with co-morbidity and complex disability.
- Multidisciplinary team working and comprehensive geriatric assessment.
- Central importance of rehabilitation.
- Recognition of caregivers' stress; respite care.
- The teaching of geriatric medicine to colleagues, post graduate and undergraduate doctors, therapists and nurses.

Case 1

82 year old female

- Was walking along the street with her daughter in law
- As she was mobilising aware of discomfort in her right thigh (suffers from OA)
- Tripped, twisted and fell
- Landed on her left side
- Reported immediate pain in her right hip post fall
- Unable to mobilise following the fall
- Attended to by a first aider and advised not to move
- No head injury / chest pain / palpitations / SOB prior to fall



Results

White blood cell (WBC) count	11.5 (H)
Red blood cell (RBC) count	4.20
Haemoglobin (Hb)	119
Mean cell volume (MCV)	82.3
Mean cell haemoglobin (MCH)	28.5
Red cell distribution width (RDW)	12.5
Platelet (PLT) count	283
Mean Platelet volume (MPV)	7.6
Haematocrit (Hct)	0.344 (L)
	15/08/2019 00:38
Serum Sodium	135
Serum Potassium	3.5
Serum Urea	5.3
Serum Creatinine	53

High Sensitivity Troponin	833.9 (HH)	2088.6 (HH)

- X-ray Pelvis:

How would you manage this lady?

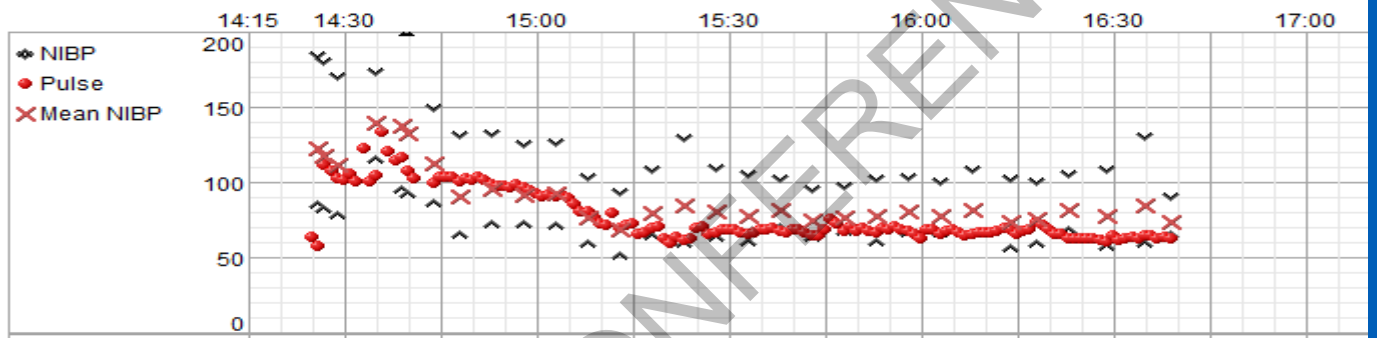
1. Cancel theatre
2. Request an urgent cardiology review
3. Start treatment for ACS
4. Arrange for an echocardiogram

Initial management

- Bedside Echocardiogram
  - Normal left ventricular size and low normal systolic function - visually estimated LV EF = 50-55%
  - Regional wall motion abnormalities were noted, in the setting of sub-optimal image quality
  - At least mild to moderate mitral regurgitation
- Repeat ECG: SR with resolution of ST changes

Progress in theatre

Intraprocedure Grid/Graph



Fentanyl (mcg)		75								
0.5% Bupivac... (mL)		2.7								
Diamorphine (mcg)		300								
midazolam inj... (mg)				1.5						
Gentamicin (mg)				120						
teicoplanin (mg)				400						
Metaraminol b... (mg)				0.5						
Hartmanns 1 lit (mL)		/							750	
PIP (measu... (cm H2	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[1]
I:E Ratio	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]	[1:2.00]
PEEP/CPA... (cm H2	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]
Urine Volume (mL)										100
Position					Supine					
SpO2 (%)	[97]	[95]	[100]	[100]	[100]	[100]	[100]	[100]	[100]	[100]

Progress

- Operation performed: Internal fixation - IM nail (long)
- Good progress with physiotherapists and occupational therapists
  - STS to RF independently. Mobilised ~15M with frame and loose supervision of one

- CHA2DS2-VASc Score: 4
- Stroke risk per year: 4.8%
- Risk of stroke/TIA/systemic embolism: 6.7%
- HAS-BLED score: 2 points
- Bleeding risk: 4.1%
- Cardiology review:
- OP MIBI scan - if positive for angiography
- Transferred home in 7 days

Case 2

- 73 year old man
- Admitted via ED with vomiting and constipation
- Bowels not opened for 7/7
- Known oesophageal cancer with liver and peritoneal metastases
- Diagnosed June 2019 after investigations for progressive dysphagia since Christmas 2018
- Injury in garden 2-3/52 ago resulting in right hip pain - twisted as he caught his right foot in the trouser leg on the left
- No fall but jarred hip resulting in poor mobility

History

- 2nd fall 7 days prior to admission in the bedroom - lost balance and fell onto right shoulder causing pain and discomfort to right upper limb
- Deteriorating in recent weeks - generally weaker
- Managing only sips of water
- Main issue is pain in right hip
- This stops him from sleeping
- Struggling to transfer
- Minimal pain at rest but severe pain on movement
- Pain described as terrible ache in right hip

Examination

- BP 102/68 mmHg Pulse 105
- Temp 36.9°C Resp 20
- SpO2 95%
- AMTS 10/10
- Frail and icteric
- No metabolic flap
- Lying on left side
- Mucous membranes dry ++
- Muscle wasting ++
- Bruising right upper limb

p 100 reg JVP low

HS 1&2 and gallop

Bilateral lower limb oedema Left > right

Chest clear

Abdomen distended ++

Palpable liver edge 3-4cm below ribs

Ascites +++

Right lower limb shortened and externally rotated

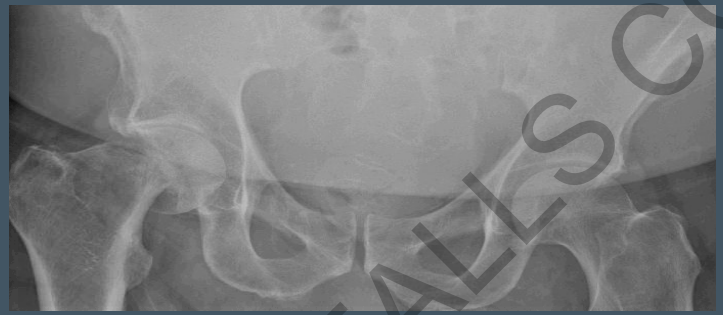
Investigations

- ECG: SR HR 95 LAD Small complexes

WBC	16.0*	17.6*	19.2*
HB	143	135	137
MCV	91.4	91.8	92.3
PLT	159*	149*	122*
SERSODIUM	--	138	140
SERPOTASSIUM	--	4.6	4.6
CREAT	--	164*	175*
SERUREA	--	27.4*	30.6*

PT 14.4
INR 1.23

Baseline creatinine 80
Estimated Creatinine Clearance: 43.3 mL/min (by C-G formula based on Cr of 175).



What would you do next?

1. Optimise for palliative surgery
2. Arrange for a nerve block
3. Request input from oncology
4. Move to supportive care and transfer to hospice

Next steps

- Patient and NOK updated
  - Sadly patient still expecting an operation for hip fracture
  - "its got to be done"
  - "If I make it I do and if I don't, I don't"
- Fascia iliaca block in theatre
- Reviewed by palliative care team
- Anticipatory medications prescribed
- Move to supportive care
- Peacefully passed away

Case 3

- 83 year old man
- Mobilising in his kitchen without his frame, bent down to get something out of the cupboard and felt a bit dizzy.
- Lost his balance, fell and landed on the floor.
- Unwitnessed fall
- Attempted to get up but realised there was something wrong with his left hip
- Able to press his pendant alarm necklace.
- Ambulance arrived and brought him to ED
- No head injury / LOC / chest pain / palpitations or SOB at time of fall

Past medical history

- Essential hypertension
- Orthostatic hypotension
- Myasthenia gravis
- Type 2 diabetes mellitus
- Sensory peripheral neuropathy
- Vertigo

Orthogeriatric assessment

Falls Risk Factors

+ Visual impairment - wears bifocals and has early cataracts

+ Hearing impairment - has hearing aids but doesn't wear them

+>4+ medications including metformin, sertraline and pregabalin

+ OA

+ Neurological disease - Myasthenia gravis and sensory peripheral neuropathy

+ Walking aids - frame

+ Nocturia - twice

Risk Factors for Osteoporosis

No previous fragility fracture

+ Diabetes mellitus - type II (diet and medication controlled)

No rheumatoid arthritis

No family history of osteoporosis

No parental hip fracture

Ex smoker – stopped ~20 years ago

No alcohol in last 3-4 years

No steroid therapy

Investigations

- **ECG:** SR HR 85, RBBB, Prolonged QTc
- Pelvic x-ray:

- HGB 114* WBC 12.24*
- PLT 156 MCV 104.8*
- SODIUM 140.5
- POTASSIUM 4.09
- CREATININE 86.0
- UREA 8.1
- C-REACTIVE PROTEIN <1
- ALKALINE PHOPHATASE 69.1
- ALANINE TRANSFERASE 13.2
- **Secondary screen**
- Vit B12 203 TSH 2.47 Folate 6.96
- HbA1c 33 Adj Ca 2.16

What are the issues here?

Issues to consider

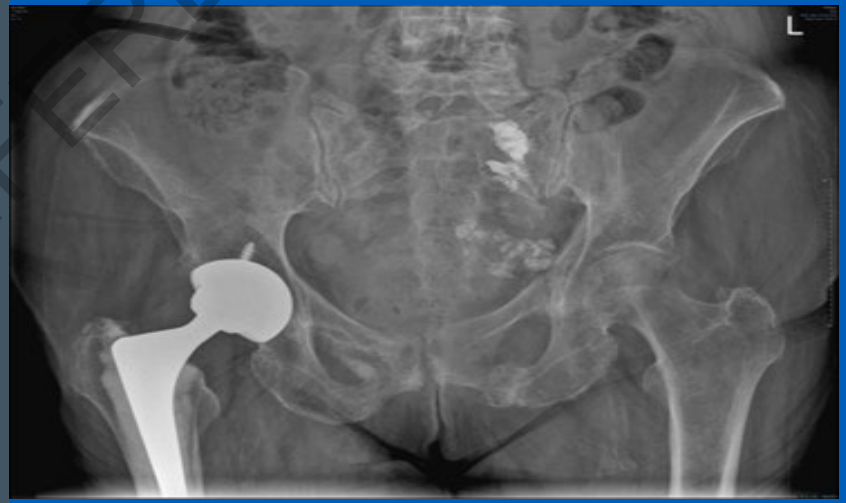
- Pre-op pulmonary evaluation to be discussed with Neurology SpR on call regarding PFTs/MG/anaesthetic
- Anaesthetic assessment pre-op – aware certain anaesthetic agents to be avoided in view of MG
- Traction pre-op however
  - 7 day delay to theatre and post op instructions
  - Mobilise WB as tolerated to transfer from bed to chair only - for 6 weeks
- Medically optimised for surgery - Omit metformin on the morning of surgery. Only restart post-op when he is eating and drinking adequately at least 2 meals and no clinical evidence of lactic acidosis or renal impairment
- Bone protection

Case 4

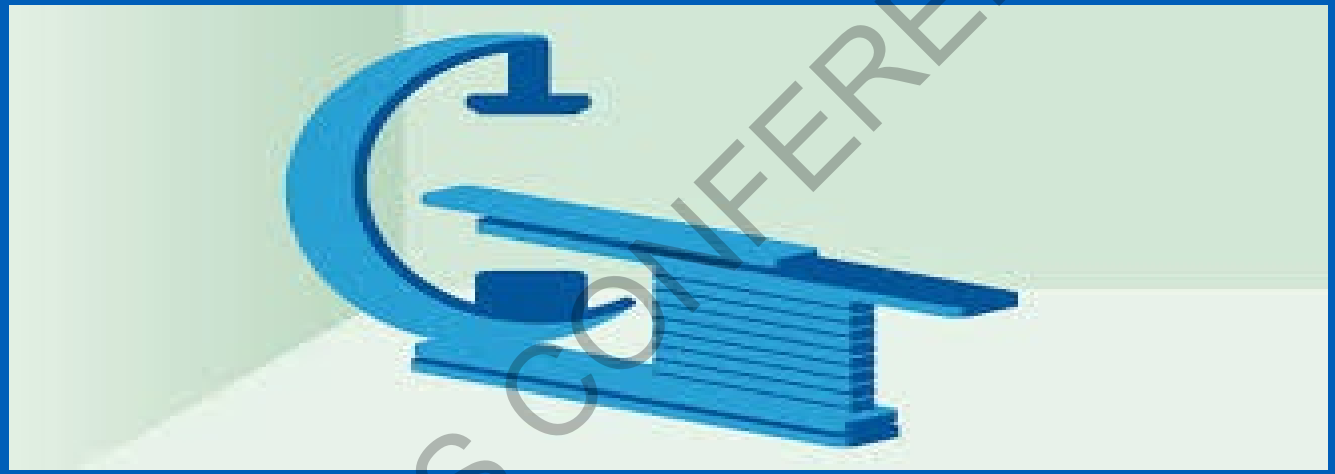
- 84 year old female, retired physiotherapist
- PMH
  - AF (anticoagulated with warfarin)
  - hypertension
  - Depression
  - Right total replacement for OA
  - Cataracts
- Stood from dressing table → walked to bathroom → fell

Initial management

- Admitted to medicine
  - Analgesia
  - Mobilise
  - Assess for orthostatic hypotension
- Inpatient day 3
  - Rotunda transfer
  - Unable to gain foot clearance due to pain



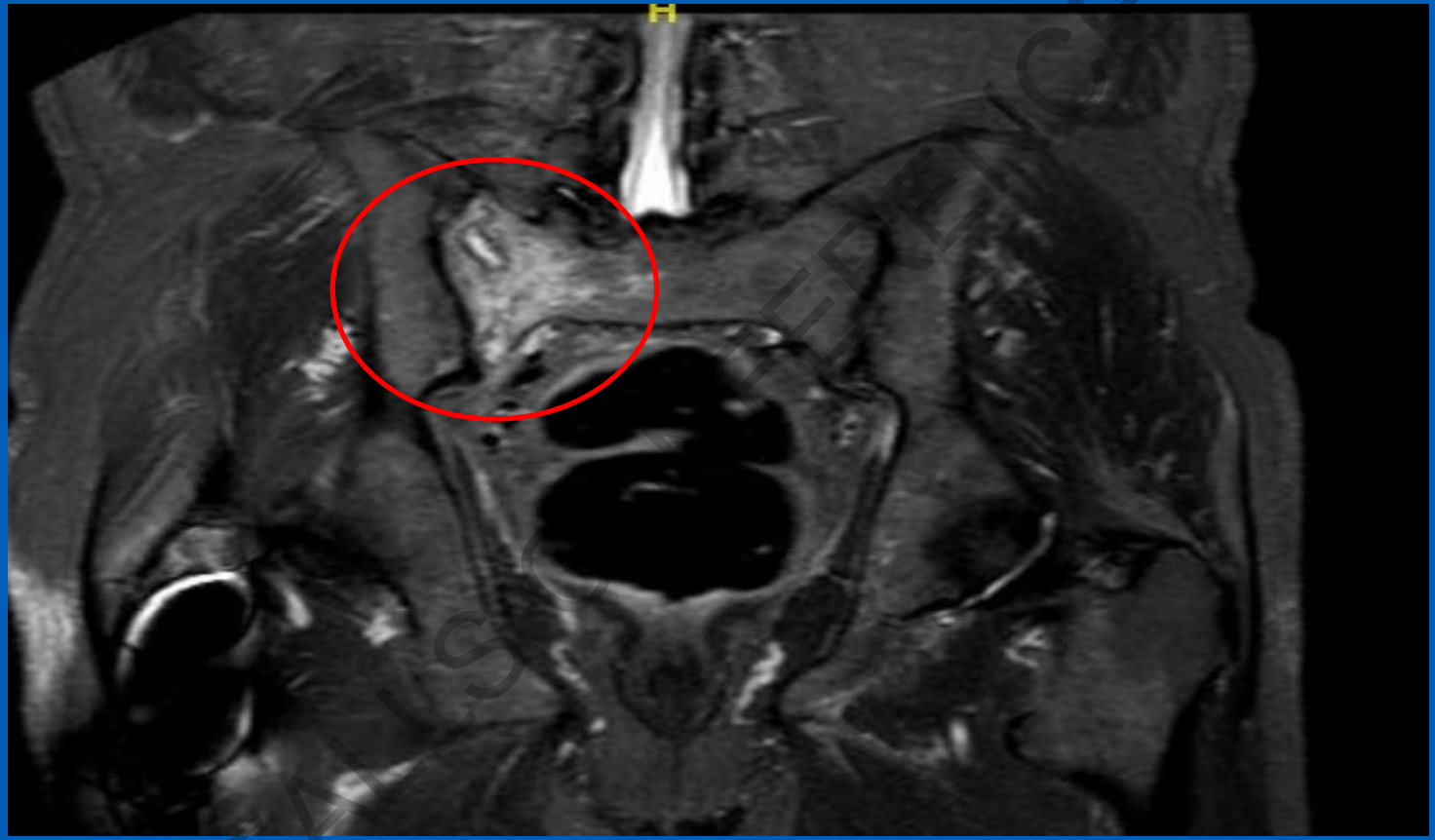
What is the role of further imaging of pelvic fractures?



Inpatient day 7

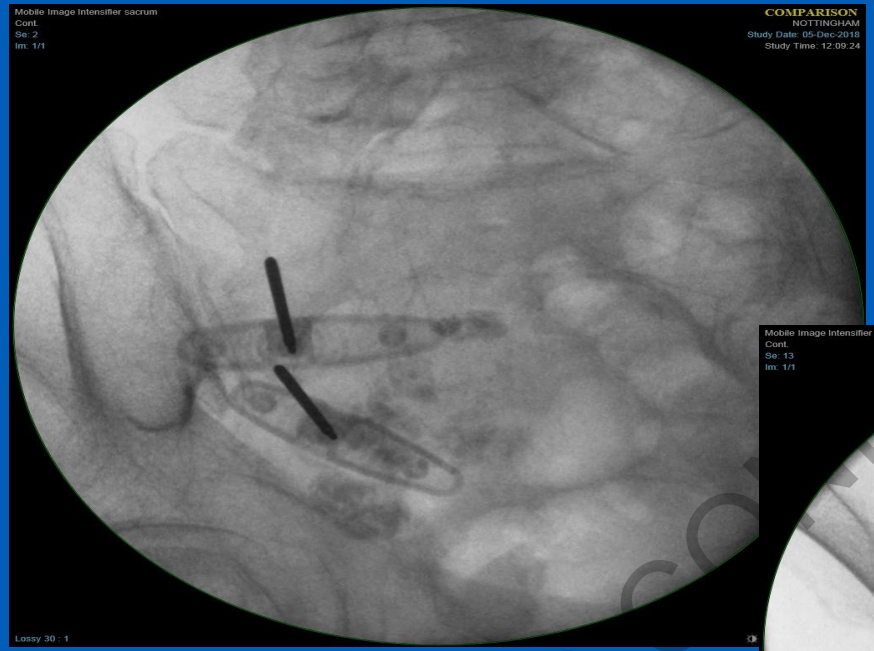
The medical issues

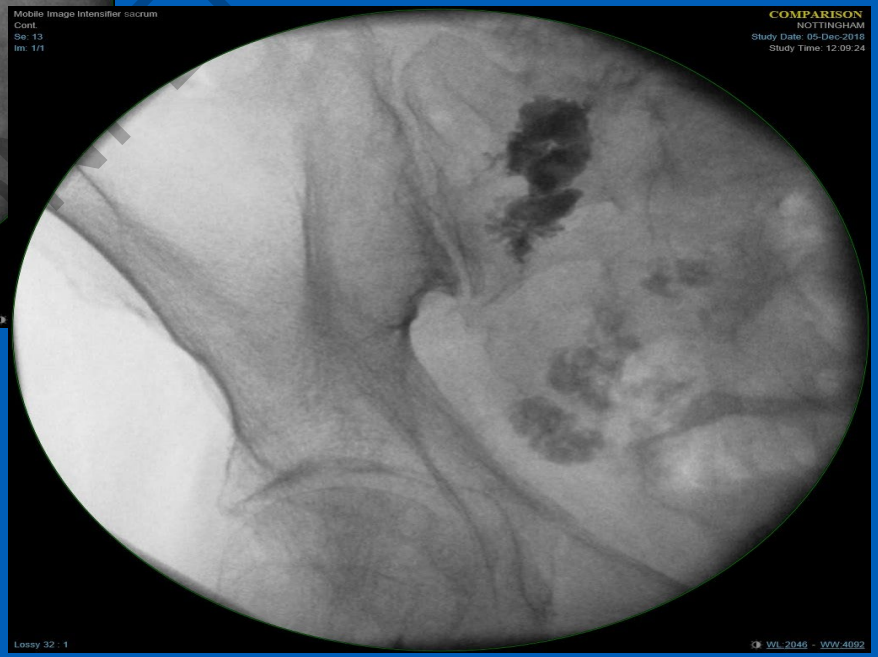
- Pain and inactivity. Utilising 40 – 60mg of morphine
- Constipation
- Urinary tract infection
- Orthostatic hypotension (in the context of hypertension)
- Low trauma fracture


H

Next steps

- Transferred to the surgical ward
- Sacral augmentation
- Medical management by geriatricians pre- and post-op
- Access to nurses and therapist with trauma experience





Day 2 post-op

Progress

- Discharged 5 days post-op to residential rehabilitation
- Returned home 7 days after
- Independent with personal ADLs and mobility

The Changing Face of Major Trauma

Major Trauma traditionally seen as a disease of the young, especially males and involving RTCs but this is changing to elderly with simple fall from standing height **SILVER TRAUMA**

Case 5

- 82 year old lady
- Fell off stepladder while putting curtains up in the kitchen.
- She overbalanced and fell off the ladder. Stepladder approximately 4-5 feet off the ground
- On floor for ~1 day as could not move
- Neighbour heard her knocking on door and looked though the letterbox, called the ambulance
- Neighbour was going to work and got her husband to force the door open
- No chest pain / palpitations / dizziness / syncope or head injury

Background

- Hypertension – on amlodipine
- GORD
- Obesity

Social history:

- Lives in a ground floor flat
- 2 steps to access property
- 1 step indoors from living room to kitchen
- Independent with ADLs and IADLs

Risk Factors for Osteoporosis:

- Post menopausal female

Falls Risk Factors:

- Visual impairment - Early cataract in left eye
- Hearing impairment - hearing aid
- OA
- High BMI
- Walking aids – stick or rollator frame outdoors
- Nocturia - 3-4 times/night

Imaging

- XR RIGHT SHOULDER
- There is a comminuted fracture of the right greater tuberosity and neck of humerus
- XR PELVIS/ L HIP/ L FEMUR
- Fracture of the left distal femur with laterally displaced butterfly fragment.
- CT R ANKLE: multicomminuted fracture of the calcaneum involving the anterior, middle and posterior subtalar articulations

- CT L KNEE: multicomminuted, laterally displaced fracture of the left distal third femur and lateral femoral condyle.

Major trauma in older patients

- The population is ageing
  - 24.7% of the UK population is predicted to be over 65 by 2046
  - Increased mean age for admissions in major trauma - from 36.1 to 53.8 years between 1990 and 2013
  - 26.9% of major trauma patients in 2013 were over 75 years old
- In major trauma:
  - Comorbidity is a well-documented risk factor for morbidity and mortality
  - But there is limited evidence about the impact of frailty and outcomes of major trauma

Frailty

Frailty is a clinically recognised state of increased vulnerability to stressors

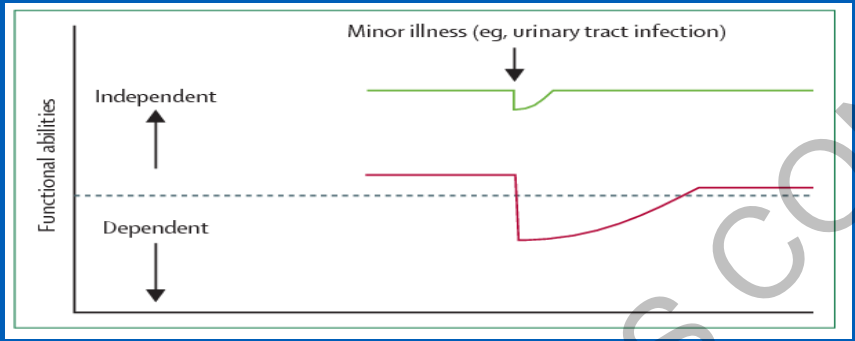


Figure 1: Vulnerability of frail elderly people to a sudden change in health status after a minor illness

- Rockwood Frailty Score

Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house.** Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging. Revised 2008.
2. K Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

DALHOUSIE UNIVERSITY
Inspiring Minds

Together–Safe | Kind | Excellent

CUHFT review of TARN data

- High frailty is associated with higher mortality at 30 days (26.2%) and 1 year (51%, OR 2.22)
- CUHFT length of stay is longer than the TARN average (18 versus 11 days)
- High frailty is associated with higher rates of unplanned intubation, treatment for infection, renal failure and higher rates of discharge to NH and specialist centres

Next steps at CUHFT

- Recognition of the impact of frailty on outcome after major trauma in older patients
- Optimisation of care in this patient group to counteract the effect of frailty
- Recruiting to develop an orthogeriatric model of care for older major trauma patients
- Routine frailty scoring of all older patients who experience major trauma to
  - Inform prognosis discussions with patient / family
  - Highlight the need for targeted care

Major Trauma Centre: Best Practice Tariff

- Additional payment made to Major Trauma Centres only
- Based on Injury Severity
  - Level 1: Moderate Trauma (ISS>8): £1,500
  - Level 2: Major Trauma (ISS>15): £3,000
- Conditional on 'Best Practice' targets being met & data correctly entered onto TARN database
- All patients 65 years or older have a Clinical Frailty Scale completed within 72 hours of admission by a geriatrician (defined as Consultant, Non-Consultant Career Grade (NCCG) or Specialist Trainee ST3+).

Summary

- Fractures are an increasingly common problem in older people and lead to significant levels of morbidity and mortality
- Falls are often multifactorial
- The holistic and person-centred approach of geriatric medicine benefits older people with their unique spectrum of physiological and psychological needs
- There will be greatly improved outcomes for the individual, and the wider population, with gains for capacity and governance within the acute hospitals and the health economy at large if robust systems are in place to pro-actively care for this vulnerable group of patients