Evidence based Update in Anaesthesia for Hip Fracture Surgery
#NOF

Dr Paul Thomas, Consultant Anaesthetist, Royal Devon and Exeter Foundation Trust, England
Who is he?
Where’s he from?
Where does he work?
Royal Devon and Exeter Hospital

Large Teaching Hospital situated in Exeter, Devon

800 beds, 80 day case beds
10 theatre complex
5 theatre orthopaedic suite
2 ophthalmic theatres
2 O&G theatres
….and I thought we were busy!

- Bangladesh population 168,122,130
- Dhaka population ~ 20,000,000 (4.2% annual increase)
- Bangladesh area 130,172 km sq
- Population density 1291 km sq
- Dhaka 23,234 km sq
- Doctor : person ratio 0.472:1000
- Average life expectancy 70.4 years (up from 67.2 in 2009)

- UK population 67,000,000
- Exeter population 129,000
- UK area 242,000 km sq
- Population density 395 km sq
- Doctor : Person ratio 2.8:1000
- Average life expectancy 82.9 years
Why is Management of # NOF is so important?

- Incidence increasing in UK ageing population 77,000 in 2009, projected to be 100,000 in 2033
- Increasing inpatient financial costs ~0.8 billion to ~2.7 billion over the same time frame
- Often frail cohort of patients with multiple ongoing and acute comorbidities which may have led to the fall in the first place
- Statistically one of the highest 30 day post surgical mortality rates and morbidity in the hospital
Epidemiology of #NOF

75% Femoral fractures occur in women

98% hip fractures managed surgically

70% patients are ASA III or IV

25% moderate cognitive impairment

Post operative mortality ∼8-12% at 1 month, 30% at 1 year
Median length of stay 23 days
Recurring Dilemmas in #NOF management

- Optimum Time to Surgery
- Regional vs General Anaesthesia
- Blood Transfusion triggers
- Cessation of anticoagulants
- Management of Heart Murmurs
Time to Surgery

- Probably reduces morbidity and mortality if operation done early

- ....but where's the evidence?
Reports of Original Investigations

Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis, and meta-regression

[Le délai opératoire est-il associé à une mortalité accrue chez les patients atteints d'une fracture de la hanche ? Synthèse systématique, méta-analyse et méta-régression]

Toshiya Slija MD PhD, Zen'ichiro Wajima MD PhD, Yoko Ohe MD PhD

Purpose: Mortality associated with hip fracture is high in elderly patients. Surgical repair within 24 hr after admission is recommended by The Royal College of Physicians' guidelines; however, the effect of operative delay on mortality remains controversial. The objective of this study was to determine whether operative delay increases mortality in elderly patients with hip fracture.

Methods: We searched electronic databases, including MEDLINE and Embase, for articles on operative delay in hip fracture. We reviewed all articles and selected those that reported mortality rates in elderly patients with hip fracture. We performed a meta-analysis of controlled trials and a meta-regression of observational studies.

Results: We identified 120 articles, of which 16 observational studies met our inclusion criteria. These studies had a total of 15,478 patients for whom mortality data were complete (11,964 total deaths). Based on the five studies that reported mortality within 30 days after hip fracture surgery, the mortality rate for patients aged 80+ years was 19%. Univariate analysis showed that operative delay was associated with a significant reduction in mortality relative to controls (OR: 0.81, 95% confidence interval [0.75-0.87], p < 0.001).

Conclusions: Our study suggests that reducing operative delay may reduce mortality in elderly patients with hip fracture.
Conclusions

✓ Prolonged starvation and recurrent delay to theatre may well be contributing factor
✓ Increased risk of hospital acquired pneumonia and PE associated with prolonged immobilization
Regional Anaesthetic vs General Anaesthetic vs other combination?
Regional versus General Anaesthesia

Meta analysis of 15 randomised trials comparing morbidity / mortality.

Conclusion
Marginal advantages for regional anaesthesia compared to general anaesthesia for hip fracture patients in terms of early mortality and risk of DVT.
Anaesthesiology 2012 117:72-92

In a review of more than 18,000 patients using regional anaesthesia was associated with a 25 – 29% reduction in major pulmonary complications and death.
Signal emerging from the ‘noise’

Results: Of 18,158 patients, 5,254 (29%) received regional anesthesia. In-hospital mortality occurred in 435 (2.4%). Unadjusted rates of mortality and cardiovascular complications did not differ by anesthesia type. Patients receiving regional anesthesia experienced fewer pulmonary complications (359 [6.8%] vs. 1,040 [8.1%], \( P < 0.005 \)). Regional anesthesia was associated with a lower adjusted odds of mortality (odds ratio: 0.710, 95% CI 0.541, 0.932, \( P = 0.014 \)) and pulmonary complications (odds ratio: 0.752, 95% CI 0.637, 0.887, \( P < 0.0001 \)) relative to general anesthesia. In subgroup analyses, regional anesthesia was associated with improved survival and fewer pulmonary complications among patients with intertrochanteric fractures but not among patients with femoral neck fractures.

Conclusions: Regional anesthesia is associated with a lower odds of inpatient mortality and pulmonary complications among all hip fracture patients compared with general anesthesia; this finding may be driven by a trend toward improved outcomes with regional anesthesia among patients with intertrochanteric fractures.
Nerve blocks (subcostal, lateral cutaneous, femoral, triple, psoas) for hip fractures (Review)

Funce M, Griffin R, Appadu R

The Cochrane Collaboration

Comparative Effectiveness of Pain Management Interventions for Hip Fracture: A Systematic Review

Ahmed A. Alhou-Satta, MD, PhD, Laure A. Brouwer, PT, PhD, Seth R. Beding, MD, MSc; Donna M. Dryden, PhD; Michelle P. Harris, MSc; Cheryl A. Sadowski, BScN, PhD; Rwari P., MD, MPH; Sani R. Majumdar, MD, MSc, Donna M. Wilburn, RN, PhD; Mohammad Khademi, MD, Soma S. Motamed, MD, PhD; Wang MD, MSc; Lisa Trunfeld, MD, and C. Alexander James, PT, PhD

Background: Pain management is integral to the management of hip fractures.

Purpose: To review the evidence linking pharmacological and nonpharmacological interventions for managing pain after hip fracture.

Data Sources: 25 electronic databases (January 1990 to December 2010), gray literature, trial registers, and reference lists with no language restrictions.

Study Selection: Multiple reviewers independently and in duplicate screened 9247 citations, identified randomized controlled trials (RCTs), nonrandomized, controlled trials (non-RCTs) and cohort studies of pain management techniques in older adults after hip fracture.

Data Extraction: Independent, duplicate data extraction and quality assessment were conducted, with discrepancies resolved by consensus or a third reviewer. Data extracted included study characteristics, inclusion and exclusion criteria, participant characteristics, interventions, and outcomes.

Data Synthesis: 80 unique studies (64 RCTs), 5 non-RCTs, and 14 cohort studies were included. 63 studies addressed nerve blocks (n = 30), spinal anesthetics (n = 30), systemic analgesia (n = 30), traction (n = 10), multimodal pain management (n = 20), repositioning (n = 2), and complementary and alternative medicine (n = 2). Overall, moderate evidence suggests that nerve blocks are effective in reducing acute pain and reducing delirium. Low-level evidence suggests that preemptive fracture does not reduce acute pain. Evidence was insufficient on the benefits and harms of nerve interventions, including spinal anesthesia, systemic analgesia, multimodal pain management, acupuncture, rehabilitation therapy, transcutaneous electrical neurostimulation, and physical therapy regimens, in managing acute pain.

Limitations: No studies evaluated outcomes of chronic pain or outcomes of intervention participants from nursing homes or with cognitive impairment. Systematic analysis was limited to nonrandomized, nonpharmacologic interventions, and subjective and self-reports of pain interventions during the search period.

Conclusions: Nerve blocks seem to be effective in reducing acute pain after hip fracture. Sparse data preclude firm conclusions about the relative benefits or harms of many other pain management interventions for patients with hip fractures.

Primary Funding Source: Agency for Healthcare Research and Quality.
PLAIN LANGUAGE SUMMARY

Local anaesthetic nerve blocks for people with a hip fracture

To reduce pain after a hip fracture and subsequent surgery, various nerves may be blocked using local analgesics (pain killers). This review examined the evidence from randomised trials that evaluated the use of local anaesthetic nerve blocks for people with hip fractures. Seventeen trials, involving 888 mainly female and old people who had been admitted to hospital with hip fracture, were included in the review. In nine trials, nerve blocks were applied at the time of admission with the hip fracture, and in the other eight trials, application was at the time of surgery. Most studies were small with limited reporting of outcomes. Most studies found that a nerve block will reduce pain and the need for other painkillers for people with a hip fracture. There were few reported complications associated with nerve blocks. However, the available evidence is insufficient to determine whether nerve blocks have other clinical benefits and to what extent adverse effects may occur.

Nerve blocks do seem to reduce the pain after a hip fracture and hip fracture surgery, but more evidence is needed.
Transfusion Triggers
Transfusion Trigger data

- 19 studies, all RCTs
- 6264 patients
Constant Vigilence required

- Measure frequently
- Blood loss is usually 2.5g/dl
- Beware, many are already anaemic before fracture
- Blood loss usually associated with the initial trauma rather than the surgery
...but nobody has the definitive answer
Hip Fracture Time Line

- 1984 GA vs Spinal study
- 1993 Scottish Hip Fracture Audit starts
- 1999 BGS/BOA Blue Book appears
- 2001 Cochrane Review
- 2006 BGS/BOA Blue Book appears
- 2007 NHFD
- 2007 Hip Fracture Anaesthesia Network
- 2011 NICE124
- 2012 AAGBI Guidelines – first ever document specifically for Anaesthetists
Early Guidelines
Royal College of Anaesthetists
- the professional body responsible for the specialty of anaesthesia throughout the United Kingdom
- It sets standards in anaesthesia, critical care, pain management, and the training of anaesthetists and anaesthetic practitioners.

Association of Anaesthetists of Great Britain and Ireland
- to advance and improve patient care and safety in the field of anaesthesia
- to promote and support education and research in anaesthesia
- to represent, protect, support and advance the interests of its members
Royal College of Anesthetists, London
Hip fracture Perioperative Network

National Audit
Data on 300,000 patients
Hip fractures are prevalent, and on the rise. These are common and serious injuries of the elderly, associated with high morbidity and mortality, occupying a significant proportion of hospital resources, leading to a serious financial burden to the NHS and society.

Hip Fracture Anaesthesia Sprint Audit Project (ASAP)
Chart 10 - Type of anaesthesia

The introduction of this data field and the resultant chart shows that general anaesthesia (52.7%) is favoured over spinal anaesthesia (42.4%) and that only 29.4% of patients are given a supplementary nerve block.
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Anaesthetised by Consultant Anaesthetist
Spinal should be considered for all patients
Spinal should be administered using hyperbaric bupivacaine with patient positioned bad side down
Co-administered intrathecal use of opioids restricted
If sedation is required this should be propofol or midazolam
Supplemental oxygen should always be provided
Inhalational induction should be at least considered
Spontaneous ventilation preferred over IPPV
Consider Intraoperative nerve blocks for all
Neuraxial block and GA should NOT be combined
Hypotension should be avoided
Patients should be routinely assessed for Bone Cement Implant Syndrome (BCIS)
NOTTINGHAM HIP FRACTURE SCORE CALCULATOR
v1.3 (2012)

Nottingham Hip Fracture Score Calculator
Risk of 30-day Mortality v1:2012

- Age:
  - < 66 years
  - 66-85 years
  - >= 86 years

- Gender:
  - Male
  - Female

- Admission Hb:
  - <= 10g/dl
  - > 10g/dl

- Admission AMTS:
  - <= 6/10
  - > 6/10

- Number of co-morbidities:
  - < 2
  - >= 2

- Living in an Institution?
  - Yes
  - No

- Malignancy?
  - Yes
  - No

Risk: 2.70%
Summary

- There should be protocol driven, fast track admission of patients with hip fractures through the emergency department.
- Patients with hip fractures require multidisciplinary care, led by orthogeriatricians.
- Surgery is the best analgesic for hip fractures.
- Surgical repair of hip fractures should occur within 48 hours of admission.
- Surgery and anaesthesia must be undertaken by appropriately trained surgeons and anaesthetists.
QUESTIONS?