Pre-operative pain management for fractures

BSOA Spring Meeting 2016

Dr Paul Bhalla

FRCA FFPMRCA

Inside Harborview: An elite emergency team fights to mend broken bodies and minds

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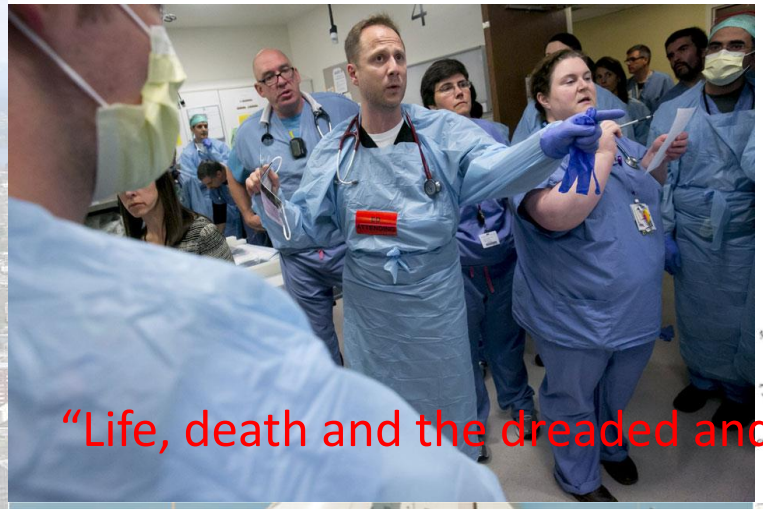
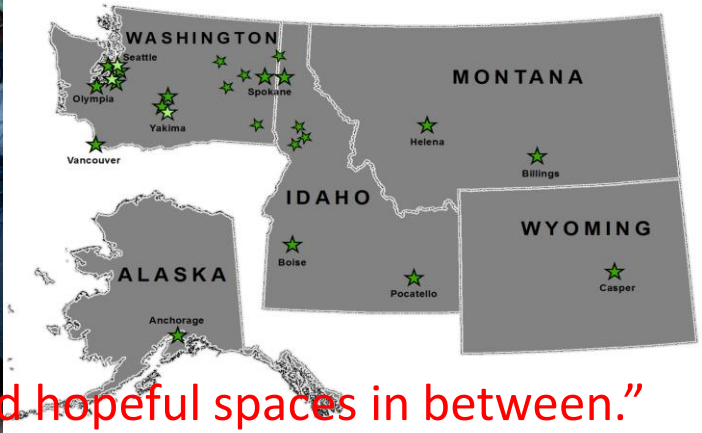
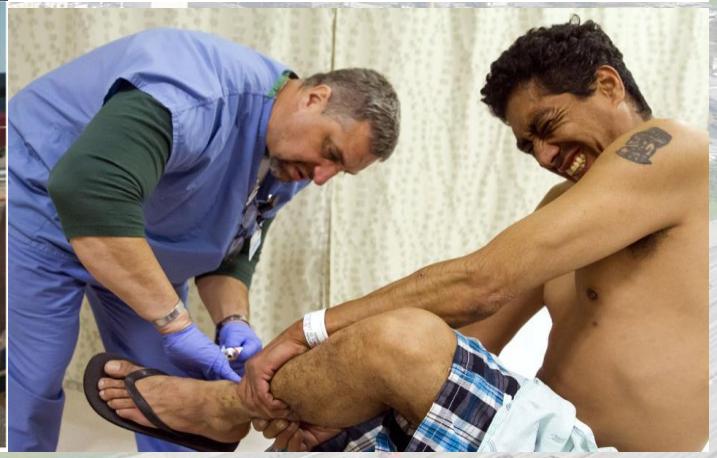




"Life, death and the dreaded and hopeful spaces in between."



The Harborview Pain Relief Service

Mission

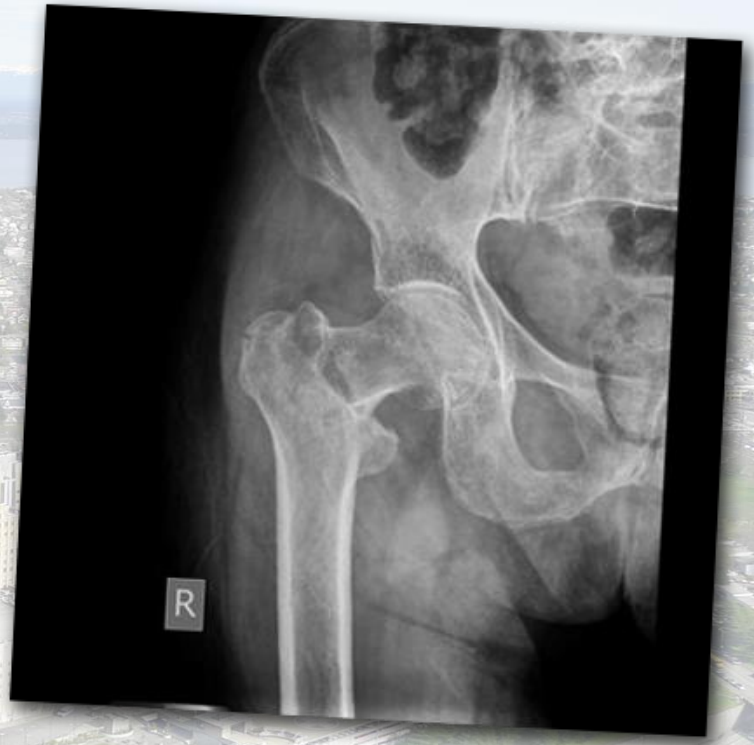
"To provide comprehensive quality inpatient and outpatient pain care that optimizes short and long term functional outcomes, improves self-efficacy and patient experience while minimizing risks."

The team

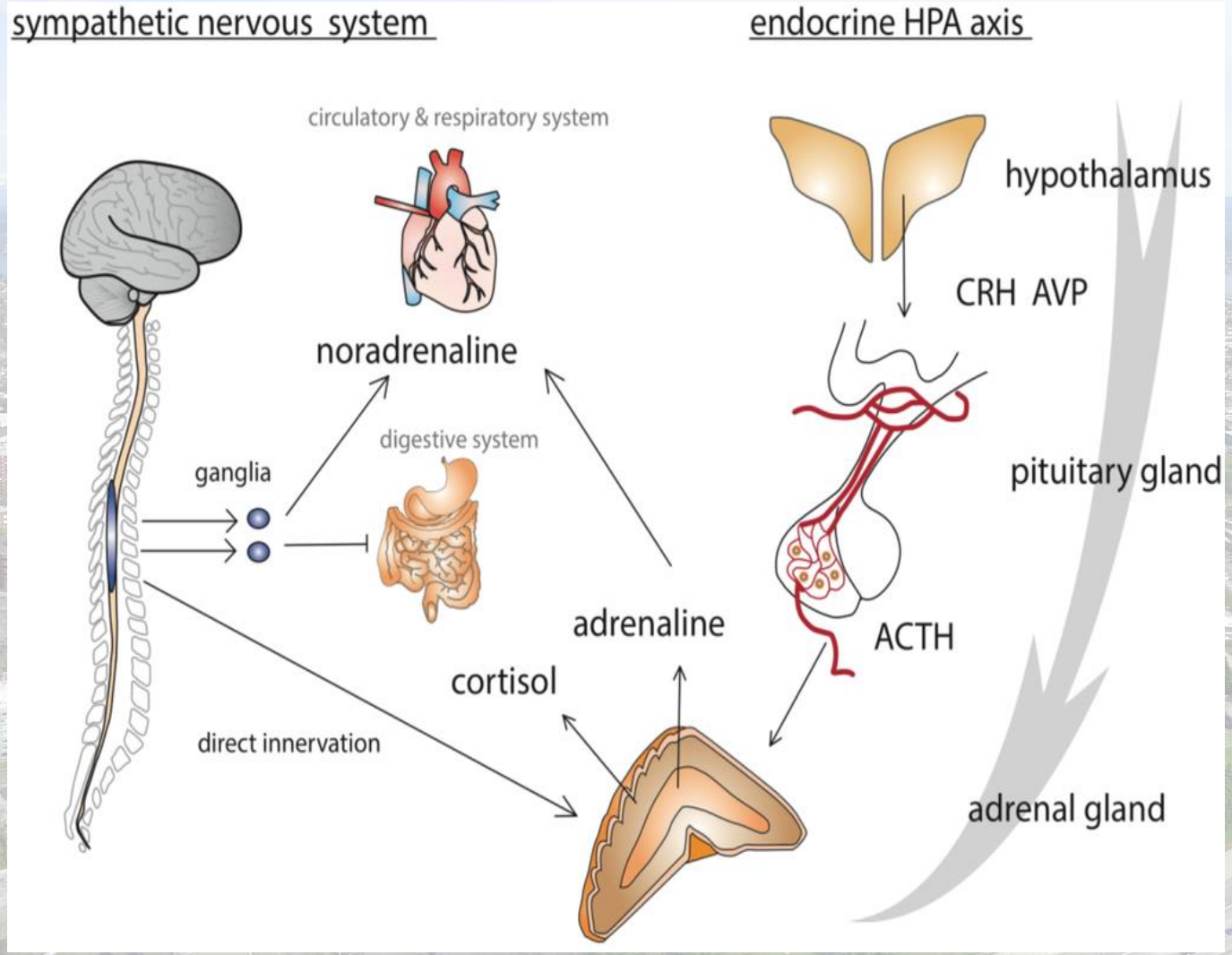
- Two attendings
- Three trainees
- Two nurses
- Rehab psychologist
- Addiction service
- Spiritual Care
- Pharmacist

The trauma epidemic

- Polytrauma
- Hip fracture
  - Incidence 75000
  - 101000 by 2020
  - Cost £2 billion pa.
  - Mortality 8.2% at one month, 33% at one year
  - Early surgery helps



Why is pain so important?



Problems for the future

- Trauma pain impairs physical function. Morrison RS, Magaziner J, McLaughlin MA, et al. The impact of post-operative pain on outcomes following hip fracture. Pain 2003;103(3):303–11.
    - Delayed time to ambulation ($P < 0.01$)
    - Missed or shortened physiotherapy sessions ($P = 0.002$)
    - Longer hospital stays ($P = 0.03$)
    - Reduced mobility at 6 months ($P = 0.02$)
- Leads to high attendance in chronic pain clinics. I.K. Crombie et al. Cut and thrust: antecedent surgery and trauma among patients attending a chronic pain clinic. Pain 76 (1998) 167–171
    - 18.7% clinic attendees had chronic pain secondary to trauma
- Is any of this modifiable??

Physiological changes of acute pain

- Pain is a normal response to injury
- Sensitisation is protective
- Preventive analgesia is the aim

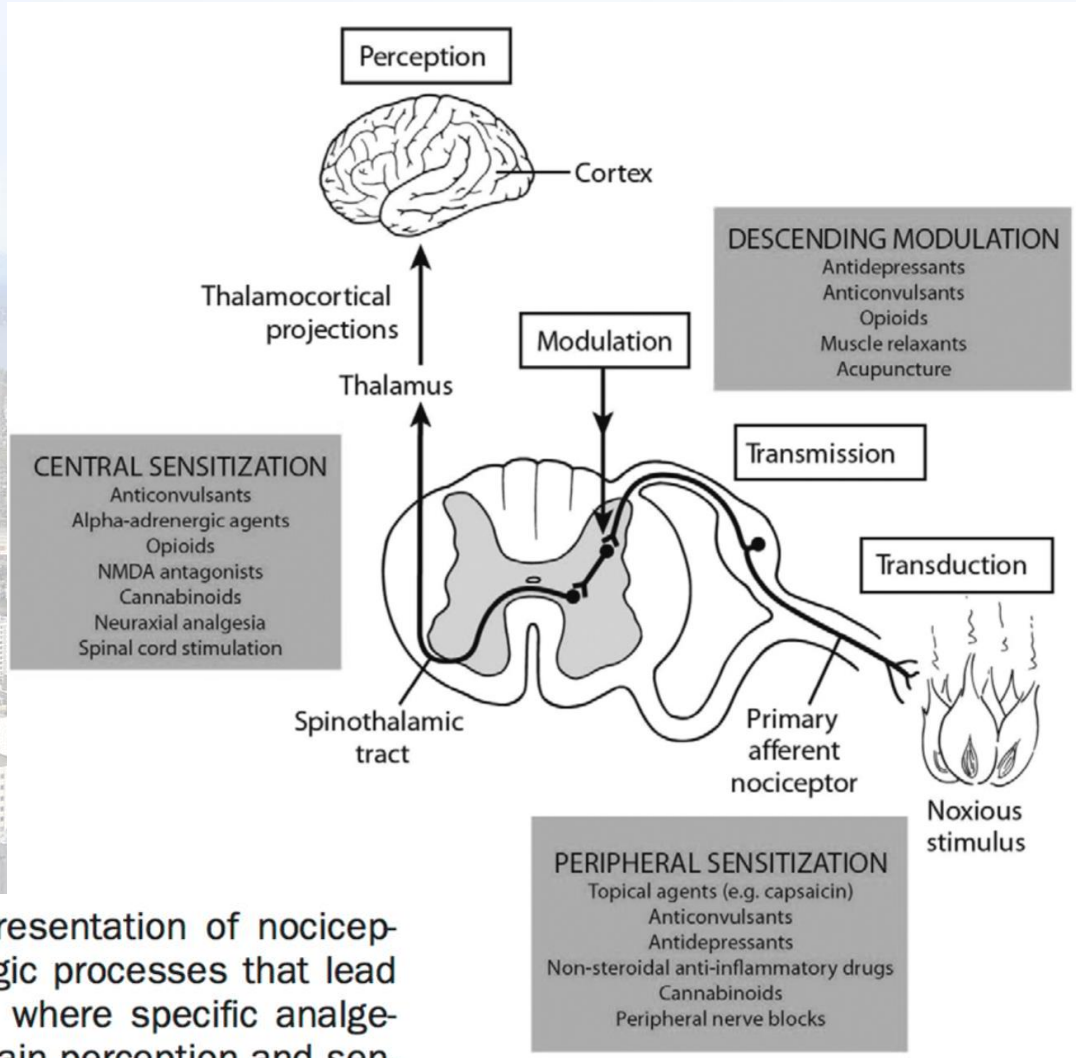
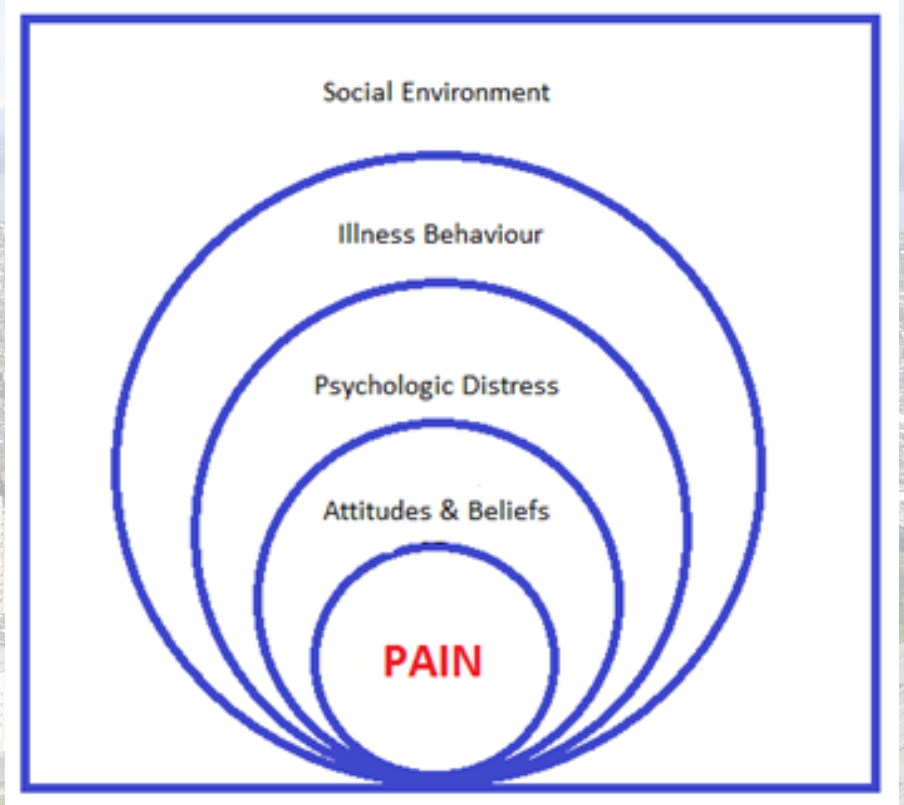


Figure 1. Schematic representation of nociception: the normal physiologic processes that lead to pain perception. Sites where specific analgesics may modify normal pain perception and sensitized neuronal structures are shown.

From: IARS 2013 REVIEW COURSE LECTURES

Why is trauma different to elective?

- High early nociceptive load prior to surgery
  - Like chronic pain?
- Modulation ‘filter’ is already struggling
- High level of psychological stress associated with trauma

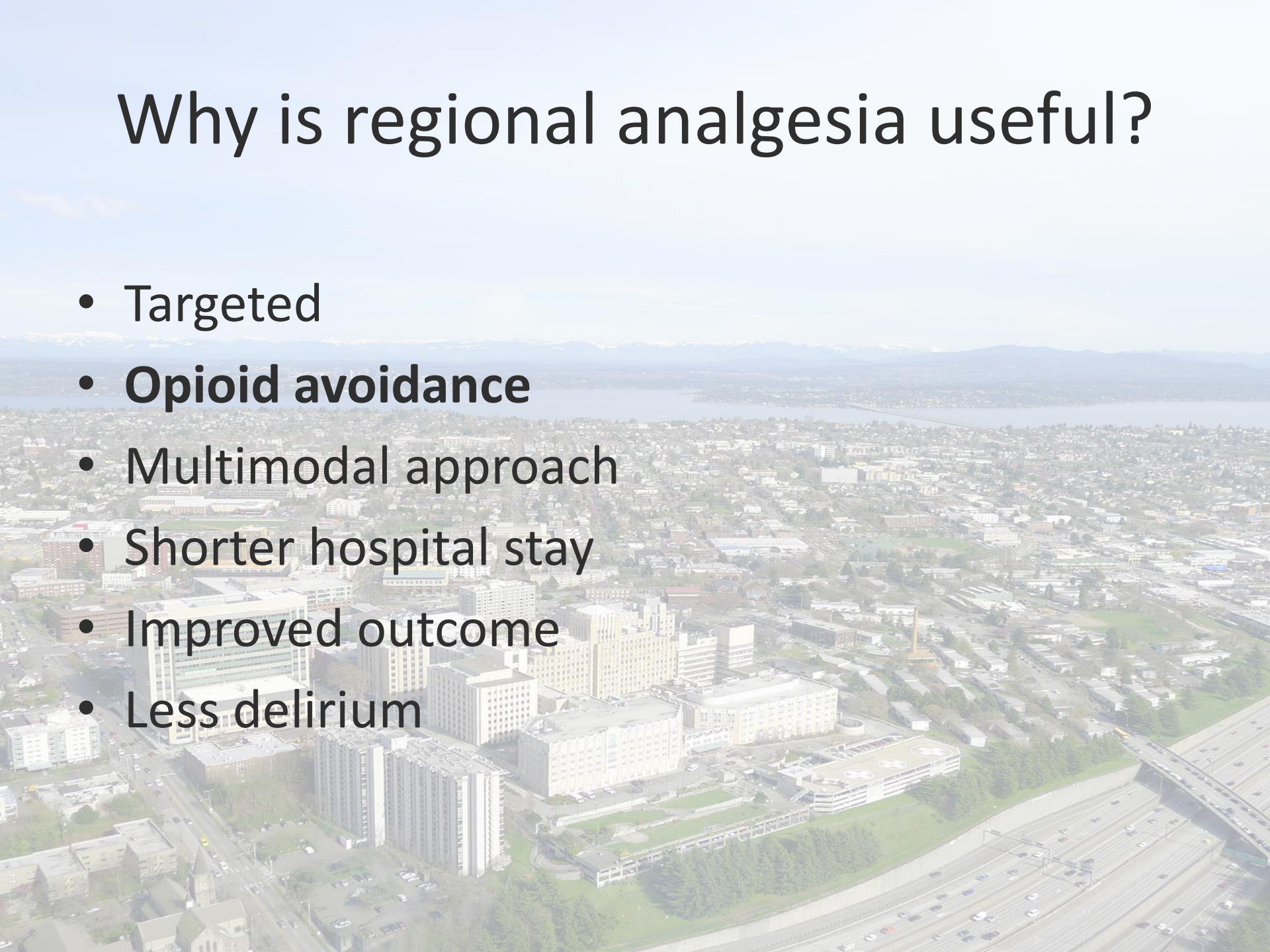


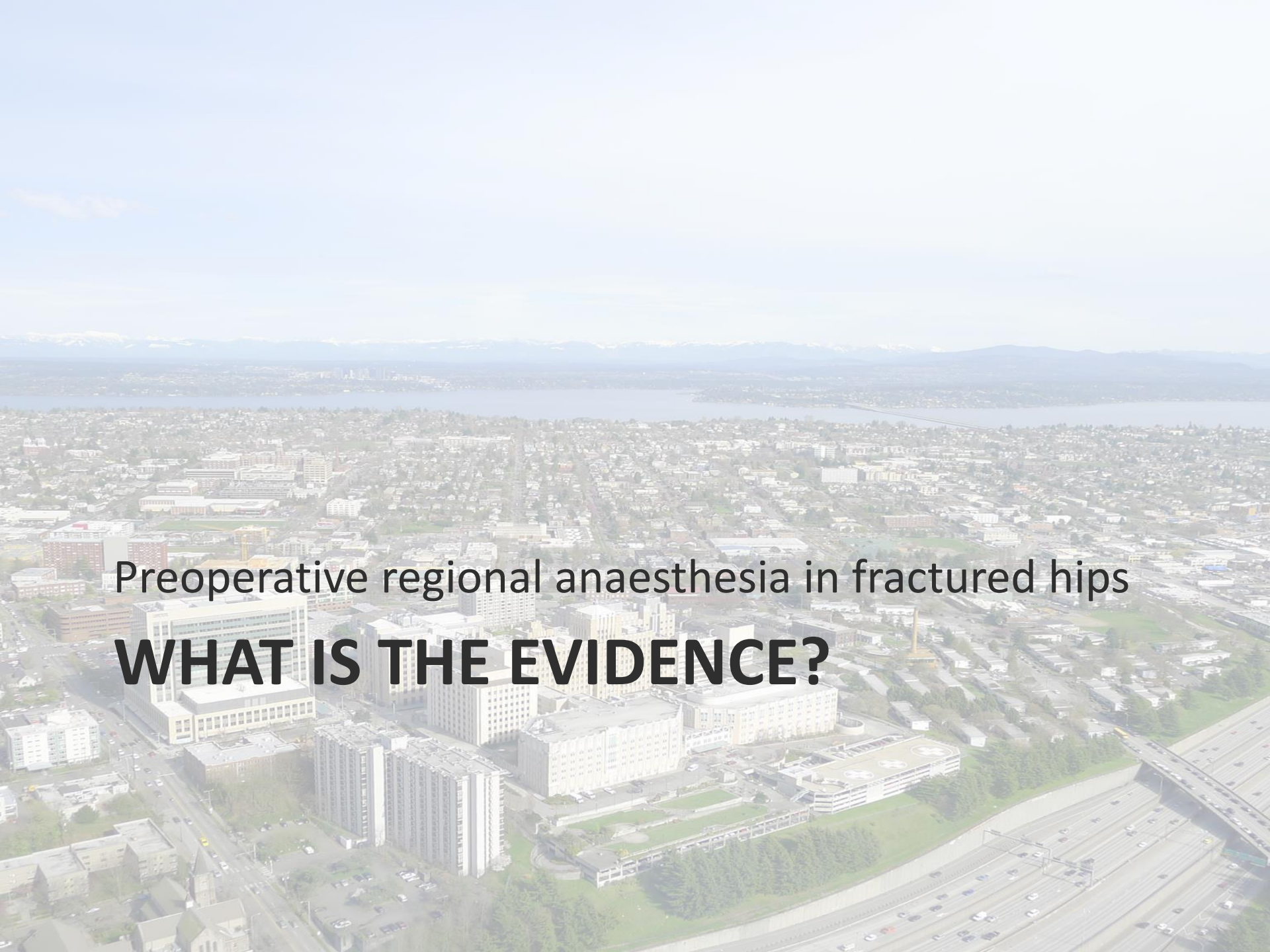
REGIONAL ANALGESIA

PRE-OPERATIVE TREATMENT OF TRAUMA PAIN

Why is regional analgesia useful?

- Targeted
- **Opioid avoidance**
- Multimodal approach
- Shorter hospital stay
- Improved outcome
- Less delirium





Preoperative regional anaesthesia in fractured hips

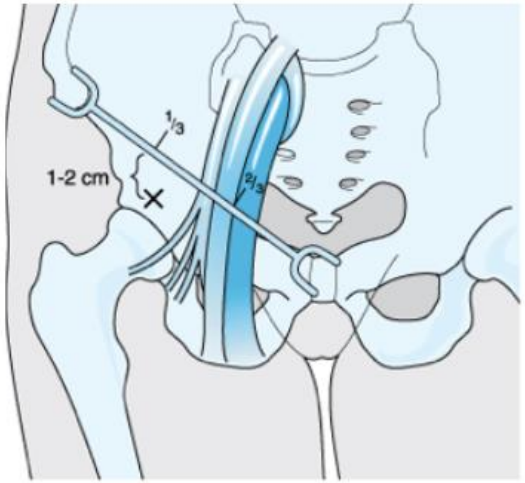
WHAT IS THE EVIDENCE?

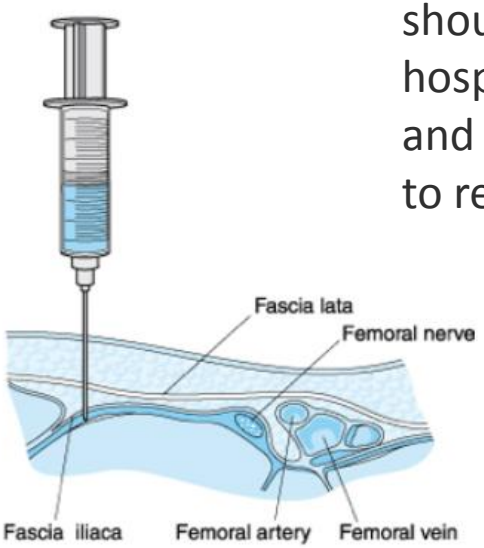
Fascia Iliaca Blocks and Non-Physician Practitioners

AAGBI POSITION STATEMENT 2013

The Association of Anaesthetists of Great Britain & Ireland

RA-UK Regional Anaesthesia United Kingdom





"Ideally, appropriately trained physicians should perform fascia iliaca blocks but, in many circumstances, they are not immediately available to administer the blocks. Other registered health professionals who have received appropriate training and are following agreed clinical governance procedures may perform these blocks. This extended role of non-medically qualified personnel should be closely monitored by the hospital's Department of Anaesthesia, and such practices should be subject to regular audit and review."

Fascia Iliaca block

PAIN AND REGIONAL ANESTHESIA

Anesthesiology 2007; 106:773–8

Fascia Iliaca Compartment Blockade for Acute Pain Control in Hip Fracture Patients

A Randomized, Placebo-controlled Trial

Nicolai B. Foss, M.D., Billy B. Kristensen, M.D.,† Morten Bundgaard, M.D.,‡ Mikkel Bak, M.D.,‡ Christian Heiring, M.D.,‡ Christina Virkelyst, M.D.,‡ Sine Hougaard, M.D.,‡ Henrik Kehlet, M.D., Ph.D.§*

Int J Emerg Med (2010) 3:321–325
DOI 10.1007/s12245-010-0234-4

ORIGINAL RESEARCH ARTICLE

Pain treatment in post-traumatic hip fracture in the elderly: regional block vs. systemic non-steroidal analgesics

Daniel Godoy Monzón · Jorge Vazquez · José R. Jauregui · Kenneth V. Iserson

Foss et al. (2007)

- 48 patients, double blinded
- FICB plus IM saline or
- IM morphine 0.1mg.kg plus placebo FICB
- Assessed at 30, 60 and 180 minutes
- Given further IV morphine prn
- FICB showed superior pain relief, less morphine use, lower sedation

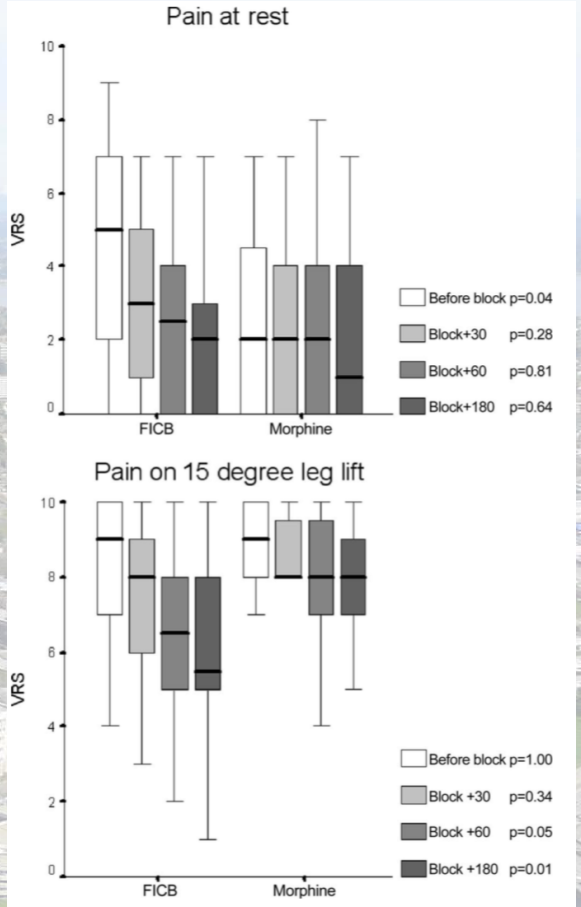
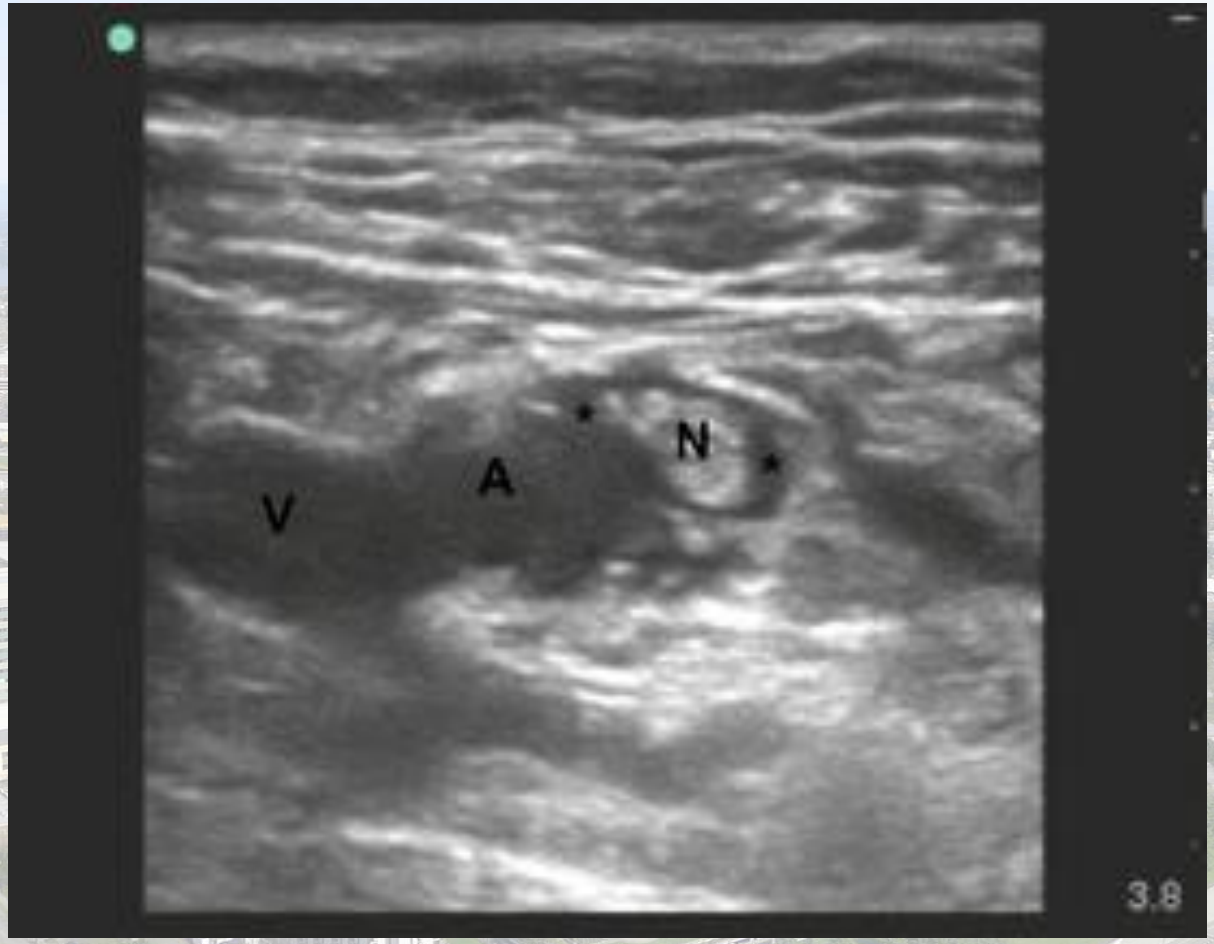


Fig. 1. Pain at rest and on movement in hip fracture patients randomized to fascia iliaca compartment blockade (group FICB) or systemic morphine (group morphine) preblock and at 30, 60, and 180 min after block. VRS = 10-point verbal ranking scale.

Monzon et al. 2010

- 175 patients randomised to:
- Fascia-iliaca block with bupivacaine and parenteral saline injection or
- Placebo block with saline and an IV NSAID injection
- Concluded:
  1. Parenteral NSAIDs are very effective as analgesics after hip fractures in elderly patients,
  2. Fascia-iliaca regional blocks are nearly as effective for up to about 8 h

Femoral Nerve block



Academic Emergency Medicine
Volume 20, Issue 6, pages 584-591, 12 JUN 2013 DOI: 10.1111/acem.12154
http://onlinelibrary.wiley.com/doi/10.1111/acem.12154/full#acem12154-fig-0001

Use of Femoral Nerve Blocks to Manage Hip Fracture Pain among Older Adults in the Emergency Department: A Systematic Review

Madison Riddell*; Maria Ospina, PhD†; Jayna M. Holroyd-Leduc, MD*†‡

From the *Department of Medicine, University of Calgary, Alberta; †Alberta Health Services, Alberta; and ‡Department of Community Health Sciences, University of Calgary, Alberta.

Correspondence to: Dr. Jayna M. Holroyd-Leduc, Foothills Hospital, 11th Floor South Tower Room 1103, 1403-29 Street NW, Calgary, Alberta, T2N 2T9; Email: Jayna.holroyd-leduc@albertahealthservices.ca

 CJEM 2015:1-8 DOI 10.1017/cem.2015.94

Does the use of femoral nerves blocks in the ED (preoperative) reduce acute pain, use of additional pain medications, and rates of delirium, and improve the functional status postoperatively of older adults (older than 65 years of age) with acute hip fracture as compared to placebo or standard care?

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- Single shot and continuous blocks had positive impact on elderly patients presenting to the ED with acute hip fracture.
- decreased pain intensity,
- decrease in the amount of required rescue analgesia administered, and
- fewer adverse events.
- No comment on delirium rates (but other studies have)
- Perceived barriers hindered use.

Regional Nerve Blocks For Hip and Femoral Neck Fractures in the Emergency Department: A Systematic Review

Brandon Ritcey, MD*; Paul Pageau, MD*; Michael Y. Woo, MD*†; Jeffrey J. Perry, MD, MSc*†

From the *Department of Emergency Medicine, University of Ottawa, Ottawa, ON; and †Ottawa Hospital Research Institute, Ottawa, ON.

Correspondence to: Dr. Brandon Ritcey, Department of Emergency Medicine, The Ottawa Hospital - Civic Campus, 1053 Carling Ave., E-Main Room EM-206, Box 227, Ottawa, ON K1Y 4E9; Email: britcey@toh.on.ca

 CJEM 2016;18(1):37-47 DOI 10.1017/cem.2015.75

The largest systematic review of regional nerve blocks for hip and femoral neck fractures targeted to emergency medicine providers

- Lower pain scores
- Reduced morphine consumption
- regional nerve blocks are likely at least as effective and possibly superior

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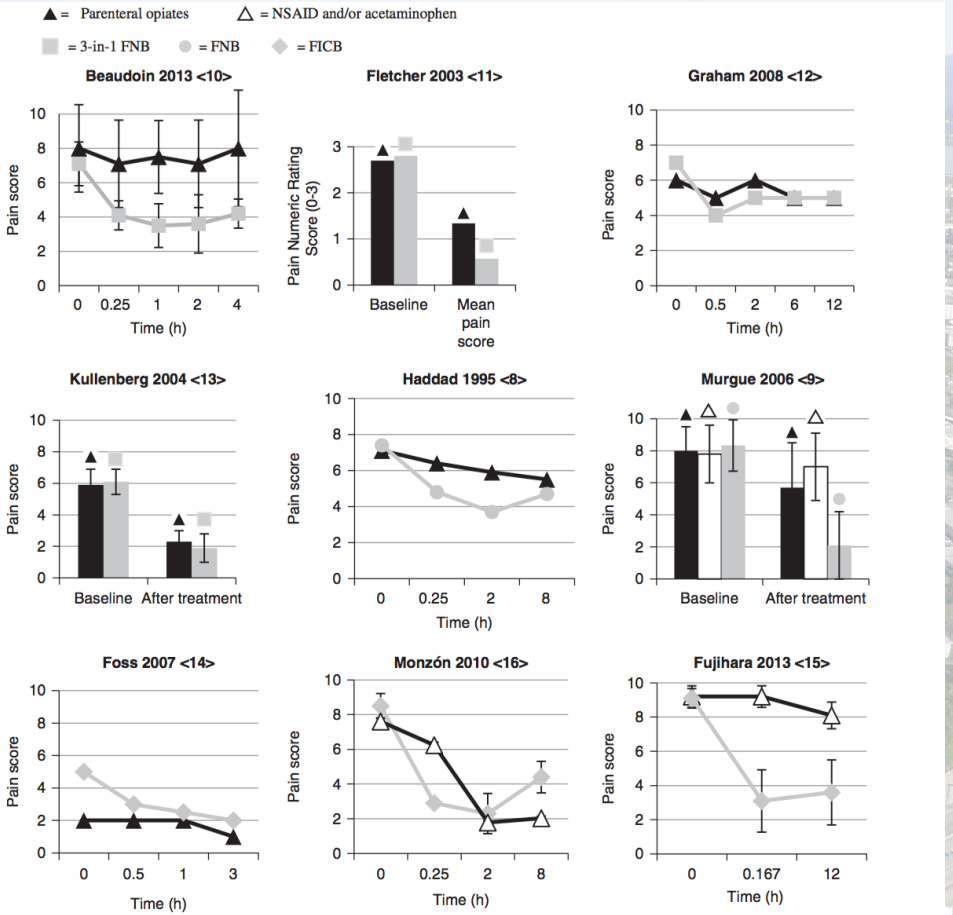
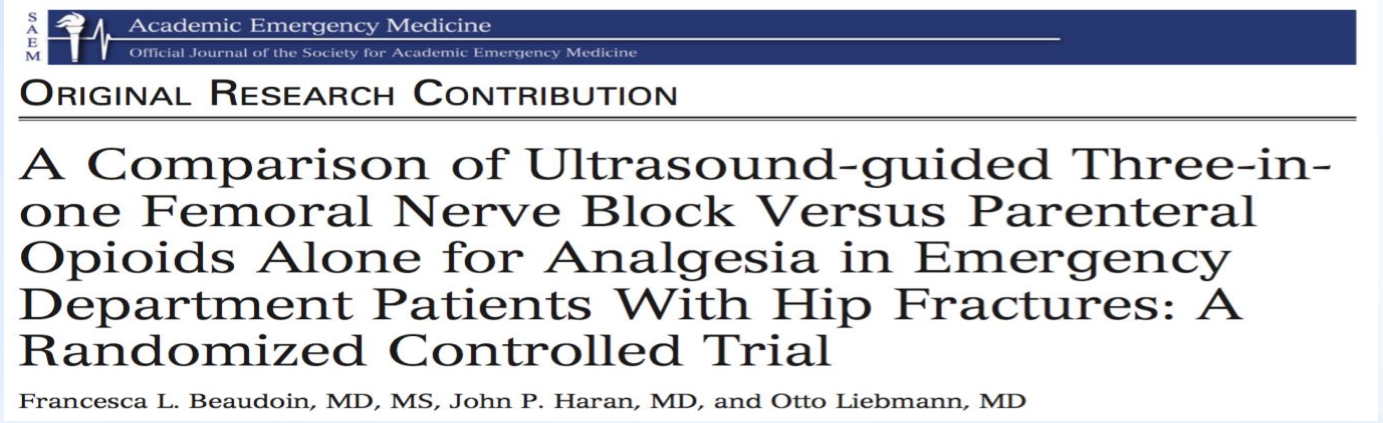


Figure 3. Pain score reduction over time in all studies. Error bars represent standard deviations where information was available.



- High quality double blind RCT
- US guided FNB v parenteral opioid
- Thirty-six patients (18 in each arm) completed the study
- NRS scores at 4 hours were significantly lower in the FNB group ($p < 0.001$).
- No patient in the standard care SC) group achieved a clinically significant reduction in pain
- SC group received significantly more IV morphine than those in the FNB group
- Blocks are underused in the ED and standard means of pain control in hip fracture patients are inadequate.

Academic Emergency Medicine
Official Journal of the Society for Academic Emergency Medicine

ORIGINAL RESEARCH CONTRIBUTION

A Comparison of Ultrasound-guided Three-in-one Femoral Nerve Block Versus Parenteral Opioids Alone for Analgesia in Emergency Department Patients With Hip Fractures: A Randomized Controlled Trial

Francesca L. Beaudoin, MD, MS, John P. Haran, MD, and Otto Liebmann, MD

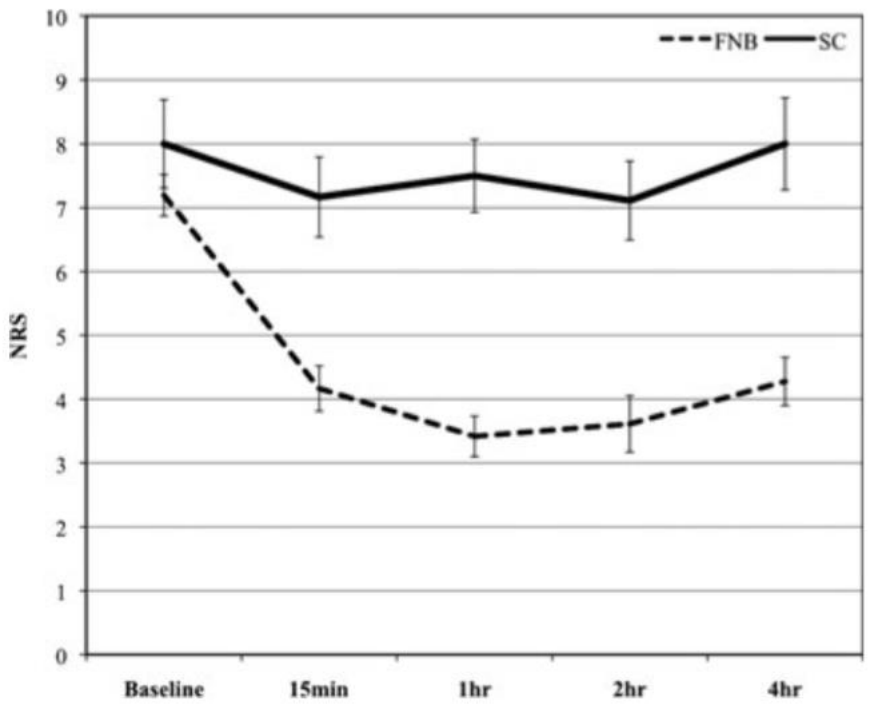


Figure 3. Pain intensity scores (NRS) over time by group: FNB and SC. Data are represented as mean ± standard error. FNB = femoral nerve block; NRS = numerical rating scale; SC = standard care.

Complications of Regional Analgesia

- Compartment syndrome
- Technical complexity
- Nerve Injuries
- Coagulopathy and Anticoagulation
- LA toxicity
- Infection
- **FAILURE**

Compartment syndrome

- What the surgeons care about the most!
- Reliance on pain as a marker is dangerous
- Concern should not prevent the use of RA
  - Catheters ideal with low dose LA
- Current literature is limited to case reports
  - None withstand close scrutiny

"If the risk is sufficiently high then fasciotomies should be performed in anticipation, otherwise close monitoring is the key. However, both surgeon and anaesthetist must agree on the appropriate analgesic technique.

Beard & Wood Pain in complex trauma: lessons from Afghanistan
BJA Education, 15 (4): 207–212 (2015)

Nerve damage

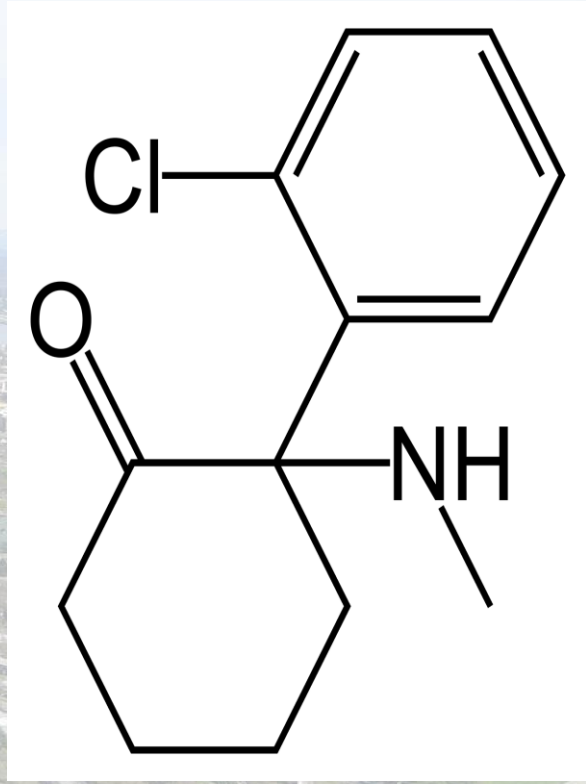
- Mechanisms of nerve injury include trauma, toxicity, ischemia, or, more frequently, a combination of these mechanisms
- Incidence between 0.2 and 2%
- Neural trauma may result from the needle, intraneural injection, compression, or stretch
- Close supervision of inexperienced practitioners
- Need to screen for pre-block nerve injury
- Awake patient may be helpful

Drugs

PRE-OPERATIVE TREATMENT OF TRAUMA PAIN

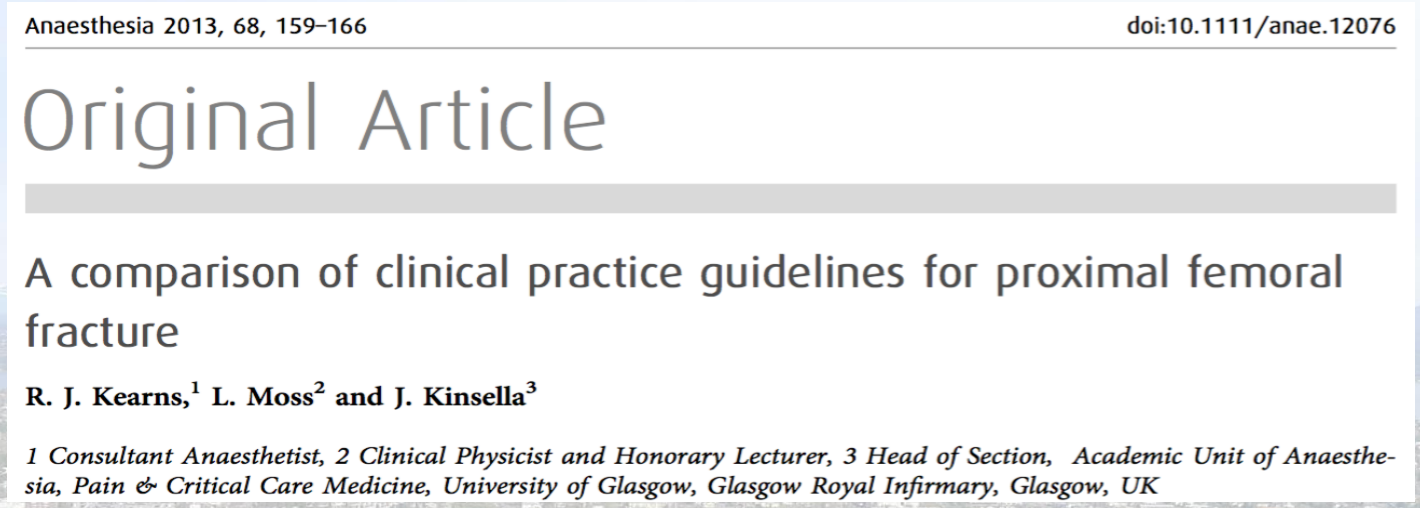
Ketamine

- Potential benefit throughout inflammatory period of injury
- Decreases central hypersensitivity
- Intense analgesia, decreased opioid requirement
- Prevention of opioid induced hyperalgesia
- Increased sense of well being and satisfaction
- Decreased risk of respiratory depression
- Decreased chronic pain



HOW DO WE IMPLEMENT BEST PRACTICE?

Guidelines for Hip fracture



Anaesthesia 2013, 68, 159–166 doi:10.1111/anae.12076

Original Article

A comparison of clinical practice guidelines for proximal femoral fracture

R. J. Kearns,[1] L. Moss[2] and J. Kinsella[3]

1 Consultant Anaesthetist, 2 Clinical Physicist and Honorary Lecturer, 3 Head of Section, Academic Unit of Anaesthesia, Pain & Critical Care Medicine, University of Glasgow, Glasgow Royal Infirmary, Glasgow, UK

Identified five guidelines produced over five years:

- British Orthopaedic Association/British Society of Geriatricians (BOA/BSG 2007)
- Scottish Intercollegiate Guideline Network (SIGN 2009
- National Institute for Health and Clinical Excellence (NICE 2011
- Association of Anaesthetists of Great Britain and Ireland (AAGBI 2011
- British Orthopaedic Association (Standards for Trauma; BOAST 2012

Anaesthesia 2013, 68, 159–166 doi:10.1111/anae.12076

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Guidance on analgesia:

- SIGN 2009 and AAGBI 2011 advised early analgesia in the pre-hospital setting while the remaining guidelines focused on management in the emergency department.
- Agreed on regular oral paracetamol, the avoidance NSAIDs, and regular assessment of pain at rest and movement
- SIGN 2009 and AAGBI 2011 advised the careful titration of intravenous morphine
- BOA/BSG 2007 specified PO or IM in preference IV

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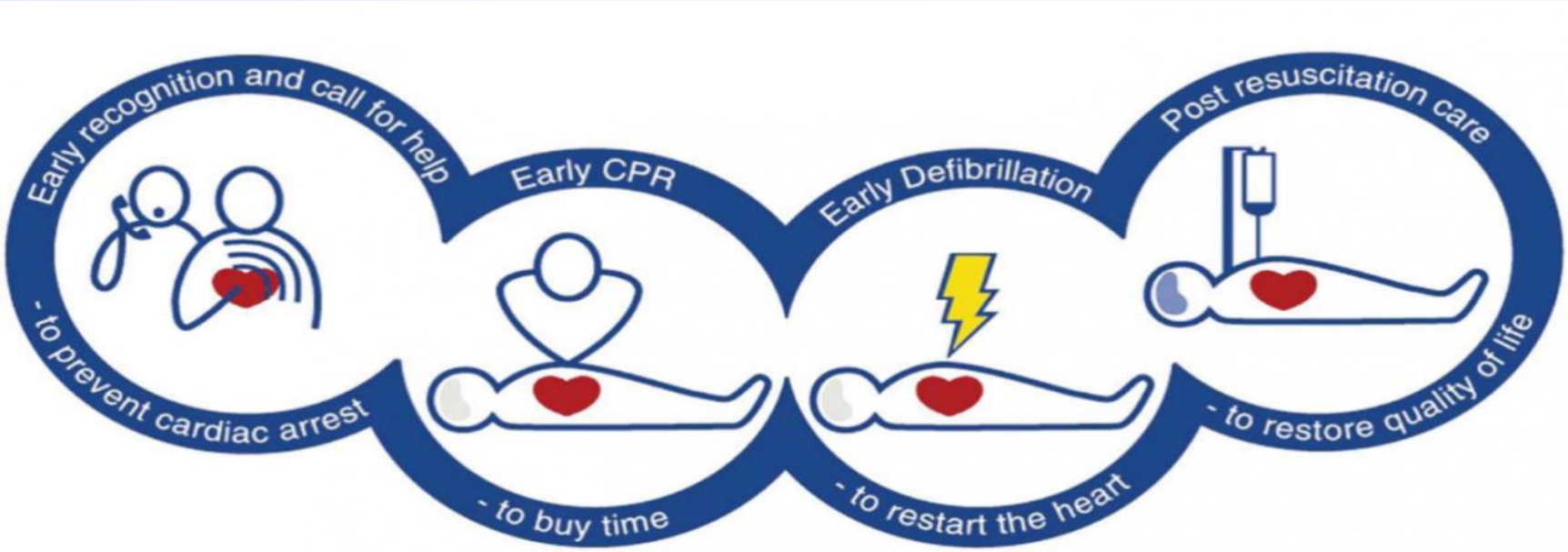
Guidance on regional:

- Peri-op nerve block discussed in SIGN 2009, NICE 2011 and AAGBI 2011.
- All three concluded that peripheral nerve blockade should be considered as an adjunct for both pre- and postoperative analgesia.
- NICE 2011 guideline specified peripheral nerve block should only be added if analgesia was inadequate after administration of paracetamol and titration of opioid.

Why is it so difficult to get right?

- Not enough clear evidence
- Heterogenous population
- We don't offer all appropriate modalities of treatment
  - Training, experience, cost, belief
- We do not always offer them at the right time
  - i.e. early enough

Chain of care in pain management?



Early Recognition and assessment of pain

Early short acting analgesia and simple regional techniques

Longer acting drugs in the ED, and more advanced regional

Peripheral nerve catheters, Neuropathic agents

Pre-hospital protocols

In pre-hospital need simplicity, safety and effectiveness:

- Paracetamol IV
- Fentanyl boluses (IV or IN)
  - Titration and monitoring
- Ketamine routinely or at least to opioid non-responders
- Landmark technique FICB
- Frequent pain scoring

Emergency department

- Longer acting drugs
  - Morphine
  - Consider NSAIDs
- Regional anaesthesia, preferably via catheter
  - Trained ED physicians
  - Ultrasound guided
- Consideration for starting antineuropathics
  - Gabapentin
  - Ketamine infusion

Implementing change

BMJ Quality Improvement Reports

BMJ Quality Improvement Reports 2016; u210130.w4147 doi: 10.1136/bmjquality.u210130.w4147

Analgesia in hip fractures. Do fascia-iliac blocks make any difference?

Jacqueline Callear, Ku Shah
John Radcliffe Hospital, Oxford

Plan Do Study Act. A masterclass in change

BMJ Quality Improvement Reports

BMJ Quality Improvement Reports 2016; u210130.w4147 doi: 10.1136/bmjquality.u210130.w4147

Analgesia in hip fractures. Do fascia-iliac blocks make any difference?

Jacqueline Callear, Ku Shah
John Radcliffe Hospital, Oxford

- PDSA Cycle 1
  - Retrospective audit to identify baseline
  - 54% of all hip fractures got fascia iliaca block
- PDSA Cycle 2
  - Prospective data collection to prove efficacy
  - less post-operative and total analgesia (p=0.04, p=0.03)
  - lower rates of delirium (p=0.03)
  - shorter inpatient stay (p=0.03)

BMJ Quality Improvement Reports

BMJ Quality Improvement Reports 2016; u210130.w4147 doi: 10.1136/bmjquality.u210130.w4147

Analgesia in hip fractures. Do fascia-iliac blocks make any difference?

Jacqueline Callear, Ku Shah
John Radcliffe Hospital, Oxford

- PDSA Cycle 3
  - Presentation at monthly fragility fracture meeting
  - physiotherapists, occupational therapists, pharmacists, anaesthetists, senior house officers, registrars, consultant surgeons, and ortho-geriatricians
  - Everyone keen to engage
- PDSA Cycle 4
  - Presentation was delivered to the Accident and Emergency team
  - Positive impact emphasised
  - keen for more widespread teaching and education

BMJ Quality Improvement Reports

BMJ Quality Improvement Reports 2016; u210130.w4147 doi: 10.1136/bmjquality.u210130.w4147

Analgesia in hip fractures. Do fascia-iliac blocks make any difference?

Jacqueline Callear, Ku Shah
John Radcliffe Hospital, Oxford

- PDSA Cycle 5
  - informal lecture to trauma and orthopaedic SHOs
  - 100% of orthopaedic juniors were in attendance
  - Admission bundle including analgesia was devised
- PDSA Cycle 6
  - New standardised hip fracture admission pathway
  - 90% of hip fracture patients now receive a single shot fascia-iliac block on admission
  - 90% of patients had regular inpatient prescriptions

BMJ Quality Improvement Reports

BMJ Quality Improvement Reports 2016; u210130.w4147 doi: 10.1136/bmjquality.u210130.w4147

Analgesia in hip fractures. Do fascia-iliac blocks make any difference?

Jacqueline Callear, Ku Shah
John Radcliffe Hospital, Oxford

"All hospitals admitting patients with proximal femur fractures should have a dedicated care pathway. Each pathway should ultimately incorporate regional anaesthesia like the fascia-iliac block."

Conclusion

We cannot single out the pre-operative period for analgesia without following it through to rehabilitation.

Blocks and drugs are good…

Pathways and bundles are essential

There are two rules in life

1. Always leave them wanting more.