Optimal pain management in thoracic trauma

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Rib fractures

- What might we do?
- What do we actually do?
- What should we do?
- Why are we doing it?
Principles

Inadequate pain control => ↓TV + cough
  – Splinting of chest wall
  – Atelectasis
  – Sputum retention
  – Pneumonia
  – Reduction in FRC
  – V/Q mismatch
  – Hypoxaemia
  – Respiratory failure
Mortality/morbidity

- US NTDB 10yrs
  - Overall mortality 10%, morbidity 13%
  - Increases with # number & age

- Flail chest – 5-13%
  - Greater pulmonary morbidity
  - 60% require ventilation

- Haemothorax
  - 81% where >2#

- Pneumonia
  - 11% in < 65yrs
  - 31% in > 65 yrs
  - Overall 6% mortality
Is good pain relief essential?

  — 203 patients with varying injuries – 7% flail, 22% bilateral
  — Epidural 9% (no other regionals)
  — Significant reliance on opioids -89% initially & 66% at 60 d (NSAIDs 25% & 26%)
  — At 60days: 59% chest wall pain, 76% functional disability

  — Same group of patients
  — At 6 months: 22% chest wall pain, 53% functional disability

• Severe acute pain in first 2 weeks predicted chronic pain
Multimodal analgesia

- Paracetamol
- NSAIDs
- Tramadol
- Opioids
- Ketamine
- Adjuvants
  - Gabapentinoids
  - Clonidine
- Regional analgesia
Multimodal analgesia

• Paracetamol
  – 1g QID regularly

• NSAIDs
  – Effective dose
  – Contraindications
  – COX2 inhibitors

• Tramadol
  – Part opioid
  – Titrate
  – Serotonin syndrome
Multimodal analgesia

Opioids

- Route – oral or intravenous
- Preemptive use
- Drug – morphine, oxycodone, fentanyl
  - Same side effect profile
  - Renal impairment – oxycodone or fentanyl
- Formulation
  - Quick release – titrate
  - Slow release – rarely necessary
Multimodal analgesia

- Ketamine
  - Reduce wind up/sensitisation
  - Reduce opioid use

- Adjuvants – rarely relevant in acute phase
  - Gabapentinoids
    - Inconsistent mild analgesia
    - Neuropathic pain
  - Clonidine
    - Epidural
  - Lignocaine patches
    - No effect
Regional anaesthesia – intercostal block

- Very effective
- At least each # rib
- Short-lasting
- Can tunnel catheter across multiple ribs
- Difficult above T7
- Small risk pneumothorax
Regional anaesthesia - epidural

- At level midpoint #s
- Single injection + catheter for prolonged use
- Very effective
- Good for bilateral #s
- Risks:
  - Hypotension
  - Dural puncture
  - SC/nerve injury
  - Urinary retention
  - Sensorimotor block
- Contraindications
Regional anaesthesia - paravertebral

- Single injection + catheter for prolonged use
- Effective for unilateral #
- Few contraindications
- Minimal haemodynamic changes
- No urinary retention
- Small risk pneumothorax
- Small risk epidural spread
- Challenge to thread catheter
Regional anaesthesia - interleural

- Unpredictable & unreliable
- Lose LA if chest drain
- Gravity influenced
- Risk of LA toxicity
- Risk of lung damage
Regional anaesthesia – serratus block

- Suitable when spinal trauma, head injury
- Ultrasound guided
- Reports of catheter use
- Risk of LA toxicity, pneumothorax
- Minimal side effects
- Probably only for anterolateral #
Regional anaesthesia – erector spinae block

- Recently described
- Potentially effective hemithorax block
- For fractures along whole of rib
- Ultrasound guided
- Catheter possible
- Minimal complications
Change the context .......... Change the pain
Auckland experience 2016

- 227 inpatients with rib fractures seen by trauma service – 172 (76%) “uncomplicated”
- 116 seen by APS – 86 (74%) “uncomplicated”

- Male – 65 (76%)
- Female – 21 (24%)
Main mode used by APS vs number of fractures

- Oral (12% total)
- Ketamine + PCA (8% total)
- PCA (79% total)
- Failed paravertebral (100% fail)
- Failed epidural (33% fail)
- Epidural (9% total, 3% alone)
Main analgesic mode vs age
"Your x-ray showed a broken rib, but we fixed it with Photoshop."