Pain management for patients with chest trauma

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Clinical Bottom Line

- Treat life threatening events
- Assess and decide early
  - Less than 3, to go home
- Pharmacology
  - Simple analgesics
  - Opiates
    - Intravenous
    - Oral
- Invasive techniques
  - Intercostal nerve blocks
  - Thoracic epidural
  - Paravertebral nerve block
Back to the beginning

Epidemiology

Hippocrates
- Hemoptysis, pleurisy, empyema

Most commonly seen after MVC

8% trauma admissions

Commonest chest injury

Marker of severity of injury

Increased morbidity and mortality
HAS THIS PAIN MADE YOU TENSE?

NOT REALLY.
Morbidity

- Chest trauma causes pulmonary contusions
  - Ventilation perfusion mismatch
  - Decreased lung compliance
  - Hypoxemia

- Pain causes
  - Decreased coughing
  - Shallow hyperventilation
  - Reduced FRC
  - Sputum retention
The elderly (over 65)

- Mortality 22% vs 10%
- Pneumonia 31% vs 17%
- LOS 15.4 vs 10.7 days
- Ventilators days 4.3 vs 3.1
- Intensive care days 6.1 vs 4.0
- Each additional # rib increased mortality by 19% and pneumonia by 27%
Long term consequences

- Average time off work is 70 days
- Pain at 1 month still averages 3.5/10
- Chronic pain not been assessed
What did we do?

- Strapping the chest wall
- External stabilisation of chest wall
- Early ventilation for all people with flail chest
So what now?

- Early and effective pain control
- Aggressive respiratory therapy
- Avoid fluid overload
- Early mobilisation
Effective pain management

- Enables deep breathing and coughing
- Less than 3 #s
  - oral analgesics, NSAIDS paracetamol, weak opiates
  - intercostal nerve blocks
- More extensive
  - Intravenous opiates, IV protocol or PCA
  - Sedation, respiratory depression, cough suppression
  - Regional techniques shown to be better
Intercostal nerve blocks
Pro’s and con’s

Advantages
- No CNS depression
- Effective for 8-24 hours
- Can put in a catheter

Disadvantages
- Risk of pneumothorax
- Not suitable for posterior rib fractures
- Multiple injections
- Difficult for first seven ribs
Paravertebral nerve block
Pro’s and con’s

**Advantages**
- Simpler, safer, easier than an epidural
- No CNS depression
- Haemodynamically stable
- Normal bladder function
- Normal limb power

**Disadvantages**
- Risk of pneumothorax
- Unpredictable spread
- Few Anaesthetists confident to do it
Thoracic epidural
Thoracic epidural

- Decreased mortality and pulmonary morbidity in the elderly
- Increased FRC, lung compliance, vital capacity and PaO₂
- Shallow breathing becomes near normal
- Shorter ICU and hospital stays
The down side

- Difficult to do with patients in pain
- Hypotension compounding hypovolaemia
- Mask intra-abdominal trauma
- Mask delayed haemothorax
- Coagulopathy made precipitate a haematoma
- Infection, puritis, nausea, urinary retention
- Motor blockade
Other options

- Intrathecal opiates
- Intrapleural block
- TENS machine
Choice of analgesic technique

- Pain relief needs to be individualised
  - Less than 3# ribs oral anagesia +/- ICNB
  - Patients requiring immediate surgery are best managed with intravenous opiates
  - Regional techniques can be added in latter
  - Head injury and spinal trauma are contraindication for epidural analgesia
94% of patients with multiple rib fractures have other injuries
55% require surgery
Haemodynamically stable, pneumothorax/haemothorax drained
Abdominal visceral damage excluded
This all takes time, during which IV opiates are the treatment of choice