Gold Standard Perioperative Analgesia for Severe Chest Trauma – meeting the NHS England Major Trauma Services Quality Indicators

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Introduction

Rib fractures are common with severe blunt thoracic trauma. Multiple fractures are correlated with respiratory morbidity, multi-system injury and mortality.¹ Outcomes from regional anaesthesia are superior to treatment with systemic opioids.²

NHS England has set quality indicators for the management of major chest wall injuries and include early regional analgesia as a key indicator.

Case

A 37-year-old man was admitted to our hospital from a regional trauma unit after sustaining significant thoracic and abdominal injuries during a car accident. CT imaging showed fractures of right posterior ribs from T3-11, and anteriorly T2-7 (Fig. 1), left first rib fracture with brachial plexopathy, haemopneumothorax and a grade 3 liver laceration.

He was transferred to level 2 care but developed respiratory failure and reported increasing pain despite parenteral opiates. Anaesthetic review was requested and a thoracic epidural was inserted immediately. CT images were reviewed and used to measure the distance between skin and epidural space, providing depth guidance. The epidural was placed at T5-6 using a paramedian approach, with loss of resistance at 13.5cm. It was loaded with 20mls 0.25% levobupivacaine and low dose infusion of 10-15mls/hr 0.1% levobupivacaine started. Epidural analgesia reduced pain scores from 'severe' to 'mild', allowed sleep, reduced opiate consumption and avoided intubation.

The following morning he underwent rib fixation surgery under general anaesthesia with fixation of five posterior fractures. He was extubated immediately afterwards.

References

1. Malekpour M, Hashmi A, Dove J et al. Analgesic Choice in Management of Rib Fractures: Paravertebral Block or Epidural Analgesia? Trauma. 2017;124:6.
2. Bulger EM, Edwards T, Klotz P, Jurkovich GJ. Epidural analgesia improves outcome after multiple rib fractures. Surgery. 2004;136:426–430.

Fig. 1- 3D reconstructed CT images of anterior and posterior rib fractures

Discussion

This patient suffered a very significant chest wall injury. Such injuries compromise respiratory mechanics, produce significant parenchymal contusions and cause extreme pain. Our experience suggests this often results in mechanical ventilation and prolonged stay in critical care. We avoided mechanical ventilation, and it's associated morbidity, entirely in this case. Early identification and multidisciplinary input resulted in effective regional anaesthesia and identification for rib fixation

We believe in utilising trauma CT imaging to help aid appropriate placement of epidural.

Epidural analgesia provided perioperative analgesia sufficient to allow extubation following rib fixation and rehabilitation far earlier than would have otherwise been possible.

Key Learning Points

Early intervention with regional anaesthesia for chest trauma:

- can reduce further respiratory deterioration
- reduces pain
- reduces opiate burden and associated side effects
- enables physiotherapy and rehabilitation

Chest trauma requires a co-ordinated multidisciplinary approach involving Intensive Care, Trauma Anaesthesia, Radiology, Trauma Surgery, Physiotherapy and the Acute Pain Team to achieve optimal outcomes.