

Blunt Thoracic injury & the Management of Mutliple Rib Fractures

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Case Presentation

Day 2 ICU: Desaturated despite aggressive

A 65 year old man was brought to the ED by ambulance. He was the restrained front seat passenger in a vehicle travelling at 80kph, struck on the front passenger side by an articulated lorry. The vehicle was forced into a ditch. No rollover occurred. Extrication took 20 minutes.

On arrival he was complaining of left shoulder and chest pain. Initial observations were: HR 92, BP 150/80, RR 16, Oxygen saturation 98% on 15L Oxygen.

Examination of the left chest showed; reduced movement, tenderness, bruising, swelling and crepitus. There was reduced air entry at his left lung base.

He was an ex smoker & was being treated for an intercurrent respiratory tract infection.

He received 10mg IV Morphine for pain relief followed by another 10mg 30minutes later.



physiotherapy and incentive spirometry. A left intercostal drain was placed to treat the left apical pneumothorax. PCA was changed to a remifentanil infusion, oral Diclofenac was added and he was commenced on BiPAP. Pipercillin-Tazobactam was prescribed for antimicrobial cover.



Day 8: Repeat CT Thorax showed complete left lung collapse and a small pleural effusion. A thoracic epidural at T7/8 was inserted for pain control with fentanyl topups as required. His cough strength improved and oxygen requirements reduced

Day 12: Transferred to the general surgical ward. Weaned from BiPAP. He required IV antibiotics and chest physiotherpy for a LRTI.

Investigation:

Up to 50% of rib fractures may be missed on standard CXR. ^[5, 6] CT is more sensitive than CXR in the detection of pulmonary, pleural and bony abnormalities in the patient with chest trauma^[7]

Recent studies show that unless there is clinical evidence of neurological or vascular injury arteriography is unnecessary for fractures of first and second ribs.^[8]

Isolated first rib fracture is rare and relatively benign, with mortality rates approaching 1.5%.

Patients over 45 years old, with 4 or more rib fractures should be hospitalized and monitored for likely pulmonary complications ^[9]



Initial CXR

Initial chest x-ray showed eft sided rib fractures with patchy opacity of the left lower lobe, suggestive of lung contusion.

CT thorax revealed fractures of left ribs 1 to 11 with a small left apical pneumothorax and an undisplaced fracture of the right first rib. There was an extensive left subclavian haematoma but no obvious vascular injury.





Day16: His left intercostal drain was removed. He had persisting left sided chest wall pain which required trigger point injection of the left lower trapezius with good effect.

Day 18: He was discharged home on day 18.

Case Discussion

This case highlights the management of multiple rib fractures, with associated pulmonary contusion and pneumothorax.

Rib fracture due to blunt thoracic trauma is an indicator of the severity of the trauma.

CT Thorax showing bilateral first rib fractures

Management:

A multidisciplinary clinical pathway decreases rib fracture-associated infectious morbidity and mortality in high-risk trauma patients ^[10] Treatment is based on adequate pain relief and maintenance of pulmonary function with input from physiotherapy, occupational therapy, dietician, acute pain and respiratory services.

Historically thoracic epidural was shown to significantly improve outcomes in the patient with multiple rib fractures ^[1, 11].

However recent meta-analysis has shown no significant benefit on mortality, ICU and hospital lengths of stay compared to other analgesic modalities. It may reduce the duration of mechanical ventilation^[11]

NSAIDs are used with caution in the elderly and before other pathology is excluded.

Patient controlled analgesia is suitable in cooperative patients. Infusion of short acting opioids eg. remifentanil may be preferred for refractory pain.

Continuous catheter intercostal nerve blocks and local anaesthetic paravertebral blocks may also be

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ABG showed Type I respiratory failure with a pO₂ of 7.79. He had refractory left sided chest pain and reduced Oxygen saturation to 90%.

He was transferred to ICU and placed on morphine PCA.

Overall mortality rates for multiple ribs fractures (more than 6) is 10% with an increase for every additional rib fracture.^[1, 2] Mortality rates increase when associated with pulmonary complications to 15 - 25%.^[3]

The true danger of rib fracture is the potential for penetrating injury to underlying organs.

Rib fractures in the elderly, especially over 65, have increased potential for morbidity. This is due to underlying pulmonary disease and side effects of opioid analgesia^[4]

used.

Mechanical ventilation is required in approximately 60% of hypoxic patients with multiple rib fractures and associated lung contusion.

CPAP combined with regional anaesthesia can reduce hospital and ICU lengths of stay and mean duration of treatment compared to intubation and mechanical ventilation.^[12]

Positive pressure ventilation provides 'internal stabilization' as well as improving oxygenation and ventilation in pulmonary contusion and has replaced fracture fixation except in selected patients with a flail injury. ^[13]

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