

A Case Report on Blunt Chest Trauma

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Abstract

Blunt chest trauma is a leading cause of death worldwide and may be missed in a poly-trauma patient. Multiple rib fractures, pneumothorax and lung contusions can cause ventilator insufficiency needing mechanical ventilation. Many patients can be managed non-operatively with timely use of intercostal drains, support of ventilation, pain relief and good physiotherapy.

We present a case of 48 years old male patient with multiple chest injuries following a fall who had a remarkable recovery.

Introduction

Blunt chest trauma is a leading cause of morbidity and mortality (1). Immediately life threatening thoracic injuries include, tension pneumothorax, pericardial tamponade, simple pneumothorax, massive haemothorax and flail chest. Rib fractures comprise a major part of blunt chest trauma and each additional rib fracture predisposes to more complications (2,3). Most injuries can be managed non-operatively with the timely use of intercostal drains, oxygenation, pain relief and good physiotherapy.

Case Report

A 48 years old male was brought to the casualty ward following a fall from 15 feet height on to a cement slab. On admission he was conscious and alert and complained of severe back pain and bilateral chest pain. He denied any history of loss of consciousness, ear nose oral bleeding, amnesia or vomiting. No abdominal pain. Airway was patent and bilateral breath sounds were heard equally with normal saturation on room air. There was marked tenderness over bilateral 8-10 ribs in anterior chest wall and respiratory rate was 20/min. There were right anterior chest wall abrasions. Initial findings of circulation were as follows. Pulse rate of 110/min, blood pressure 140/90mmHg and capillary refilling within 2 seconds. Abdomen was soft although mild tenderness over right hypochondriac region. Neurological examination of both lower limbs were normal.

Focused Assessment of Sonography for Trauma (FAST) was negative for free fluid. Chest, thoracolumbar spine and pelvis X-rays were taken. Pelvic X-ray was negative for acute injuries. On chest X-ray there were multiple rib fractures including 5th and 6th on right side and 6th and 7th on left side. No evidence were noted for pneumo/hemothorax. Seventh and eleventh thoracic vertebra compression fractures were also noted.

Vital signs measured in the ward and initial laboratory findings are as follows: Blood pressure: 140/90mmHg; Pulse rate: 110bpm; Respiratory rate: 21/min; Temperature: 98.7oF, pH = 7.31; lactate = 0.5mmol/l; pCO₂ 32mmHg; pO₂ 154mmHg; HCO₃⁻ 16.1mmol/l

Patient was resuscitated with oxygen via face mask, intramuscular opioid analgesics, and strict log rolling and kept under close observation.

Following day patient developed surgical emphysema on right thoracic region, worsening chest pain and difficulty in breathing. Examination revealed resonant percussion note and reduced breath sounds on right side with normal position of trachea. Repeat CXR was positive for right side pneumothorax. Intercostal tube was inserted under local anesthesia and admitted to Intensive Care Unit. Due to poor arterial oxygenation patient was intubated in the ICU.

During further imaging, CT scan of the brain, whole spine, abdomen and thorax were requested. They confirmed the bilateral rib fractures with bilateral basal consolidations, small right side plural effusion, right lung lower lobe contusion, and small right side pneumothorax.

Additionally there was T7 burst fracture and stable T 11 compression fracture and multiple fractured transverse processes of T8/T9. Other regions were normal. Unstable fractures were fixed in order to maintain good ventilation and facilitate early mobilization. He gradually recovered after 4 days in ICU and his rest of the hospital stay was uncomplicated. Patient was discharged on lumbar brace and oral analgesics.

Discussion

Safe triangle is an important land mark in inserting an intercostal tube. Its apex is formed by the axilla and lateral border of Pectoralis major and lateral border of Latissimus dorsi forms the anterior and posterior boundaries respectively. Inferiorly it is guarded by the 5th rib. Sticking to triangle of safety will prevent damage to abdominal organs, intercostal neurovascular bundle and breast tissue in females.

Chest X-ray (CXR) is an important tool in screening and diagnosing thoracic injuries. It is used as a primary initial diagnostic test (11). The sensitivity of CXR is 55.3% and 33% in identifying rib fractures and pneumothorax respectively (11). Pneumothorax on chest radiograph may be difficult to see on a supine image. Mediastinum may appear widened when the patient is supine.

Chest CT is more sensitive than chest x-ray for detection of fractured rib, scapula, sternum, and vertebra. With regard to pneumothorax and pneumomediastinum, CT is extremely accurate in detecting of abnormal accumulation of air density (10).

Rib fractures may compromise ventilation by many mechanisms. Pain from rib fractures can cause respiratory splinting which resulting in basal atelectasis and lower respiratory tract infection (2,3). Multiple consecutive rib fractures (flail chest) create an independent segment, moving paradoxically from the chest wall, potentially causing ventilator insufficiency (8). Patients with associated thoracic spinal fractures will have more respiratory insufficiency due

to more pain. Fragments of fractured ribs can penetrate pleura causing haemothorax or pneumothorax. Patients with multiple rib fractures and surgical emphysema should be closely observed because of possible delayed presentation of pneumothorax (7).

Pain in blunt chest trauma can be severe enough to compromise ventilator function, which can lead to serious complications (4,5,13). Patients should have good pain relief and may be given an incentive spirometer to facilitate respiratory movements. (12). There are several modes of analgesia including non-steroid anti-inflammatory medications, epidural catheters, intravenous opioids, patient controlled analgesia (PCA), intercostal blocks and paravertebral blocks (13) that should be individualized and used.

The majority of traumatic chest injuries can be managed with careful observation or minor surgery such as intercostal tube insertion (6). Only 12% to 15% of them will require thoracotomy (6). In patients with poor arterial oxygenation need mechanical ventilation via endotracheal tube (6). Ventilation in traumatic chest patients need proper balance between adequate ventilation and minimizing barotrauma (6). The goal of ventilation in this condition is low FiO₂, plateau pressure, and using reduced tidal volumes to protect the lungs from harmful effects of ventilation. (6).

The patient presented had multiple rib fractures with pneumothorax. Intercostal tube failed to improve his oxygenation, so mechanical ventilator support was given. Fixing of unstable spinal fractures allowed early mobilization of the patient.

Conclusion

This case concludes the importance of timely insertion of intercostal tube and support of ventilation in chest trauma.

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