Australasian Emergency Nursing Journal (2011) 14, 257—263

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CASE STUDY

Assessment, monitoring and emergency nursing care in blunt chest injury: A case study

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Received 20 December 2010; received in revised form 11 March 2011; accepted 22 May 2011

KEYWORDS
Blunt chest trauma;
Lung injury;
Nursing assessment;
Rib fractures;
Emergency care

Summary The case study highlights several complications that commonly develop in trauma patients who sustain blunt chest injuries with underlying lung injury and discusses essential nursing assessment and care. Rib fractures are one of the most common injuries sustained from blunt chest trauma and frequently co-exist with underlying lung injury. Rib fractures alone are associated with high morbidity and mortality. The addition of underlying lung injury such as lung contusions increases the incidence of adverse outcomes. Emergency nursing care must involve thorough assessment and timely intervention with a particular focus on maximising respiratory function and reducing pain. This can be achieved by appropriate oxygen therapy, early chest physiotherapy and adequate analgesic strategies.

A 58-year-old female, unrestrained front seat passenger was hit at high speed by another vehicle on the front passenger side at 0930 h. There was major deformity to the vehicle. No airbags were deployed. She was trapped by confinement for 20 min and extricated by Advanced Life Support Paramedics who applied a cervical hard collar. At the scene her heart rate (HR) was 134 bpm, blood pressure (BP) 140/76 mmHg, Glasgow Coma Score (GCS) 15 and oxygen saturations (SaO_2) were 100% on high flow oxygen via a non-rebreather (NRB) mask. A 22 gauge intravenous (IV) cannula was inserted in the patient's right hand. 10 mg IV metoclopramide and 10 mg IV morphine were administered prior to being transferred to the regional trauma centre. The patient arrived at 1000 h.

On arrival to the Emergency Department (ED) the patient was given a Triage Category 2, a trauma call was activated and the patient was transferred directly to the resuscitation room. A primary and secondary survey was conducted. Airway was patent and spinal immobilisation was maintained. The patient's respiratory rate was 40 and SaO_2 89% on room air, increasing to 100% on oxygen via NRB mask. Air entry was decreased in the right lung base and crackles were heard

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1574-6267/$ — see front matter
doi:10.1016/j.aenj.2011.05.005

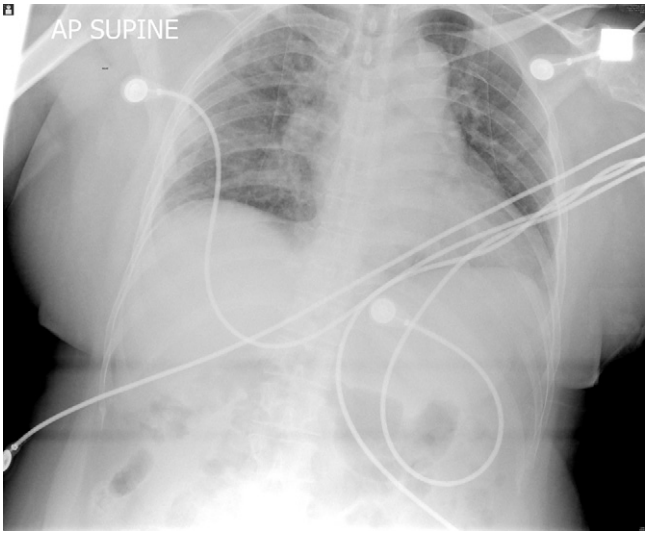

Figure 1 Initial CXR demonstrating right sided rib fractures and lung contusion.

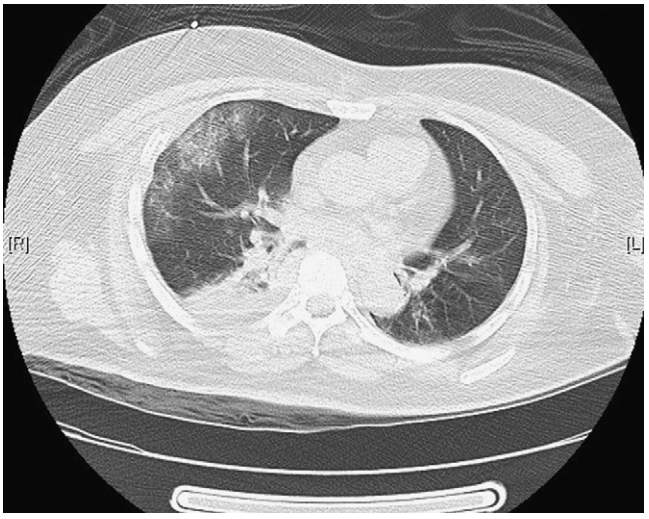

Figure 2 Initial chest CT demonstrating right sided haemothorax and lung contusion.

across the right lung fields. The HR was 138 bpm and BP 137/72 mmHg. She had a GCS of 15 and pupils were equal and reactive. Temperature was measured 36.2 °C and warm blankets were applied. The patient was exposed and a log roll was performed. Bruising and tenderness was present across the right anterior chest wall. A laceration to the chin, pain to the right jaw and deformity to the right knee was also identified. No significant medical history was reported.

A second 18 gauge IV cannula was inserted in the left cubital fossa and baseline bloods were collected (Venous Blood Gas; Full Blood Count; Urea, Creatinine and Electrolytes; Liver Function Tests; Troponin I; and Group, Screen and Hold). An electrocardiograph (ECG) reported the patient was in sinus tachycardia. Continuous cardiac monitoring and pulse oximetry were commenced. Further increments of IV morphine were administered to reduce pain levels. One litre of Hartmann's solution was administered over 1 h to treat the tachycardia, potentially caused by hypovolaemia. A Focused Assessment with Sonography for Trauma (FAST) was attended by an accredited ED staff specialist. FAST is a bedside ultrasound used to identify the presence of blood in the peritoneal cavity as a result of trauma. No intra thoracic, abdominal or pericardial fluid was seen.

A mobile X-ray of the chest (CXR) (Fig. 1) and right knee were attended. Multiple right rib fractures and a right tibia plateau fracture were reported. Given the high index of suspicion for multiple injuries, the patient was transferred for a computed tomography (CT) pan scan which includes the head, neck, chest, abdomen and pelvis. The scan reported a fractured right mandible, right rib fractures 3—5, a right upper lobe lung contusion and small right haemothorax (Fig. 2).

While still in ED 90 min after presentation, the patient's HR remained elevated at 130 bpm. The systolic BP dropped to 75 mmHg and GCS to 9. To maintain airway patency the patient was intubated with an endotracheal tube using rapid sequence intubation. An orogastric tube was inserted and Synchronised Intermittent Mandatory Ventilation (SIMV) with pressure support (PS) was commenced. A repeat haemoglobin was found to be 70 d/L and the patient's BP was stabilised with 4 units of packed red blood cells infused via a fluid warmer. A repeat FAST was not attended as there was no accredited staff available at this time. Once the patients BP stabilised a chest CT was repeated 3 h after presentation to identify the cause of the patient's deterioration and reported worsening lung contusions (Fig. 3).

The facial laceration was sutured and a back slab was applied to the right leg. The mandible fracture was managed non-operatively and the patient was admitted to the Intensive Care Unit (ICU) for ongoing management and Pressure Controlled Ventilation (PCV). Her progress CXR demonstrated significant progression of lung contusion (Fig. 4).

On day 2 the patient developed thick purulent sputum, fevers and increased oxygen demands. A repeat CXR identified bilateral lower lobe pneumonia. Positive end-expiratory pressure (PEEP) and PS were increased, chest physiotherapy was conducted twice daily and IV antibiotics were administered. Respiratory function gradually improved and on day

Figure 3 Repeat chest CT at 3 h post injury demonstrating worsening lung contusions.