

1. Introduction

- In pre-hospital care, the most common problem associated with severe thoracic injuries is hypoxia, either from impaired ventilation or secondary to hypovolaemia from massive bleeding into the chest (haemothorax) or major vessel disruption (e.g. ruptured thoracic aorta).

2. Incidence

- Severe thoracic injuries are one of the most common causes of death from trauma accounting for approximately 25% of such deaths.

3. Severity and Outcome

- Despite the very high percentage of serious thoracic injuries, the vast majority of them can be managed in hospital with chest drainage and resuscitation and only 10–15% require surgical intervention.

4. Pathophysiology

- The mechanism of injury is an important guide to the likelihood of significant thoracic injuries. Injuries to the chest wall usually arise from direct contact, for example, intrusion of wreckage in a road traffic collision or blunt trauma arising from direct blow. Seat belt injuries fall into this category and may cause fractures of sternum, ribs and clavicle.
- If the force is sufficient, the deformity and the damage to the chest wall structures may induce tearing and contusion to the underlying lung and other structures. This may produce a combination of severe pain on breathing (pleuritic pain) and a damaged lung, both of which will significantly reduce the ability to ventilate adequately. This combination is a common cause of **hypoxia**.
- Blunt trauma to the sternum may cause myocardial contusion which may result in cardiac rhythm disturbances (ECG rhythm disturbances).
- Penetrating trauma may well damage the heart, the lungs and great vessels both in isolation or combination. It must be remembered that **penetrating wounds to the upper abdomen and neck may well have caused injuries within the chest remote from the entry wound**. Conversely, penetrating wounds to the chest may well involve the liver, kidneys and spleen.
- The lung may be damaged with bleeding causing a haemothorax or an air-leak causing a pneumothorax. Penetrating or occasionally a blunt injury may result in cardiac injuries. Blood can leak into the non-elastic surrounding pericardial sac and build up pressure to an extent that the heart is incapable of refilling to pump blood into circulation. This is known as **cardiac tamponade** and can be fatal if not rapidly relieved at hospital (see additional information in Table 4.19).
- Rapid deceleration injuries may result in shearing forces sufficient to rupture great vessels such as the aorta, caused by compressing the vessels between the sternum and spine.

- The six major thoracic injuries encountered in the pre-hospital setting include:
 - i. a tension pneumothorax,
 - ii. massive haemothorax (following uncontrolled haemorrhage into the chest cavity),
 - iii. open chest wounds,
 - iv. flail chest,
 - v. cardiac tamponade
 - vi. air embolism.

5. Assessment/Management

For the assessment and management of thoracic trauma refer to Tables 4.18 and 4.19.

KEY POINTS

Thoracic Trauma

- **Thoracic injury is commonly associated with hypoxia, either from impaired ventilation or secondary to hypovolaemia from massive bleeding into the chest (haemathorax) or major vessel disruption.**
- **Count respiratory rate and look for asymmetrical chest movement.**
- **Pulse oximetry MUST BE used as this will assist in recognising hypoxia.**
- **The mechanism of injury is an important guide to the likelihood of significant thoracic injury.**
- **Blunt trauma to the sternum may induce myocardial contusion which may result in ECG rhythm disturbances.**
- **ECG monitoring.**
- **Impaling objects should be adequately secured. If the object is pulsating do not completely immobilise, but allow the object to pulsate.**
- **Do not probe or explore penetrating injuries.**