pulmonary contusion:- a common problem in severely injured multitrauma patients
- may result from a direct blow, shearing or lancing at an interface or transmission of a shock wave
- pathophysiologic changes fundamentally involves haemorrhage with surrounding oedema & manifests clinically with hypoxia, hypercarbia & increased work of breathing due to VOC inhaled & decreased pulmonary compliance
- may not appear radiographically on initial presentation but are usually seen by 6 hours post injury & are seen more readily on CT chest in the early stages
- the degree of pulmonary dysfunction usually peaks at 72 hours and generally resolves within 7 days in the absence of necrotising pneumonia
- an admission PP ratio of >250 predicts a poor outcome
- post-traumatic pulmonary pseudocysts are cavitory lesions that occur in 3% of parenchymal lung injuries; they generally cause few symptoms & resolve in 2-4 months

- thoracic trauma is responsible for 20% of all trauma-related deaths & is general have the potential for significant morbidity & mortality
- post-traumatic pulmonary pseudocysts are cavitary lesions that occur in 3% if parenchymal lung injuries; they generally cause few symptoms & resolve in 2-4 months
- bleeding is usually self limiting and a chest tube is the only required treatment
- of the 10% requiring thoracotomy, approximately 20% need a lung resection
- body obstruction, trauma to the larynx, trachea or bronchus may complicate or preclude airway control
- occurs most commonly in motor vehicle accidents but can occur following virtually any trauma to the chest
- initial assessment (i) pneumothorax (ii) haemothorax (iii) pulmonary contusion (iv) flail chest
- Cardiac Rupture:- 80-90% are lethal within minutes
- may result from direct impact force to the heart or pressure transmitted via venous channels, deceleration with lacerations at junctions between fixed & mobile structures (eg atriocaval disruptions); myo(r)cardial contusion with subsequent necrosis and rupture; broken rib or sternal penetrating the heart
- patients who reach the hospital alive typically have a pericardial effusion and may develop pericardial tamponade
- Cardiac rupture involves the valves in approximately 5% of patients
- the most common injured valve is the aortic followed by the mitral, tricuspid & pulmonary, the chordae tendinae or papillary muscles, the atria or ventricles
- Valvular injury:- may result from direct thoracic impact or from an acute increase in intra-abdominal pressure - tears most commonly occur on the left paracing the phrenic nerve (84%)
- hemothorax or hypotension may occur from a cardiac tamponade
- in the eldery Bulger et al found that each additional rib fracture increases mortality by 19% and pneumonia by 27%
- painful deep midrib fractures are associated with injury to the thoracic cage and with increased intrathoracic pressures
- Open pneumothorax:- results from a full thickness chest wall wound
- may be immediately managed by an occlusive dressing secured on three sides, to prevent sucking of more air, but always assess the pneumothorax until definite wound closure and tube thoracostomy can be performed

- Pericardial tamponade is present when the patient becomes hypotensive and the heart sounds distant or muffled
- untreated, it may progress to cardiac tamponade and hypotension
- in the supine position, there may only be a subtle haziness on the affected side
- thoracic trauma commonly causes life-threatening breathing problems including:
- (i) pneumothorax (ii) haemothorax (iii) pulmonary contusion (iv) flail chest
- Thoracic trauma may also cause life-threatening circulation problems including:
- (i) tension pneumothorax (ii) cardiac tamponade (iii) great vessel injury
- Cardiac injuries are common sequelae of thoracic trauma
- cardiac rupture is the most lethal cardiac injury and is generally fatal
- may result from direct impact force to the heart or pressure transmitted via venous channels, deceleration with lacerations at junctions between fixed & mobile structures (eg atriocaval disruptions); myo(r)cardial contusion with subsequent necrosis and rupture; broken rib or sternal penetrating the heart
- Massive haemorrhage:- a massive haemorrhage is usually the result of a major vascular injury & is life threatening.
- may result from direct impact force to the heart or pressure transmitted via venous channels, deceleration with lacerations at junctions between fixed & mobile structures (eg atriocaval disruptions); myo(r)cardial contusion with subsequent necrosis and rupture; broken rib or sternal penetrating the heart
- Medical treatment of the patient with penetrating injuries to great vessels can be inferred from the location of wounds and the chest radiograph
- chest wall injury
- patients with penetrating injuries to extrapericardial thoracic great vessels usually succumb in the field
- approach to surgical treatment of patients with penetrating injuries to great vessels can be inferred from the location of wounds and the chest radiograph
- Penetrating injuries: - patients with penetrating injuries to extrapericardial thoracic great vessels usually succumb in the field
- approach to surgical treatment of patients with penetrating injuries to great vessels can be inferred from the location of wounds and the chest radiograph
- Blunt injuries: - blunt thoracic great vessel injuries require tremendous force because the aortic arch branch arteries are protected by strong musculoskeletal tissues
- the most common site of injury is the aortic isthmus (just distal to the left subclavian at the location of the ligamentum arteriosum) followed by the innominate artery
- injury with intravascular stenting is growing but is still relatively limited
- in the American Association of Trauma multicity study, widening of the mediastinum was present in 8.5% of cases; however, 7% of patients with a torn aorta had a normal chest x-ray
- recent series of blunt thoracic aortic injuries are reported to have a mortality of 15-30% due to delayed recognition, which has a profound impact on outcomes
- management of delayed presentations is difficult and often requires re-expploration and conversion to an open repair
- Blunt thoracic aortic injury: - blunt thoracic aortic injuries are uncommon but should be excluded in the presence of cervical subclavian injuries, mediastinal trauma, or pneumothorax with a persistent leak
- traumatic injury to the aorta may be associated with injury to the brachiocephalic trunk, carotid arteries, and innominate artery
- blunt trauma to the chest wall may result in rapid exsanguination, which may be fatal
- management of delayed presentations is difficult and often requires re-expploration and conversion to an open repair
- Blunt thoracic aortic injury: - blunt thoracic aortic injuries are uncommon but should be excluded in the presence of cervical subclavian injuries, mediastinal trauma, or pneumothorax with a persistent leak
- although CT may reveal some injuries, the preferred diagnostic test is bronchography
- transecting injuries of the bronchial tree may be diagnosed using bronchoscopy
- a positive end-expiratory pressure should be minimised post-operatively where possible
- whereas tracheal and bronchial injuries may be repaired without tracheostomy
- positive end-expiratory pressure should be minimised post-operatively where possible