

Chest Trauma

Trauma is the number one cause of death in children and young adults. Emergency Medical Service professionals are seeing an increase in the number of patients with traumatic injuries to the thoracic region.

There are two types of chest trauma:

- penetrating
- blunt

Penetrating chest trauma is a wound(s) where an object penetrates the chest wall and creates an opening into the chest cavity. These wounds are generally associated with violent crimes but can also be associated with accidents. Injuries from violence include gunshot wounds and stabbings. Accidental injuries can include auto collisions, falls, and industrial accidents.

Blunt chest trauma is a force that is propelled onto the chest wall that does not leave an open wound. Possible causes include motor vehicle collisions, falls, sports injuries, crush injuries, and violence. Blunt chest trauma falls into four categories.

- acceleration
- deceleration
- shearing
- compression

Types of chest trauma:

- Rib fractures: The most common type of chest trauma.
- Flail chest: Occurs when two or more adjacent ribs are fractured at two or more sites, resulting in a free-floating rib segment.
- Hemothorax: Collection of blood in the space between the chest wall and the lung.
- Pneumothorax: Collection of air or gas in the chest causing the lung to collapse.
- Tension Pneumothorax: Complete collapse of the lung that occurs when air enters, but does not leave, the pleural space.
- Open pneumothorax: Collection of air or gas in the chest causing the lung to collapse usually caused by an open injury to the chest.
- Pulmonary contusion: Damage to the lung tissues resulting in hemorrhage and localized edema.
- Subcutaneous emphysema: Can often be seen as the presence of gas within the tissues beneath the skin.
- Other possible injuries could include myocardial contusion, open chest wounds, cardiac tamponade, sternal fractures, and aortic rupture.

Signs and symptoms:

- Rib fractures:
 - Severe pain, tenderness, and muscle spasm over the site of the fracture.
 - Possible bruising around the fracture site.
 - Possible grating sound in the thorax.

- Flail chest:
 - Inspiration – as the chest expands, the detached part of the rib segment will move in a paradoxical manner in that it is pulled inward during inspiration reducing the amount of air that can be taken into the lungs.
 - Expiration – the flail segment will bulge outward impairing the patient’s ability to exhale.

- Hemothorax:
 - Chest pain, shortness of breath, rapid heart rate, anxiety, and restlessness.
 - Decreased or absent breath sound on the on the affected side.

- Pneumothorax:
 - Sudden chest pain, shortness of breath, chest tightness, easy fatigue, and rapid heart rate.
 - Cyanosis caused by lack of oxygen.
 - Anxiety and restlessness.
 - Decreased or absent breath sounds on the affected side.

- Tension pneumothorax:
 - Sudden chest pain, shortness of breath, chest tightness, easy fatigue, and rapid heart rate.
 - Cyanosis caused by lack of oxygen.
 - Low blood pressure.
 - Decreased mental status
 - Distended neck veins.
 - Decreased breath sounds. (Possibly bilateral)
 - Tracheal shift towards unaffected lung.

- Open pneumothorax:
 - Sudden chest pain, shortness of breath, chest tightness, easy fatigue, and rapid heart rate.
 - Cyanosis caused by lack of oxygen.
 - Sucking chest wound.
 - Bubbling of blood and air at the open site.

- Pulmonary contusion:
 - May be mild, moderate, or severe.
 - Tachypnea, tachycardia, pleuritic chest pain, hypoxemia, and blood tinged secretions.
 - Crackles.

- Subcutaneous emphysema:
 - Palpation of the skin produces an unusual crackling sensation. (Rice Crispies)

Management of chest trauma:

- Rib fractures:
 - Control pain and detect and treat any injury.
 - Possible use of sedation to allow for deep breathing and coughing.
 - Possible use of chest binder may also be used to abate pain.

- Flail Chest:
 - Provide ventilatory support.
 - Clear secretions from lungs.
 - Control pain.
 - Splint with bulky dressing over flail segment.
 - Be aware of possible pulmonary contusion.

- Hemothorax:
 - Provide ventilatory support.
 - Rapid transport to hospital.
 - If tension pneumothorax is present, consider pleural decompression.
 - No definitive prehospital treatment.

- Pneumothorax:
 - Provide ventilatory support.
 - Rapid transport to hospital.
 - If tension pneumothorax is present, consider pleural decompression.

- Tension pneumothorax:
 - Provide ventilatory support.
 - Rapid transport to hospital.
 - Consider pleural decompression.

- Open pneumothorax:
 - Provide ventilatory support.
 - Rapid transport to hospital.
 - Cover open wound with a sterile occlusive dressing.
 - If tension pneumothorax develops, lift corner of occlusive dressing, if no relief, consider pleural decompression.

Pulmonary contusion:

- Provide ventilatory support.
 - Maintain airway.
 - Provide adequate oxygenation.
 - Control pain.
 - Difficulty to diagnose prehospitally, but maintain high index of suspicion.
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- Subcutaneous emphysema:
 - Provide ventilatory support.
 - Rapid transport to hospital.
 - No definitive prehospital treatment.

Conclusion:

Because there is a narrow interval of opportunity to diagnose and treat chest injury victims, prompt and aggressive management is imperative. The key to diagnosis is a thorough assessment. Any delays can multiply the chance of death. Identification of all injuries must be a priority. Life threatening injuries must be stabilized immediately and as the patient is stabilized the assessment should continue and include evaluation for complications.

Sources:

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