

Chest Trauma

Introduction :-

The chest contains the two most vital of the life sustaining organs, the heart and the lung. Therefore any trauma to the chest that seriously compromises the function of these organs is a threat to life.

Types of chest trauma

-Blunt trauma: crushing chest wall between two blunt objects

-Penetrating and perforating injuries .penetrating wound. A wound with site of entry perforating wound. Wound which has got an entry and exit.

-Blast injuries. These are injuries of the lung caused by bomb explosion which may create an intense positive pressure wave followed by negative pressure wave transmitted to the lung through an intact chest wall result in alveolar and vascular rupture both of these may lead to:-

1-interstitial hemorrhage 2- intra alveolar hemorrhage 3- lung edema
4-pneumo thorax 5- hemo thorax

Causes of early death

1- Upper air way obstruction

2-open pneumo thorax

3-flail chest

4-tension pneumothorax

5-massive hemothorax

6-cardiac tamponade

Therefore these conditions require urgent intervention

General principles in treatment of chest trauma

- 1- Resuscitation from shock (restoration of blood volume and relief of pain)
- 2- Restoration of normal cardiopulmonary function
 - a:-relief of upper airway obstruction, remove any foreign body from the mouth and put the patient in lateral position and some time we may need to do tracheostomy
 - b:-decompression of pleural cavity, drainage of chest by chest tube
 - c:-relief pericardial tamponade
 - d:-stabilization of chest movement if there is flail chest injuries
- 3-prevention of infection

Components of chest trauma

1-chest wall injuries

A: Open pneumothorax: this will result in sucking wound in chest wall and this allows air to enter the pleural space during inspiration causing collapse of the lung

Treatment:- the aim is to convert open pneumothorax to closed one by suturing the wound or covering it with gauze in place with adhesive plaster after that we insert a chest tube attached to under water seal.

B: Fracture of the ribs:

-simple rib fracture: this will result in pain and local tenderness and some time dyspnea, treated by analgesia and inter costal nerve block and encourage cough

-multiple rib fracture: this may result in tear in the lung lead to hemothorax and pneumothorax.

Stove in chest, when multiple rib fracture produces a segment in chest wall which is permanently indented (depressed)

Flail chest: when the multiple ribs fractures produce flaccid unstable segment exhibiting paradoxical movement in which the flail area is sucked in ward during inspiration and pushed out in expiration. This will result in pain, tenderness, paradoxical movement and pneumo or hemothorax.

Treatment of flail chest

- ١- Establishing and maintaining clear airway (endotracheal tube or tracheostomy)
- ٢- Restoring and maintaining stabilized chest wall by :-
 - External immobilization
 - Traction
 - internal fixation
 - intermittent positive pressure ventilation IPPV
- 3- Drainage of pleural cavity and maintaining expanded lung by chest tube

3- Pleural injury: - my lead to

- pneumothoracic
- hemothoracic
- empyema

pneumothoracic either open or closed and the closed one either be minimal or massive

Minimal pneumothoracic my require no active treatment the air will be absorbed and the lung re expanded fully in few days

Massive pneumothoracic this treated by chest tube occasionally one finds continued leakage of air with failer of lung to remain expanded in this situation thoracotomy may needed.

Tension pneumothoracic

The high intra pleural pressure not only collapses the epsilateral lung and obstructs venous return to the heart but also partially compress contra lateral lung. This life threatening situation and must be diagnosed and treated by tube thoracostomy with out delay.

Hemothoracic:- presence of blood in the pleural cavity and it is more serious situation than pneumothoracic because

- ١- blood lose
- ٢- collapse of the lung
- ٣- shifting of mediastinum
- ٤- compression of other lung
- ٥- later fibrothoracic and empyema

Causes of hemothoracic: injury to heart and great vessels, intercostals vessels and internal mammary vessels injury.

Treatment

- ١- Minimal hemothoracic less than 300 cc need only observation usually absorbed within 10 days
- ٢- Moderate hemothoracic can be treated with thoracocentesis but if pneumothoracic also present chest tube needed
- ٣- Massive hemothoracic treated by restoration of the circulatory volume, chest tube and then thoracotomy

4-Injury to the lung

Usually caused by laceration of the lung this may cause pnego or hemothoracic or both and treated accordingly.

5-Tracheobronchial injury: due to penetrating injury leading to

- ١- Tracheal laceration
- ٢- Rupture of trachea
- ٣- Rupture of bronchus

Manifestations

- ١- Massive air leak lead to pneumothoracic, mediastinal emphysema, and surgical emphysema
- ٢- Hemoptysis

Treatment: with chest tube some time we do thoracotomy and re anastomosis of injured trachea and bronchus.

6-Cardiac injury

Usually caused by penetrating wounds such as stab, bullet, and shell which may result in:-

- ١- Hemorrhage
- ٢- Cardiac tamponade
- ٣- Constrictive pericarditis
- ٤- Ventricular aneurysm

Treatment: anti shock therapy, pericardiocentesis and pericardiotomy for suturing of the wounds.

7-Diaphragmatic injuries: most commonly caused by blunt trauma which burst diaphragm mostly in the left side as the right protected by the liver. This result in hernia and its complication.

Diagnosis: clinical state, chest x-ray, barium study and some time CT-scan

Treatment: by thoracotomy, reduction of herniated organ and closure of diaphragmatic tear.