

Chest trauma essay sample

[Health & Medicine](#), [Nursing](#)



Chest trauma is classified as either blunt or penetrating.

1. Blunt Chest Trauma

I. Definition

a. Blunt chest trauma results from sudden compression or positive pressure inflicted to the chest wall. Motor vehicle crashes (trauma due to steering wheel, seat belt), falls, and bicycle crashes (trauma due to handle bars) are the most common causes of blunt chest trauma. II. Pathophysiology

Injuries to the chest are often life-threatening and result in one or more of the following pathologic mechanisms: * Hypoxemia from disruption of the airway; injury to the lung parenchyma, rib cage, and respiratory musculature; massive hemorrhage; collapsed lungs; and pneumothorax * Hypovolemia from massive fluid loss from the great vessels, cardiac rupture, or hemothorax * Cardiac failure from cardiac tamponade, cardiac contusion, or increase intrathoracic pressure

These mechanisms frequently result in impaired ventilation and perfusion leading to ARF, hypovolemic shock and death. III. Assessment and Diagnostic Findings

Assess the patient immediately to determine the following:

- b. When the injury occurred
- c. Mechanism of injury
- d. Level of responsiveness
- e. Specific injuries
- f. Estimated blood loss
- g. Recent drug or alcohol use

h. Prehospital treatment

Physical examination includes inspection of the airway, thorax, neck veins, and breathing difficulty. Include assessing the rate and depth of breathing for abnormalities, such as stridor, cyanosis, nasal flaring, use of accessory muscles, drooling, and overt trauma to the face, mouth, and neck.

Assess for :

- * Bruising
- * Petichiae
- * Lacerations
- * Burns

The vital signs and skin color are assessed for signs of shock. The thorax is palpated for tenderness and crepitus; the position of trachea is also assessed.

The initial diagnosis include:

- * Chest X-ray
- * CT Scan
- * Complete Blood Count
- * Clotting Studies
- * Type and cross matched
- * Electrolytes
- * Oxygen Saturation
- * Arterial Blood Gas Analysis
- * ECG

A. Sternal and Rib Fracture

Sternal fracture are most common in motor vehicle crashes with a direct blow to the sternum via the steering wheel and are most common in women, patients over age 50, and those using shoulder restraints.

Rib fracture are the most common type of chest trauma, occurring in more than 60% of patients admitted with blunt chest trauma. Most rib fractures are benign and are treated conservatively.

Clinical Manifestation

a. For sternal fracture

- * Anterior chest pain
- * Overlying tenderness
- * Ecchymosis
- * Crepitus
- * Swelling
- * Potential of chest wall deformity

b. For rib fracture

- * Severe pain
- * Point tenderness
- * Muscle spasm over the area of the fracture
- * Aggravated by coughing, deep breathing and movement

Medical Management

Medical management of the patient with a sternal fracture is directed toward

controlling pain, avoiding excessive activity, and treating any associated injuries. Surgical fixation is rarely necessary unless fragments are grossly displaced and pose a potential for further injury. Sedation is used to relieve pain include an intercostals nerve block and ice over the fracture site; a chest binder may decrease pain on movement.

B. Flail Chest

Flail chest is frequently a complication of blunt chest trauma from a steering wheel injury. It usually occurs when three or more adjacent ribs (multiple contiguous ribs) are fractured at two or more sites, resulting in free-floating rib segments. It may also result as a combination fracture of ribs and costal cartilages or sternum. As a result, the chest wall loses stability and there is subsequent respiratory impairment and usually severe respiratory distress.

Pathophysiology

During inspiration, as the chest expands, the detached part of the rib segment (flail segment) moves in a paradoxical manner (pendelluft movement) in that it is pulled inward during inspiration, reducing the amount of air that can be drawn into the lungs. On expiration, because the intrathoracic pressure exceeds atmospheric pressure, the flail segment bulges outward, impairing the patient's ability to exhale. The patient has hypoxemia, and if gas exchange is completely compromised, respiratory acidosis develops as a result of CO₂ retention.

Medical Management

Treatment of flail chest is usually supportive. Management includes providing ventilator support, clearing secretions from the lungs, and

controlling pain. The specific management depends on the degree of the respiratory dysfunction. * Chest X-ray

- * Arterial blood analysis

- * Pulse oximetry

- * Bedside pulmonary function monitoring

- * Pain management such as patient-controlled analgesia, intercostals nerve blocks, epidural analgesia, and intra-pleural administration of opioids to control pain.

If only small segment of the chest is involved, the objectives are to clear the airway through:

- * Positioning

- * Coughing

- * deep breathing

- * suctioning to aid in the expansion of the lungs, and to relieve pain.

For mild or moderate flail chest injury:

- * Monitoring of fluid intake and appropriate replacement to relieve chest pain

- * Pulmonary physiotherapy

For severe flail chest injury:

- * Endotracheal intubation

- * Mechanical ventilation

These are required to provide internal pneumatic stabilization and correct abnormalities of gas exchange.

- * Surgery is sometimes required to quickly stabilize flail segment

2. Penetrating Chest Trauma

Gunshots and Stab wounds

I. Definition

a. Gunshots and stab wounds are the most common types of penetrating chest trauma. They are classified according to their velocity. b. Stab wounds are generally considered of low velocity because the weapon destroys a small area around the wound. Knives and switchblades cause most stab wounds. c. Gunshot wounds to the chest may be classified as of low, medium, or high velocity. The factors that determine the velocity and extent of damage include the distance from which the gun was fired, the caliber of the gun, and construction and size of the bullet.

II. Pathophysiology

A gunshot or stab wound can cause damage at the site of penetration and along its pathway. It may also ricochet off bony structures and damage the chest organs and great vessels. If the diaphragm is involved in either a gunshot wound or a stab wound, injury to the chest cavity must be considered. III. Medical Management and Diagnostic Tests

The objective of immediate management is to restore and maintain cardiopulmonary function.

After an adequate airway is ensured and ventilation is established, the patient is examined for shock and intra-abdominal injuries. The patient is undressed completely so that additional injuries will not be missed.

After the status of the peripheral pulses is assessed, a large-bore intravenous line is inserted. The diagnostic workup includes:

- * Chest x-ray
- * Chemistry profile
- * Arterial blood gas analysis
- * Pulse oximetry
- * ECG
- * Blood typing and crossmatching are done in case blood transfusion is required
- * An indwelling catheter is inserted to monitor urinary output
- * Nasogastric tube is inserted

Shock is treated simultaneously with intravenous fluid solution: crystalloids, colloids, or blood, as indicated by the patient's condition.

NURSING DIAGNOSIS (both blunt and penetrating trauma) / NURSING

INTERVENTIONS * Ineffective airway clearance r/t foreign body in airway.

Position head midline with flexion appropriate for age/ condition to open

airway in at rest or compromised individuals * Risk for aspiration r/t trauma

Note administration with enteral feedings, being aware of potential for regurgitation or misplacement of tube.

Assist with postural drainage to mobilize thickened secretions that may interfere with swallowing * Ineffective breathing pattern

Maximize respiratory effort with good posture and use of accessory muscles.

Assist client to learn breathing exercises: diaphragmatic, abdominal breathing, pursed-lip. * Impaired gas exchange

Elevate head of bed/ position client appropriately, provide airway adjuncts and suctions as indicated to maintain airway.

Provide supplemental oxygen at lowest concentration or as indicated * Acute pain r/t injuring agent

Observe nonverbal cues.

Provide comfort measures (back rub, change of position, use of heat/cold) to provide nonpharmacological pain management. * Fluid and electrolyte imbalance r/t to bleeding

Intravenous fluid infusion as indicated by the physician

Blood transfusion may be administered if indicated

Increase oral fluid intake if possible

Monitor Input and Output

* MONITOR VITAL SIGNS

3. Pneumothorax

I. Definition

a. Pneumothorax occurs when the parietal or visceral pleura is breached and the pleural space is exposed to positive atmospheric pressure. Normally the pressure in the pleural space is negative or subatmospheric compared to atmospheric pressure; this negative pressure is required to maintain lung inflation.

II. Types of pneumothorax

* Simple Pneumothorax – also known as spontaneous pneumothorax occurs when air enters the pleural space through a breach of either the parietal or visceral pleura. Most commonly this occurs when air enters the pleural space through a rupture of the bleb or a bronchopleural fistula. It may be

associated with diffuse interstitial lung disease and severe emphysema. *

Traumatic Pneumothorax – occurs when air escapes through a laceration in the lung itself and enters the pleural space or enters the pleural space through a wound in the chest wall. It can occur with blunt trauma or penetrating trauma. Traumatic pneumothorax resulting from major injury to the chest is often accompanied by hemothorax. Often blood and air are found in the chest cavity. * Tension Pneumothorax – occurs when air is drawn into the pleural space from a lacerated lung or through a small hole in the chest wall. It may be a complication of other types of pneumothorax.

III. Pathophysiology

b. In open pneumothorax, air enters the chest during inspiration and expiration. A slight shift of the affected lung may occur because of a decrease in pressure as air moves out of the chest. c. In tension pneumothorax, air enters but cannot leave the chest. As the pressure increases, the heart and the great vessels are compressed and the mediastinal structures are shifted toward the opposite side of the chest. The trachea is pushed from its normal midline position toward the opposite side of the chest, and the unaffected lung is compressed.

IV. Clinical Manifestations

- * Air hunger
- * Agitation
- * Increasing hypoxemia
- * Central cyanosis
- * Hypotension

- * Tachycardia
- * Profuse diaphoresis

NURSING DIAGNOSIS/ Nursing Interventions

- * Ineffective breathing pattern related to decreased lung expansion (air/fluid accumulation)

Maximize respiratory effort with good posture and use of accessory muscles. Assist client to learn breathing exercises: diaphragmatic, abdominal breathing, pursed-lip. * Risk for decreased cardiac output r/t compression or displacement of cardiac structures

Provide for adequate rest and, positioning client for maximum comfort.

Administer analgesics as appropriate

Monitor Vital signs

- * Acute pain

Observe nonverbal cues.

Provide comfort measures (back rub, change of position, use of heat/cold) to provide nonpharmacological pain management.

Note client's attitude toward pain and use of specific pain medications and history of substance use or abuse.

4. Subcutaneous Emphysema

I. Definition

a. No matter what kind of chest trauma the patient has, when the lung or the air passages are injured, air may enter the tissue planes and pass for some distance under the skin (neck, chest). The tissues give a crackling sensation

when palpated, and the subcutaneous air produces an alarming appearance as the face, neck, body, and scrotum becomes misshapen by subcutaneous air. Fortunately, subcutaneous emphysema is of itself usually is not a serious complication. The subcutaneous air is spontaneously absorbed if the underlying air leak is treated or stops spontaneously. b. In severe cases in which widespread subcutaneous emphysema, a tracheostomy is indicated if airway patency is treated.

II. NURSING DIAGNOSIS/ Nursing Interventions

* Disturbed body image

Listen to client express his/her feelings and fears.

* Ineffective airway clearance

Position head midline with flexion appropriate for age/ condition to open airway in at rest or compromised individuals * Fluid and electrolyte imbalance r/t to bleeding

Intravenous fluid infusion as indicated by the physician

Blood transfusion may be administered if indicated

Increase oral fluid intake if possible

Monitor Input and Output.

REFERENCES:

1. Brunner and Suddarth's Medical-Surgical Nursing 10th Edition, Vol 1 – Smeltzer, S. & Bare, B. 2. (NANDA) Nurse's Pocket Guide: Diagnoses, Prioritized Interventions, and Rationales. Edition 10; Doenges, M; Moorhouse, M. & Murr, A.