

PRACTICE GUIDELINE

Effective Date: 6-18-04

Manual Reference: **Deaconess Trauma Services**

TITLE: PENETRATING CHEST INJURY

PURPOSE: To define guidelines for the management of penetrating injuries to the chest. To define an optimal diagnostic strategy and appropriate treatment plans for suspected injuries.

DEFINITIONS:

1. Penetrating injury to the chest is any penetrating injury to the thorax in an area bounded superiorly by the lower neck and inferiorly by the lower costal margin.
2. Point of Maximum Impulse (PMI) - the point on the chest where the impulse of the left ventricle is felt most strongly, normally in the fifth intercostal space inside the midclavicular line

GUIDELINES:

1. Any penetrating injury to the chest must be assumed to have caused internal organ damage which may involve the:
 - a. Heart
 - b. Lungs
 - c. Tracheobronchial tree
 - d. Esophagus
 - e. Great vessels
 - f. Diaphragm
 - g. Spinal cord
2. In all patients, assess the ABCs and obtain an airway as quickly as possible.
3. If patient has suffered cardiac arrest and has had signs of life (e.g., pulse or EKG present) at any time or is *in extremis* with low blood pressure, proceed directly to left anterior thoracotomy while the patient is being intubated and large bore intravenous lines are being inserted.
4. In the non-arrested patient, determine whether the patient is hemodynamically stable (normal) or unstable (hypotensive or tachycardic) and whether the patient has respiratory distress.
5. If patient is hemodynamically unstable or has respiratory distress consider:
 - a. Tension pneumothorax
 - i. Absent breath sounds on the affected side
 - ii. Tympanic percussion on the affected side
 - iii. Distended neck veins if adequate blood volume available
 - iv. Shift of the trachea and/or the PMI
 - v. Insert ≥ 28 Fr chest tube (consider needle thoracostomy to temporize and convert tension to open pneumothorax).

- b. Massive hemothorax:
 - i. Absent breath sounds on the affected side
 - ii. Dull to percussion on affected side.
 - iii. Stabilize blood pressure with vigorous fluid resuscitation
 - iv. Insert ≥ 28 Fr chest tube
 - v. Take immediately to OR if
 - a) Hemodynamically unstable
 - b) Initial drainage is >1500 ml, or
 - c) Drainage continues at >200 ml/hr for 2-3 hours.
 - vi. Consider massive transfusion protocol
 - c. Cardiac Tamponade:
 - i. Possible projectile trajectory near the heart
 - ii. Distended neck veins
 - iii. Distant heart sounds
 - iv. Cyanosis
 - v. Tension pneumothorax has been treated or ruled out.
 - vi. Perform FAST exam.
 - vii. Perform needle pericardiocentesis or open subxiphoid pericardiocentesis if FAST positive.
 - viii. Go immediately to the OR for thoracotomy or median sternotomy if needle pericardiocentesis or open subxiphoid pericardiocentesis positive for blood.
6. If patient is stable and has little respiratory distress, obtain AP supine chest x-ray (mark the entry and exit sites with radiopaque markers).
7. If x-ray shows:
 - a. Pneumothorax: place ≥ 28 Fr chest tube.
 - b. Hemothorax: resuscitate the blood volume and place ≥ 28 Fr chest tube.
 - c. Consider massive transfusion protocol
8. If the wound is below the nipples, consider abdominal injury.
9. If the injury is in Zone 1 of the neck (clavicle to inferior border of the cricoid), consider angiogram, bronchoscopy and esophagoscopy or exploration.
10. If the injury is between the nipples and between the suprasternal notch and xiphoid consider the possibility of cardiac injury with occult cardiac tamponade:
 - a. Consider central line for monitoring.
 - b. Consider cardiac tamponade.
 - c. Obtain FAST to look for pericardial effusion.

11. If all x-rays are normal and there is no firm indication that the pleural space or mediastinum was penetrated, obtain a repeat chest x-ray.
 - a. If there is a pneumothorax or hemothorax, follow guidelines as above.
 - b. If the film is normal, consider discharge from the ED at the discretion of the trauma surgeon.

REFERENCES:

- ❖ Deaconess Trauma Guideline Manual, PENETRATING INJURIES TO THE ABDOMEN.
- ❖ Deaconess Trauma Guideline Manual, EMERGENT THORACOTOMY.
- ❖ Deaconess Trauma Guideline Manual, PENETRATING NECK INJURY.

REVIEWED DATE	REVISED DATE
JAN 05	JAN 08
JAN 06	MARCH 2014
JAN 07	AUG 16
OCT 11	
AUG 14	
JAN 17	
JAN 18	
JAN 19	