Grady Memorial Hospital
Trauma Service Guidelines

Management of Penetrating Chest Trauma

BACKGROUND

- Penetrating chest trauma comprises a broad spectrum of injuries. Clinical consequences, diagnostic approach, and subsequent management depend on location and trajectory of the injury.
- The “cardiac box” is defined as the area on the chest bordered by the suprasternal notch, the nipples, and the costal margin (1).
- Non-invasive testing for cardiac injury includes two-dimensional echocardiography, which has a sensitivity and specificity of nearly 100% and 89% respectively. The sensitivity is reduced to 56% in the setting of a hemothorax and/or pneumothorax (1, 2).
- Injuries with transmediastinal trajectory warrant investigation of critical mediastinal structures such as the heart, great vessels, trachea, and esophagus.
- Suspected esophageal injury is evaluated with a combination of flexible esophagoscopy and contrast esophagography for increased sensitivity (3, 4).
- Posterior mediastinal structures are accessed via thoracotomy as opposed to median sternotomy.

CLINICAL PRACTICE GUIDELINES

I. Hemothorax/Pneumothorax

a. Clinical or radiographic evidence of hemothorax or pneumothorax warrants immediate tube thoracostomy. Repeat CXR should be obtained after tube thoracostomy to evaluate tube placement and resolution of hemothorax and/or pneumothorax.

b. Hemodynamic instability, initial output of greater than 1500 ml of blood, or subsequent output of greater than 200 ml per hour for 3 hours are indications for thoracotomy.

c. Patients with retained hemothorax despite an appropriately placed chest tube should be considered for operative exploration and drainage (refer to guidelines for retained hemothorax).
II. Injury to the “box”

a. At GMH, pericardiocentesis is not indicated in setting of acute trauma.

b. Patients in extremis warrant left anterolateral thoracotomy in OR or ED.

c. Stable patients are evaluated with CXR and cardiac ultrasound.

   i. Evidence of pericardial fluid warrants median sternotomy/thoracotomy for repair of potential cardiac injury.

   ii. Left hemothorax that fails to clear with tube thoracostomy should raise suspicion for cardiac injury.

   iii. The accuracy of cardiac ultrasound is significantly reduced in the setting of hemothorax or pneumothorax.

   iv. Clinical suspicion of cardiac injury despite negative ultrasound should prompt pericardial window.

d. Pericardial window should be considered in patients requiring surgery for associated injuries.

e. Based on degree of suspicion, injury to nearby mediastinal structures should be evaluated with a combination of CT scan, bronchoscopy, esophagoscopy, and/or contrast esophagography.

III. Transmediastinal injury

a. Initial evaluation starts with CXR and cardiac ultrasound.

b. Patients in extremis warrant immediate operative exploration via thoracotomy and trans-sternal extension if necessary.

c. Stable patients should undergo CT scan of the chest to determine missile trajectory and guide further workup.

   1. CTA has largely replaced aortography for evaluation of aortic injury.

      i. Flexible bronchoscopy is used to evaluate suspected tracheobronchial injury.

      1. Pneumomediastinum or large continuous air leak from a chest tube should raise suspicion for tracheobronchial injury.

      ii. Esophageal injury is evaluated with a combination of flexible esophagoscopy and contrast esophagography using gastrografin followed by thin barium.
REFERENCES


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