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Deaconess REGIONAL TRAUMA CENTER

Blunt Chest Trauma

Purpose: To define protocols for the diagnosis and management of specific chest injuries that are commonly seen after blunt trauma

Definitions: A chest injury is any injury to the thoracic cage and its contents, including the lungs, heart, great vessels, tracheobronchial tree, and the esophagus

Guidelines:

A. Evaluate and treat per ATLS protocol

B. Obtain portable AP chest x-ray after initial stabilization in the trauma bay

C. For severe anterior chest trauma, obtain an EKG

D. Treat injury according to the diagnostic findings
   a. Tension pneumothorax
      i. Treatment
         1. With hemodynamic compromise, needle decompression followed by chest tube
   b. Open pneumothorax
      i. Treatment
         1. Insert chest tube
         2. Consider surgical closure of the defect
   c. Flail chest
      i. Physiology
         1. Defined by a segment of chest wall which moves paradoxically related to remainder of chest wall
      ii. Treatment
         1. Pain control using multimodal analgesia
         2. Consider operative fixation
   d. Massive hemothorax
      i. Treatment
         1. Fluid resuscitation to correct hemorrhagic shock
         2. Place chest tube
         3. In initial drainage > 1500 ml or drainage continues at > 200 ml/hr for more than 2 hours, then consider operative intervention
         4. Signs of shock not corrected by initial resuscitation should undergo emergent thoracotomy for hemorrhage control

e. Cardiac tamponade
    i. Diagnosis
        1. FAST should be performed to assess for pericardial fluid
    ii. Treatment
        1. Pericardiocentesis
        2. Pericardial window
        3. If positive, immediately go to OR for median sternotomy or thoracotomy
f. Cardiac contusion
    i. Physiology
        1. Should be suspected with blunt chest trauma when new arrhythmias and/or non-hemorrhagic shock is noted
    ii. Treatment
        1. With high suspicion, obtain echocardiogram
            a. transthoracic or preferably TEE
        2. Monitor telemetry for 24 hours in the hospital
        3. Treat arrhythmias
        4. Treat any cardiac failure with inotropes
g. Ruptured diaphragm
    i. Treatment
        1. Operative repair through the abdomen
h. Ruptured tracheobronchial tree
    i. Physiology
        1. Usually presents as either pneumothorax and/or pneumomediastinum
            a. Should be suspected if patient continues with large air leak via chest tube, especially if continuous air leak prevents lung re-expansion
    ii. Diagnosis
        1. When suspected, diagnosis should be confirmed via bronchoscopy
    iii. Treatment
        1. Operating room for thoracotomy and operative repair
            a. consider temporary balloon occlusion via ETT to aid in repair
i. Ruptured thoracic aorta
    i. Physiology
        1. Should be considered in mechanisms where severe acceleration or deceleration is present
    ii. Treatment
        1. Avoid hypertension, using beta-blockers with vasodilator if necessary
        2. If shock is present, must find and treat other sources, as ruptured aorta is rarely if ever the source of hemorrhagic shock
        3. Consult Cardiothoracic/Vascular Surgery
        4. hen definitive repair must be delayed, hypertension should be avoided
j. Ruptured esophagus
    i. Physiology
        1. Should be suspected with blunt chest or upper abdomen trauma when pneumomediastinum is present

ii. Treatment
    1. Confirm with esophagoscopy or gastrograffin swallow (preferred)
    2. Thoracotomy for surgical repair or stenting

k. Simple pneumothorax
    i. Treatment
        1. Chest tube should be inserted in patients with traumatic pneumothorax seen on plain chest x-ray
        2. Occult pneumothorax see on CT scan without plain x-ray findings can be treated without chest tube
            a. If patient goes to the operating room, is intubated, or is transferred by air ambulance, then chest tube should be considered
            b. In all cases of occult pneumothorax managed without chest tube, expansion of pneumothorax should be suspected and repeat chest x-ray should be performed within 24 hrs

l. Fractured ribs
    i. Treatment
        1. Pain control using multimodal analgesia
        2. Pulmonary toilet
        3. Drain hemothorax with chest tube
        4. Consider rib fixation

m. Retained hemothorax
    i. Treatment
        1. If suspected on serial chest x-ray after chest tube placed, CT of chest should be performed and video assisted thoracoscopic surgery (VATS) performed to fully evaluate if present

References:

- Emergency Resuscitative Thoracotomy
- Mowery, Nathan T. MD; Gunter, Oliver L. MD; Collier, Bryan R. DO; Diaz, Jose J. Jr. MD; Haut, Elliott MD; Hildreth, Amy MD; Holevar, Michelle MD; Mayberry, John MD; Streib, Erik MD. Practice Management Guidelines for Management of Hemothorax and Occult Pneumothorax. The Journal of Trauma: Injury, Infection, and Critical Care 70(2):p510-518, February 2011. DOI: 10.1097/TA.0b013e31820b5c31
- Clancy K, Velopulos C, Bilaniuk JW, Collier B, Crowley W, Kurek S, Lui F, Nayduch D, Sangosanya A, Tucker B, Haut ED; Eastern Association for the Surgery of Trauma. Screening for blunt cardiac injury: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg. 2012 Nov:73(5 Suppl 4):S301-6. doi: 10.1097/TA.0b013e318270193a. PMID: 23114485