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	Title: Blunt Thoracic/Chest- Shared	Effective Date: 01/10/2022

PURPOSE:

Provide guidelines for managing blunt thoracic injuries including multiple rib fractures with or without displacement.

POLICY STATEMENT:

Many injuries to the thorax resulting from non-penetrating mechanisms will be treated non-operatively using a combination of chest tube decompression and drainage, along with supportive therapies. Noninvasive ventilation is provided when appropriate for management of multiple rib fractures with or without displacement and flail after blunt chest trauma

ENTITIES AFFECTED BY THIS POLICY (SCOPE):

WakeMed adopts the following policy & procedures for WakeMed Raleigh & WakeMed Cary.

WHO SHOULD READ THIS POLICY:

This policy shall be read by department supervisors, managers, directors, and administrators. Furthermore, any individual considering issuing, revising, assisting in the drafting of, or archiving a policy.

PROCEDURES:

Emergency Medicine:

- I. Determine if mechanism of injury (MOI) is high velocity vs low velocity if age of patient greater than or equal to 55 years. High velocity would include MVC, assault or fall from a height. Low velocity would include ground level falls.
- II. For low velocity MOI and patient is clinically stable perform an assessment of chest. If patient is clinically unstable complete a portable CXR and follow ATLS resuscitation guidelines.
- III. For high velocity MOI complete a portable CXR, determine if normal vs abnormal. Abnormal: follow ATLS resuscitation and stabilization guidelines. Complete assessment of chest.
 - a. Floating ribs or associated chest tenderness or right upper quadrant/left upper quadrant tenderness then complete a CT chest/abdomen/pelvis.


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Prepared by: *MGR, TRAUMA PROGRAM*

Approved by: *MEDICAL DIR TRAUMA - RALEIGH, PHYSICIAN, SURGEON*

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- b. Consult appropriately based on CT results:
 - i. Aortic Team on call (CT surgery or Vascular Surgery) & Trauma
 - ii. Pulmonary contusion, pneumothorax, hemothorax
 - 1.** consult Trauma
 - iii. 3 or more rib fractures
 - 1.** consult Trauma with admission to ICU
 - iv. 1 or 2 rib fractures assess incentive spirometry and attempt ambulation. If IS is >1000ml, pain is controlled, and able to ambulate consider discharge home.
 - 1.** Otherwise, consult Trauma for admission.
 - v. Normal CT scan with no injury discharge home.

Trauma:

- I. Determine if the patient is stable.
 - a. Obtain a portable chest x-ray taking care to treat identified injuries as indicated.
 - b. Assess for clinical flail.
 - c. Assess for other organ injuries; further studies to consider, if needed, include CT chest/abdomen, bronchoscopy and/or endoscopy.

- II. Determine if the patient unstable. In the acute setting, the primary decision-making points revolve around the ability of the patient to maintain an airway and support breathing efforts autonomously. Immediate causes of death resulting from blunt chest trauma include untreated tension pneumothorax, rupture of a

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contained aortic transection, and although not common a massive myocardial contusion.

- a. If it appears that the patient may be unable to accomplish these goals, early intubation and assisted ventilation may be the safest measure until all details are collected and assessed.
 - b. Consider tube thoracostomy as it is generally a low morbidity procedure. Care should be taken when chest tubes are placed before chest x-ray is obtained as a diaphragmatic rupture and intrathoracic visceral migration may lead to visceral injury.
 - c. Consider emergent endovascular or open operation with the suspicion of an aortic injury.
- III. Consider age & frailty; risk factors for respiratory failure after chest injury include age greater than 65 and ≥ 4 rib fractures. Respiratory failure often occurs within 48-72 hours and once present usually requires intubation with mechanical ventilation.
- a. If greater than 55 with displaced rib fractures or ≥ 4 rib fractures or any age with ≥ 4 displaced rib fractures or clinical flail admit to the ICU or Stepdown.
 - b. If less than 55 with <4 displaced rib fractures and no flail, monitor for signs and symptoms of hypoxemia, incentive spirometry and/or vital capacity.
 - c. If normal chest x-ray and exam; consider discharge in absence of other injuries.
- IV. Assess if patient is a candidate for Non-invasive ventilation (NIV). Noninvasive respiratory support with BiPAP to maintain lung volumes and splint the chest wall is our primary modality for supportive management of blunt chest injury in conjunction with aggressive pain management and pulmonary toileting. Use IS of <1000 mls as guide for implementation.


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- a. Support with systemic analgesia
 - b. If not a candidate consider epidural analgesia
- V. If >2 displaced rib fractures or clinical flail or respiratory failure consider rib fixation.
- a. May utilize NIV if patient meets criteria while awaiting fixation and after fixation.
- VI. Exclusion Criteria: long bone fracture, facial fracture, >grade I solid organ injury, TBI w/ GCS <15.

DEFINITIONS:

Displaced fracture is axial or craniocaudal displacement of greater than 100% of the rib diameter, and separation of greater than 50% of rib diameter or bicortical angulation of greater than 45°.

Radiographic "signs" of thoracic aortic injury

- I. "Wide" mediastinum (> 8 cm) or mediastinal ratio of ≥ 0.38 .
- II. Obliteration of aortic knob, loss of aortopulmonary window
- III. Left hemothorax
- IV. Left pleural "cap"
- V. Left first or second rib fracture, left scapular fracture, thoracic spine fracture
- VI. Downward displacement of left mainstem bronchus
- VII. Rightward displacement of esophagus (nasogastric tube) or trachea (ETT)


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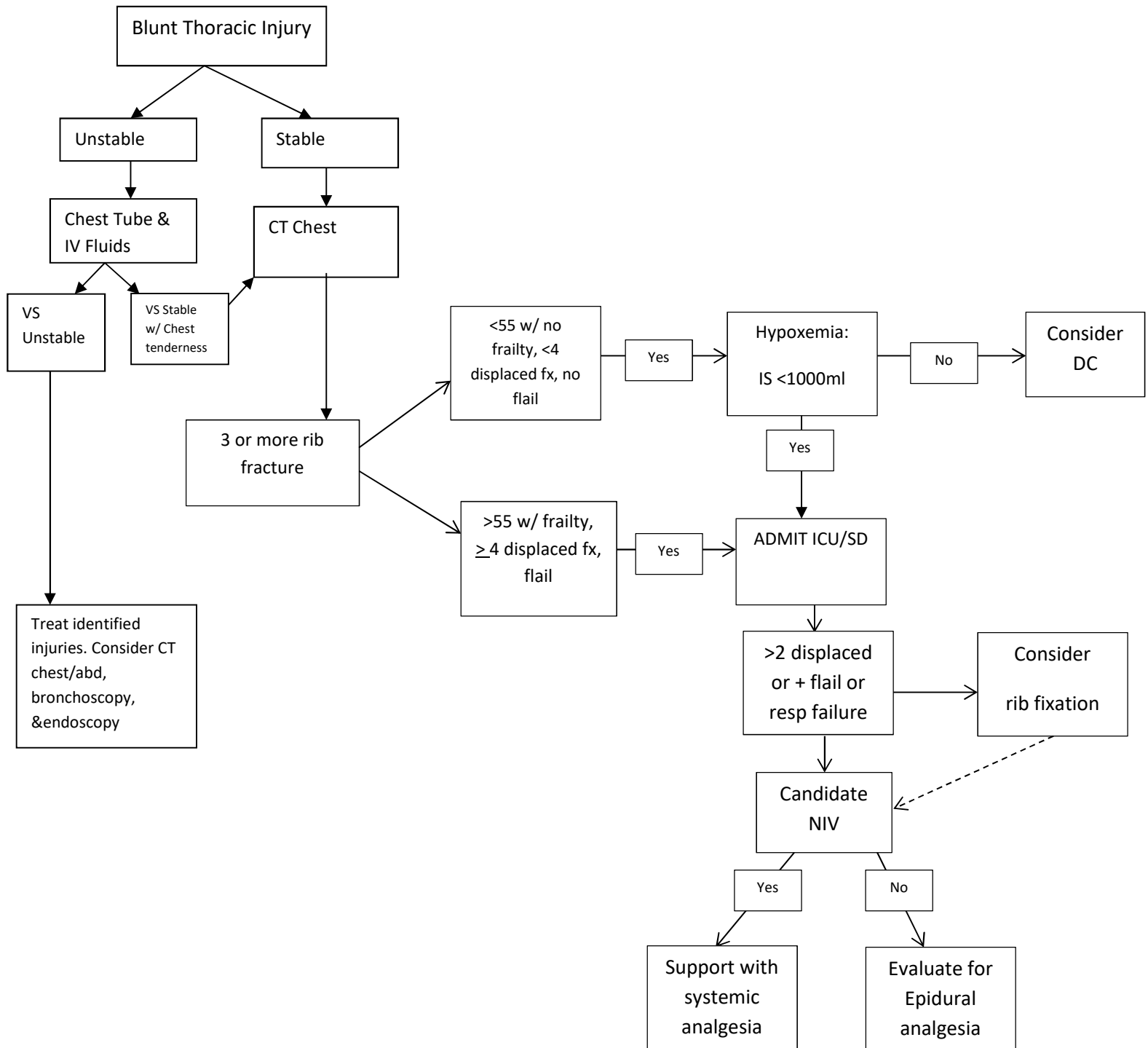
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