

Blunt Chest Wall Trauma Management Guideline

Purpose: To assist physicians and clinicians with the management of complex chest wall trauma, with the intent to improve morbidity and mortality, understanding that chest trauma can cause worsening of respiratory function up to 48-72 hours after injury, especially in medically complex patients.

Scope: Patients who have documented rib fractures will have an assessment of associated pulmonary injuries, age, and co-morbidities. A chest score will be obtained which will assist the team with appropriate management decisions. This guideline will utilize a validated scoring system for the rib fracture patient; and a clinical pathway which has been shown to improve morbidity and mortality.

Background: Rib fractures are a common injury seen in blunt force trauma. Rib fracture management has varied over time, but it is now understood that the principal cause of morbidity from fractures is change in respiratory status along with associated injuries. By improving pulmonary functions through a multimodal treatment plan, patients will have an improvement in pain, function, hospital discharge, associated morbidity and mortality. The guideline will act to screen rib fracture patients into a high-risk population through a chest trauma scoring system; and initiate the high risk population into a clinical pathway which will help to reduce complications.

Management Algorithm:

1. Identify patient with rib fracture(s)
2. Assess associated data
 - a. Patient age
 - b. Number of fractures
 - c. Laterality: unilateral or bilateral
 - d. Identify presence of pulmonary contusions
 - e. Identify additional parameters
 - i. Oxygen saturation
 - ii. Pre-existing lung disease
 - iii. Pre-injury anticoagulation therapy
3. Calculate Chest Trauma Score (See Table)
 - a. If score is 5 then patient is considered high risk
 - i. Patient admitted to critical care unit
 - ii. Initiate Clinical Pathway (See flowsheet)
 - iii. Daily recording of IS volume; pain scale; cough score (See Figure for further details)
 - iv. Aggressive pain control measures; consider:
 1. Anesthesia consultation for erector spinae block or other anesthetic modalities
 2. Lidocaine patch
 3. Surgical stabilization

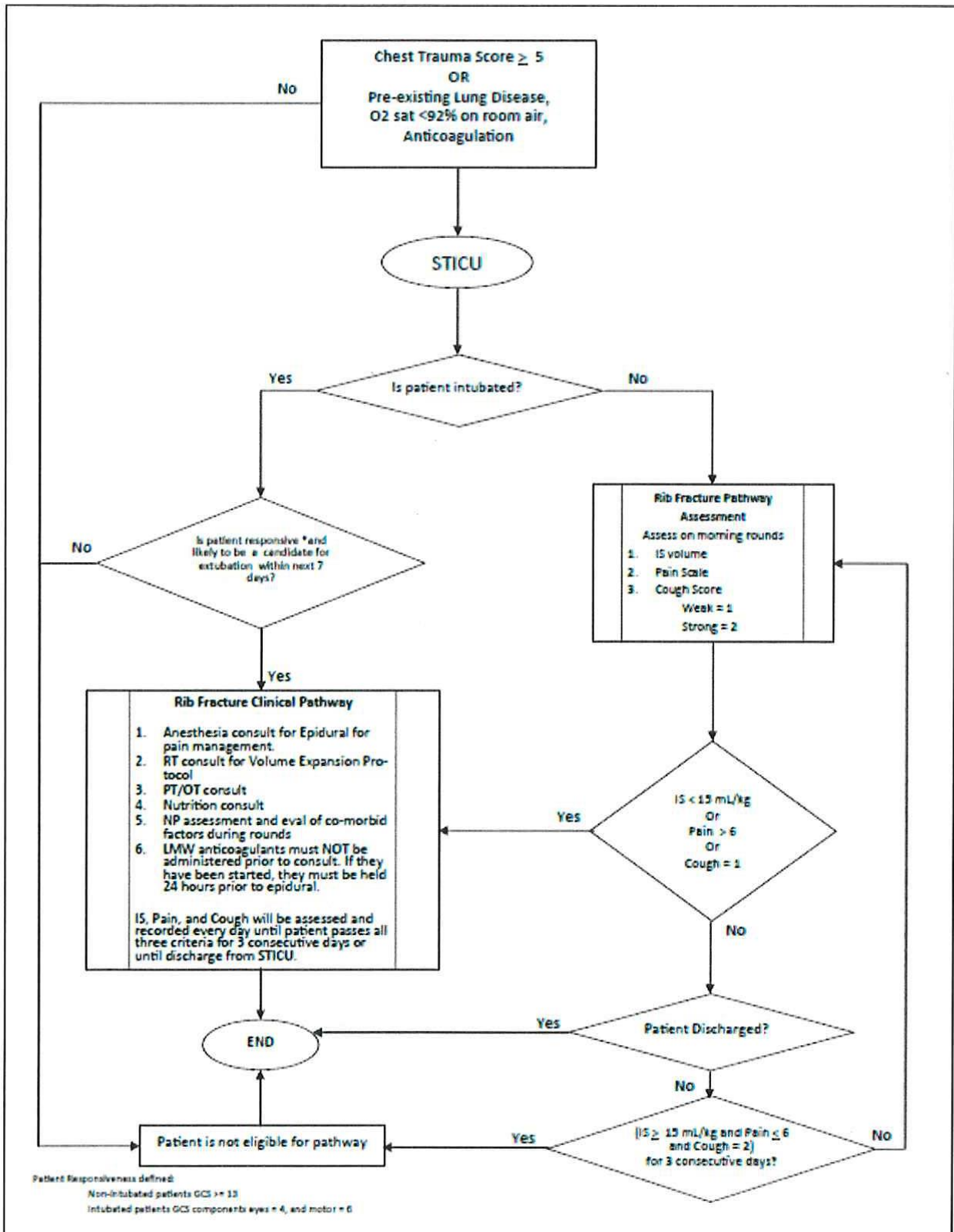
- v. Early ambulation if not otherwise contraindicated
 - vi. Early DVT prophylaxis unless contraindicated
 - vii. Consider early VATS if patient has retained hemothorax or uncontrolled air leak
 - viii. Daily chest x-ray if abnormality found
4. Low risk patients (Chest Trauma Score < 5) do not need to be initiated into the clinical pathway, however, patients with low oxygen saturations (<94% on RA); pre-existing chronic lung disease; or who are on therapeutic anticoagulation therapy should be strongly considered to be placed on the protocol as these sub-populations have been shown to be higher risk for complications
 5. Patients may be introduced or removed from the algorithm based on the judgment of the attending trauma surgeon.

Table: Chest Trauma Scoring System

Age	<45	1point
	45-65	2 points
	>65	3 points
Pulmonary	None	0 points
Contusions	Unilateral/minor	1 point
	Bilateral minor	2 points
	Unilateral major	3 points
	Bilateral major	4 points
Rib fractures	<3	1point
	3-5	2 points
	>5	3 points
Laterality	Unilateral	0 points
	Bilateral	2 points

Score 5 is high risk and should be strongly considered to enter the rib fracture clinical pathway (see Figure, below). If patient has score < 5 but has either pre-existing lung disease; low oxygen saturations (<94% on RA); or is on therapeutic anticoagulation should be considered to be placed into the clinical pathway.

Rib Fracture Clinical Pathway:



References:

1. Chen, J, et. al. A Chest Trauma Scoring System to Predict Outcomes. *Surgery* 2014; 156(4): 988-994.
2. Battle, CE, et. al. Predicting Outcomes After Blunt Chest Wall Trauma: Development and External Validation of a New Prognostic Model. *Critical Care* 2014; 18: R98
3. Todd, SR, et. al. A Multidisciplinary Clinical Pathway Decreases Rib Fracture Associated Infectious Morbidity and Mortality in High Risk Trauma Patients. *American Journal of Surgery* 2006; 192: 806-811.

REVIEW/REVISION HISTORY

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