

4. THORACIC INJURY

D. Widened Mediastinum/Thoracic Aortic Injury

OBJECTIVES:

1. Define the indications for pursuing further work up of the widened mediastinum following blunt injury.
2. Identify signs of possible thoracic aortic injury.

DEFINITION:

The mediastinum is defined as “widened” if it measures ≥ 8 cm at the level of the second ICS on an AP CXR taken at 100 cm from the chest or if the mediastinum/chest ratio is > 0.38 .

Traumatic aortic injury (TAI) involves a disruption of the thoracic aorta from blunt horizontal deceleration at the level of the ligamentum arteriosum, which is just distal to the origin of the left subclavian artery.

GUIDELINE:

Any patient who has a widened mediastinum or any of the following radiological findings on the CXR following a deceleration MOI (mechanism of injury) should be considered to have a TAI until proven otherwise:

- a. Apical cap.
- b. Depressed left mainstem bronchus.
- c. Trachea or esophagus deviated to the right.
- d. Obliterated aorto-pulmonary window.

1. Evaluate and treat the [ABCs, as described in Chapter 1](#).
2. Assess for symptomatic upper extremity BP differences (> 10 mmHg), pseudocoarctation syndrome, or infrascapular murmur. These are also suggestive of aortic injury.
3. If the possibility of TAI is considered at any point in the resuscitation, avoid hypertension. Tachycardia and Hypertension should be treated with impulse control with short-acting medications (e.g., esmolol, Clevidipine).
4. Obtain a CTA of the chest since as it is very sensitive and specific for the diagnosis of TAI (95-100% sensitivity, NPV 99-100%)¹. If the CTA of the chest shows mediastinal blood or aortic disruption, immediately contact the vascular/cardiothoracic service to determine whether there is a BAI (blunt aortic injury) or if there is a need for an angiogram.
5. Injury classification:
 - Grade 1: Intimal tear (IT) - Injuries confined to intima
 - Grade 2: Intramural hematoma/large intimal flap
 - Grade 3: Pseudoaneurysm - the presence of aortic external contour abnormality and contained rupture (Incidence 71% with 76% survival).
 - Grade 4: Rupture with the presence of aortic external contour abnormality and free contrast extravasation or hemothorax at thoracotomy (Incidence 6.4% with 11% survival).
6. The following are recommended clinical treatment guidelines for the management of BAI based on UW (University of Washington) experience²:
 - A. All patients with radiographic evidence of BAI should undergo anti-impulse therapy with β -blockade, if tolerated, coupled with antiplatelet therapy (81 mg aspirin) for low grade injuries, as appropriate.

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- B. Observation alone with interval follow-up CTA within 30 days is appropriate for all intimal tears less than 10 mm.
- C. Management of intimal tears less than 10 mm is appropriate with repeat imaging within 7 days to assess for progression. Evidence of progression should be managed, when possible, with endovascular repair.
- D. Grade 3 injuries should undergo urgent repair (< 24h after admission)
- E. Grade 4 injuries should undergo emergency repair
- F. TEVAR should be performed as opposed to open repair when possible from hemodynamic and technical standpoints to minimize morbidity (including stroke, paraplegia, and renal failure) and mortality³.
- G. All patients with an aortic external contour abnormality should be considered for semi-elective (1 week or less) EVAR if there is a high likelihood of survival from other associated injuries. These patients should be monitored with CT imaging at: 1 month, 6 months, 1 year, and every other year thereafter. Patients with hypotension on presentation and aortic arch hematoma of more than 15 mm should be repaired with EVAR methods on a more urgent basis.
- H. Intentional left subclavian artery coverage without revascularization is well tolerated in a majority of patients with BAI. Consider Carotid subclavian bypass if necessary.
- I. Patients with severe TBI and an aortic external contour abnormality should be considered for earlier repair.

References

1. Dyer DS, et al. Thoracic aortic injury: how predictive is mechanism and is chest computed tomography a reliable screening tool? A prospective study of 1,561 patients. J Trauma. 2000; 48: 673-82.
2. Starnes BW et al. A new classification scheme for treating blunt aortic injury. JVS 55 (1); 47-54, 2012
3. Evaluation and management of blunt traumatic aortic injury. A practice management guideline from the Eastern Association for the Surgery of Trauma. JOT 2015; 78: 136-146

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