Summary Statement:
Blunt thoracic aortic injury (BTAI) is potentially lethal and often associated with severe multi-system injury. BTAI has a broad range of severity and acuity of presentation. Initial workup should be focused upon accurate anatomic identification and categorization of the aortic injury and assessment of associated injuries. This information will be evaluated jointly by the trauma team and the vascular team to establish treatment priorities and formulate therapeutic plans as outlined below.

Procedure:
- Patients with severe blunt chest trauma, especially those with deceleration type injuries, will be evaluated using CT of the chest with IV contrast per current trauma service protocol. CT should be used liberally in patients with significant mechanism of injury.
- Injuries will be graded according to the current Society of Vascular Surgery (SVS) guidelines1,2 (See notes section for graphical representation)
  - Grade 1 – Intimal tear (normal external contour of aorta)
  - Grade 2 – Intra-mural hematoma
  - Grade 3 – Pseudoaneurysm
  - Grade 4 – Pseudoaneurysm with rupture
- All patients with aortic injuries should have active control of blood pressure and heart rate with β blockade to minimize wall shear stress and decrease potential for expansion or rupture3.
  - Therapeutic targets are SBP < 120, MAP < 80, and pulse < 120.
  - If SBP >120 or pulse > 120, start Esmolol 500 μg/kg slow bolus over 30 seconds, if BP remains > 120 repeat 500 μg/kg slow bolus over 30 seconds. Use caution, titrate carefully to avoid hypotension (SBP < 80 or MAP < 60)
  - Start infusion at 50 μg/kg/min
  - Titrate drip to achieve target SBP, be cautious to avoid hypotension (SBP<80, MAP< 60) especially in patients with potential brain injury
- Grade 4 injuries should undergo emergency TEVAR. These patients have substantial risk of decompensation and death.2,3
- Grade 3 injuries with high risk findings should undergo emergency TEVAR
  - High risk findings3,4 include:
    - Large pseudoaneurysm
    - Large mediastinal hematoma
    - Large left hemothorax
- Grade 3 injuries without high risk findings should undergo urgent TEVAR, no later that 24 hours after admission, and potentially much earlier.2,3
Specific therapeutic plans, including order and timing of interventions, should be established jointly after consideration of all associated injuries, most importantly the presence of severe brain injury:

- Grade 2 injuries may be managed medically or by TEVAR. Therapeutic plans should be made jointly.
- Grade 1 injuries will be managed medically.
- Anti-platelet therapy: Treatment of Grade 1 injuries will include a low-dose aspirin regimen, default is 81mg per day. Potential need for anticoagulation or antiplatelet therapy should be considered in all injury grades. Type of therapy, dosage, and duration for an individual case will be determined jointly by vascular and trauma teams.
- All patients with BTAI should have follow-up CTA scheduled at about 6 weeks post injury.
- All patients with BTAI should have appropriate followup with vascular surgery and trauma.
Notes:

- Graphical representation of SVS grading scheme

Grade 3 encompasses a heterogenous group including both small, stable pseudoaneurysms as well as larger unstable ones. Additional characteristics of the injury pattern and imaging may help to predict increased likelihood of rupture, including the size of the pseudoaneurysm, the extent of mediastinal hematoma, especially in the dependent portion of the mediastinum, and the presence of unexplained left hemоторax.

References