

Trauma Service Guidelines

Title: Blunt Aortic Injury

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Created: Version 1.0 April 2005

Revised: Version 2.0 December 2007, Version 3.0 April 2013

Revised by: R. Judson, M. Bantick & ACT Committee

Background

Blunt Aortic injuries (BAI) are a significant cause of mortality and morbidity and are the second most common cause of death with up to 90% of patients dying at the scene [1-4,15]. Almost half of patients with aortic disruption have no external signs of chest trauma and because of the variable presentation there needs to be a high index of suspicion of BAI based on mechanism of injury and imaging results[15]. Patients with BAI who make it to hospital have good expected survival rate (15%) with prompt diagnosis and treatment [1, 2, 4].

Mechanism of Injury

It is widely accepted that BAI are most commonly associated with high energy mechanisms with rapid deceleration of the thorax[1-20]. These include motor vehicle and motor cycle crashes, pedestrian vs car, falls and crush injuries. BAI has been diagnosed in patients who have fallen from heights as low 1.5 metres and in motor vehicle accident with speeds as low as 16 km/hr [1].

The direction of the impact has some influence in the incidence of BAI with side impact in one study resulting in 15 times the likelihood of BAI [9], especially in near sided accidents when compared with frontal collisions [3] There has been no correlation between seatbelt use and BAI demonstrated in the literature [3, 9]

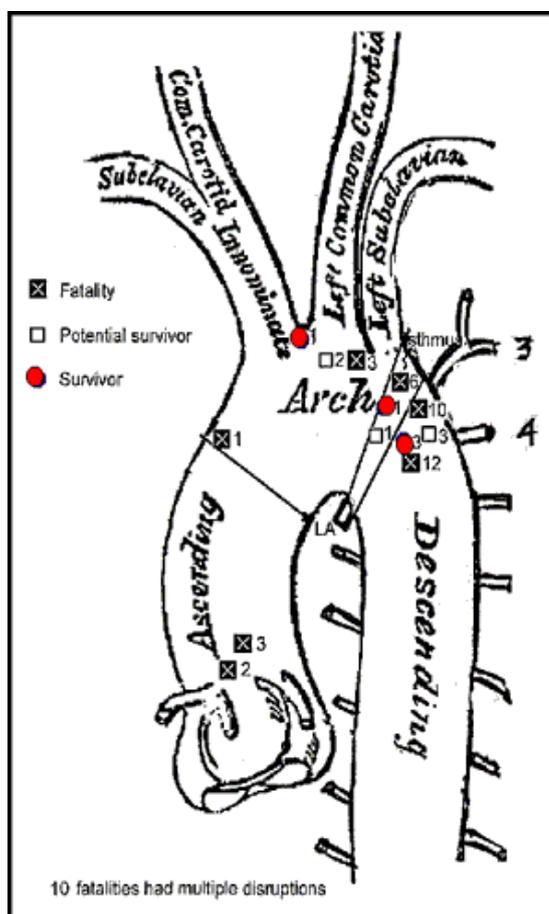
The most common site of BAI is the peri-isthmic region and left subclavian artery [1, 3, 9, 15].

Evaluation

Variation in clinical presentation is the rule with thoracic aortic injuries [15]. Clinical symptoms of BAI are rarely present and diagnosis must be based on a high index of suspicion from the mechanism of injury and radiology results[15]. For those that do not present in full cardiovascular collapse clinical signs that may accompany BAI include [1, 2, 15]:

- Chest pain and/or shortness of breath
- Chest wall bruising rib or sternal fracture, however there is no correlation between skeletal injury and BAI
- Physical exam pseudocoarctation
 - defined as elevated BP in upper extremities and low BP in lower extremities
- Aortic insufficiency, murmur on cardiac auscultation

It is important to note that the absence of clinical sign's does not exclude a diagnosis of BAI [2, 15].



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Chest X-ray

A normal chest x-ray as defined as no bony, soft tissue or great vessel pathology has a negative predictive value of approximately 97% [1].

Some studies have quoted a positive predictive value of widened mediastinum 5-20% [19]. False positives resulting from widened mediastinum due to radiological technique, mediastinal fat pads and unfolding of the aorta [1].

No studies have shown plain x-ray to be conclusive in diagnosing or excluding aortic injury [17, 19]. Patients with aortic injury are often found to have a normal CXR [1, 8, 10, 19, 20]. Where possible sitting the patient upright should result in fewer falsely abnormal radiographs [15].

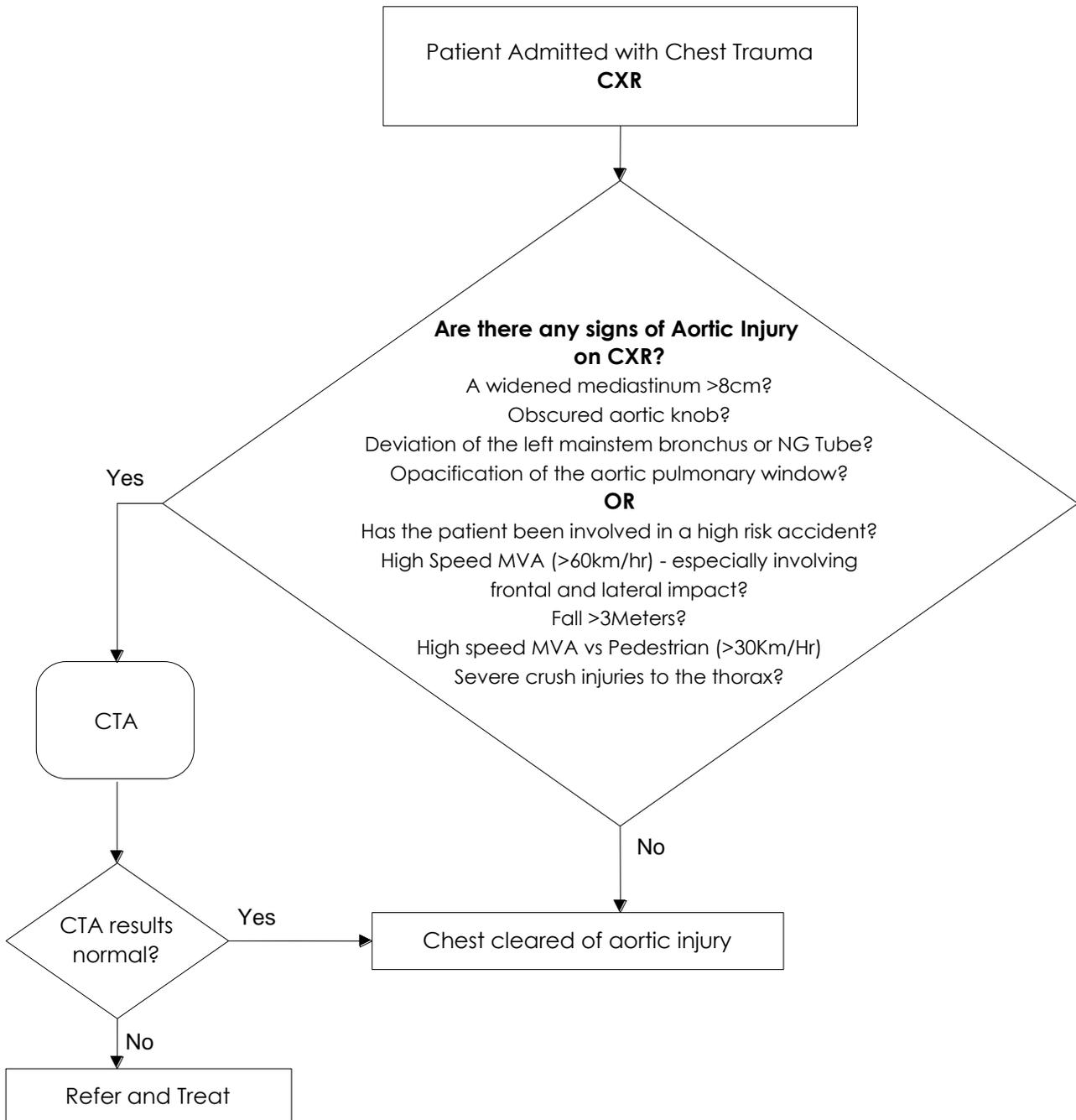
Most significant chest x-ray findings are:

- Widened mediastinum > 8cm
- Obscured aortic knob
- Deviation of the left main stem bronchus or nasogastric tube
- Opacification of the aorta pulmonary window

[1, 2, 15, 19-21]

Helical CT scan

Helical CT scanning and computed tomographic angiography provide clinicians with rapid information about BAI with the additional benefit of supplying information such as thoracolumbar spine reformats and other intrathoracic injuries. CT sensitivity and negative predictive values approach 100% compared with standard aortography [1, 2, 4, 8, 15]. CTA is increasingly becoming both a screening tool and diagnostic tool [18]. Any patient with an appropriate MOI or an abnormal CXR should have CTA.



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