

# A case of missed blunt traumatic aortic injury (BTAI)

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### SUMMARY

We are reporting a case of missed blunt traumatic aortic injury (BTAI). A 28 year male presented with chest pain following a motor vehicle accident. He was discharged following normal clinical signs and chest radiograph. The following day he complained of lower limb weakness. Traumatic aortic dissection was revealed via computer tomography (CT) of the thorax. BTAI cannot be ruled out with normal clinical signs and chest radiograph alone. CT thorax is mandatory to rule out BTAI in high impact chest injury.

### KEY WORDS:

*Blunt traumatic aortic injury, CT thorax, chest radiograph*

### CASE REPORT

A 28 year male motorcyclist arrived at emergency department (ED) following a motor vehicle accident. Primary survey was normal. He initially complained of left sided chest pain. Pulse rate was 74 /minute and blood pressure 118/75 mmHg. Focussed assessment of sonography in trauma (FAST) did not reveal any free fluid or intra-abdominal injury. Secondary survey revealed multiple laceration wounds over forehead, left hand and left wrist deformity.

There was no significant widening of the mediastinum, any rib fractures or pneumothorax on the initial chest radiograph. (Figure 1). Computer tomography (CT) of the brain and cervical spine was normal. Comminuted fracture of distal end left radius was noted on X-ray of the upper limbs. He was managed with analgesia and suturing of the forehead. Close manual reduction was performed under sedation and a volar Plaster of Paris (POP) splint was applied. He was discharged home with analgesia and antibiotics.

The following day he presented to emergency department with increasing chest pain. This was associated with new onset bilateral lower limb weakness. Examination revealed bilateral paralysis and cold peripheries distal to his knees. Repeat chest radiograph revealed left lung contusion (Figure 2). CT thorax was done and showed a 6 cm dissection of the descending thoracic aorta distal to the origin of the left subclavian artery. This aortic dissection was categorized as DeBakey type III or Stanford B. Moderate bilateral hemoperitoneum and left lower lung lobe contusion were also seen.

He then developed respiratory distress. Definite airway was secured and he was rushed to the operating theatre for thoracic endovascular aortic repair (TEVAR). Stent Captiva™

26mm x 26 mm x 150 mm was placed from the distal region of the descending aorta to the origin of the left subclavian artery. Post operative distal pulses were normal. Chest tube was placed in situ for drainage of remaining pleural effusion. Intravenous meropenem was administered for ten days. Patient survived to hospital discharge without any significant morbidity. CT aorta angiogram was arranged as outpatient appointment and did not demonstrate any graft leakage.

### DISCUSSION

This case illustrates the possibility of missing a diagnosis of blunt traumatic aortic injury (BTAI) based on initial symptoms, signs and chest radiograph alone. It is the second most common cause of death following a blunt trauma. Eighty percent of patients with BTAI die before reaching hospital.<sup>1</sup>

#### *Clinical Presentation*

Symptoms suspicious of BTAI are chest pain, dyspnoea, back pain, hoarseness, dysphagia and cough. Triad clinical and radiological signs of BTAI are increased upper limbs blood pressure, decrease lower limbs blood pressure and widened mediastinum on chest radiograph.<sup>1</sup> Nevertheless absence of these signs does not rule out BTAI. Thirty percent of patients will have no external signs of chest injury. In deviation of the true diagnosis, 75% will have distracting injury resulting from extra-thoracic fractures.<sup>2</sup>

#### *Diagnosing*

Chest radiograph is an adjunct to primary survey. Widened mediastinum, abnormal aortic outline, left main stem bronchus downward displacement, deviation of trachea and widened right parasternal stripe on chest radiograph indicates BTAI.<sup>3</sup> A study on 3728 trauma patients concluded that chest radiograph alone is not enough to rule out BTAI.<sup>3</sup> Widened mediastinum was present on only 191 (5.1%), blurred aortic contour on 10 (0.3%), and irregular aortic arch on 4 (0.1%). An acute aortic injury confirmed by chest CT was present in 17 (0.5%) patients. Only 7 of these with CT-confirmed BTAI had a mediastinal abnormality identified on CXR.<sup>3</sup> As similar to this case report, physicians were misled with the normal chest radiograph. As a lesson to be learnt from this case, due to a high impact mechanism, CT thorax should be done concurrently with CT brain and CT cervical on initial presentation. CT thorax with intravenous contrast is strongly recommended to confirm BTAI.<sup>1</sup> Exadaktylos et al showed 50% out of 93 blunt chest trauma victims with initial normal chest radiograph revealed multiple injuries following CT scan.<sup>4</sup> Therefore, a CT chest in all patients with high impact mechanism chest trauma is recommended.<sup>4</sup>

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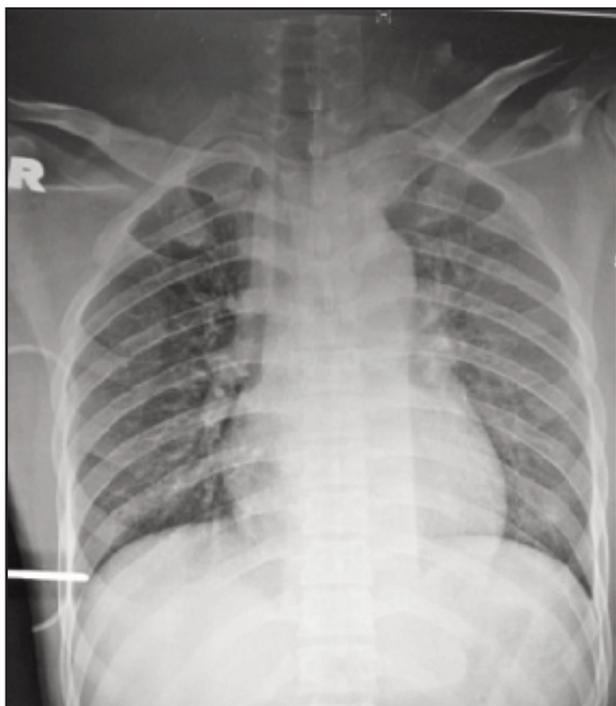


Fig. 1: AP chest radiograph.

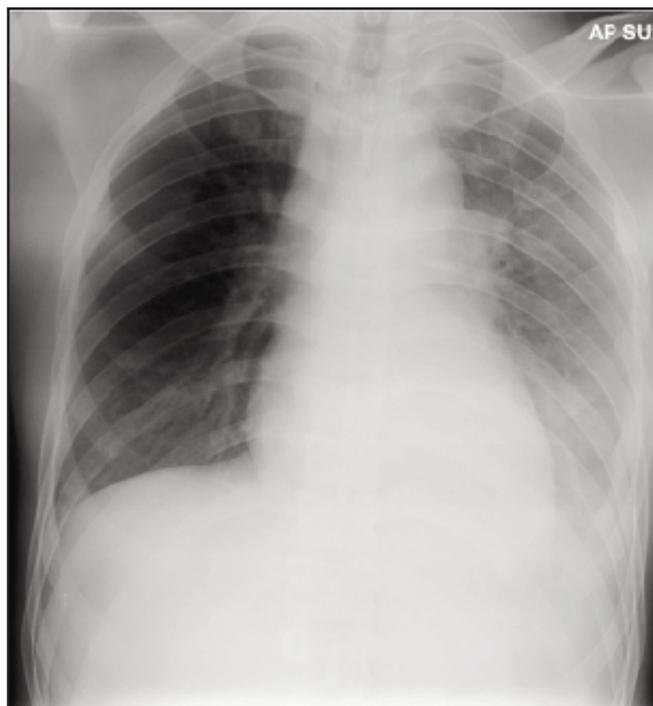


Fig. 2: Second AP chest radiograph 20 hours later.



Fig. 3: CT scan of the patient. Notice aortic dissection at the mid-descending aorta.

Prolonged observation, repeated clinical examination and serial chest radiograph should be done in centres that lack CT scan or in patients with financial constraints. If discharged home, early follow up within 24 hours should be arranged.<sup>4</sup>

**Management**

Delayed approach with serial radiological monitoring and aggressive control of blood pressure is suggested for patient who has other major concomitant injuries or medical comorbidity. Minimally invasive thoracic endovascular repair (TEVAR) is preferable for stable BTAI.<sup>5</sup> Although the numbers of patients involved are still small, several authors have shown that endovascular stent grafting in the treatment of BTAT is technically feasible and a safe alternative in comparison to open surgery. Follow up reports have

suggested a low incidence of endovascular leak and stent migration.<sup>5</sup> Risk of spinal complications can be reduced in TEVAR as clamping of the proximal aorta is not done. As a result to this prolonged hypotension can be avoided. Furthermore TEVAR only requires stenting of a short segment of the aorta.<sup>5</sup> This led to the choice of TEVAR for this patient, since there was no massive hemothorax that required an open thoracotomy. Endovascular stent leak is a major potential drawback in this form of treatment.<sup>5</sup>

**CONCLUSION**

High index of suspicion of BTAI should be made based on constellation of symptoms, signs and mechanism of injury. If any suspicion exists, CT thorax should be done without hesitancy. Obstacles in obtaining urgent CT thorax in chest trauma such as equipment availability and financial restraint should be addressed.

**REFERENCES**

1. Fox N, Schwartz D, Salazar JH, Haut ER, Dahm P, Black JH, et al. Evaluation and management of blunt aortic injury: A practice management guideline from the Eastern Association for the Surgery of Trauma. *J Trauma Acute Care Surg* 2015; 78(1):136-46.
2. Downing SW, Sperling JS, Mirvis SE, Cardarelli MG, Gilbert TB, Scalea TM, et al. Experience with spiral computed tomography as the sole diagnostic method for traumatic aortic rupture. *Ann Thorac Surg.* 2001; 72(2): 495-501.
3. Gutierrez A, Inaba K, Siboni S, Efron Z, Haltmeier T, Jaffray P, et al The utility of chest X-ray as a screening tool for blunt thoracic aortic injury. *Injury* 2016; 27(1): 32-6.
4. Exadaktylos AK, Sclabas G, Schmid SW, Schaller B, Zimmermann H. Do We Really Need Routine Computed Tomographic Scanning in the Primary Evaluation of Blunt Chest Trauma in Patients with "Normal" Chest Radiograph? *J Trauma* 2001; 51(6): 1173-6.
5. Nzewi O, Slight RD., Zamvar V., Management of Blunt Thoracic Aortic Injury. *Eur J Vasc Endovasc Surg* 2006; 31 (1): 18-27.