Blunt Traumatic Aortic Injury: A Case Report of Atypical Presentation and Management Challenges

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Abstract

Blunt traumatic aortic injury (BTAI) is a rare but catastrophic complication of high-energy deceleration trauma, with most patients dying before hospital arrival. Survivors often present with contained ruptures, but clinical findings may be subtle or overshadowed by concomitant injuries, leading to delayed or missed diagnosis. We report the case of a 31-year-old male involved in a high-speed road traffic accident, who presented with lower abdominal pain and per-rectal bleeding but without external chest trauma. Imaging revealed a descending thoracic pseudoaneurysm with traumatic Stanford Type B aortic dissection and associated bowel ischemia. The patient underwent thoracic endovascular aortic repair (TEVAR) followed by exploratory laparotomy for ischemic bowel resection. Despite timely multidisciplinary intervention, he succumbed on the second postoperative day. This case underscores the diagnostic challenge of BTAI in the absence of classical chest signs and highlights the importance of mechanism-based suspicion, early advanced imaging, and coordinated surgical decision-making to optimize outcomes in polytrauma patients.

Keywords: Bleeding per-rectum, Chest Xray, Computed Tomography Angiogram, Blunt Aortic Injury,

Introduction

Blunt traumatic aortic injury (BTAI) represents a life-threatening complication of high-energy deceleration trauma. The aortic isthmus, located just distal to the origin of the left subclavian artery, is the most common site affected, although other regions of the thoracic aorta may also be involved. Reported risk factors include high-speed motor vehicle collisions (>65 km/h), vertical falls exceeding three meters, rapid deceleration forces over 32 km/h, vehicle compartment intrusion greater than 40 cm, and side-impact crashes.[1]

Thoracic aortic injuries occur in approximately 1.5–2% of patients with blunt thoracic trauma. However, the condition carries a grave prognosis, with nearly 80% of affected individuals dying before reaching definitive medical care.[2,3] Early recognition is often hindered by the presence of concomitant injuries that can mask or delay suspicion.

Case Presentation

A 31-year-old male was admitted to the emergency department at 6:40 AM following a high-velocity road traffic collision in which his vehicle collided with a bridge wall around 12:30 AM. He had been seated in the front passenger seat; all co-passengers were declared dead at the scene. On arrival, his primary complaints were lower abdominal pain, with additional injuries involving the right upper and lower extremities.

Examination: He was conscious, Glasgow Coma Scale E3V4M5, with reactive pupils. Vital signs included heart rate 82 bpm, blood pressure 160/80 mmHg (right arm) and 150/70 mmHg (left arm), respiratory rate 19/min, and oxygen saturation 100% on room air. Cardiovascular examination was unremarkable, with equal pulses and no murmurs. Respiratory findings were normal, and there were no visible chest injuries.

Abdominal assessment showed mild lower abdominal tenderness without guarding or rigidity. There was a sutured wound over the right lumbar region and contusion over the right superior iliac crest. Per-rectal examination revealed blood-stained stools with intact sphincter tone. Additional injuries included a sutured wound on the right arm and forearm and abrasions on the right thigh.

Extended Focused Assessment with Sonography in Trauma (eFAST) demonstrated minimal free fluid in the hepatorenal and splenorenal regions. A chest radiograph showed mediastinal widening with loss of aortic contour (Figure 1). The patient was resuscitated and underwent whole-body contrast-enhanced CT imaging. CT of the brain and cervical spine showed no trauma-related injuries. CT chest revealed a

descending thoracic pseudoaneurysm with a traumatic Stanford Type B aortic dissection (Figure 2&4). CT abdomen and pelvis revealed bowel injury with patchy contrast non-enhancement of the right kidney (Figure 3).

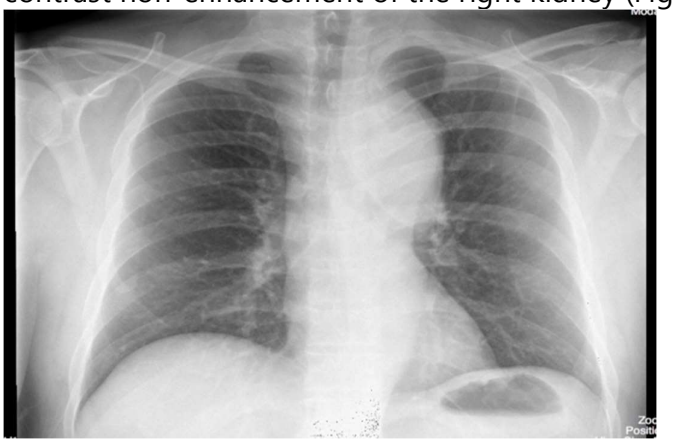

Figure 1 Chest x-ray chest anteroposterior view showing mediastinal widening.

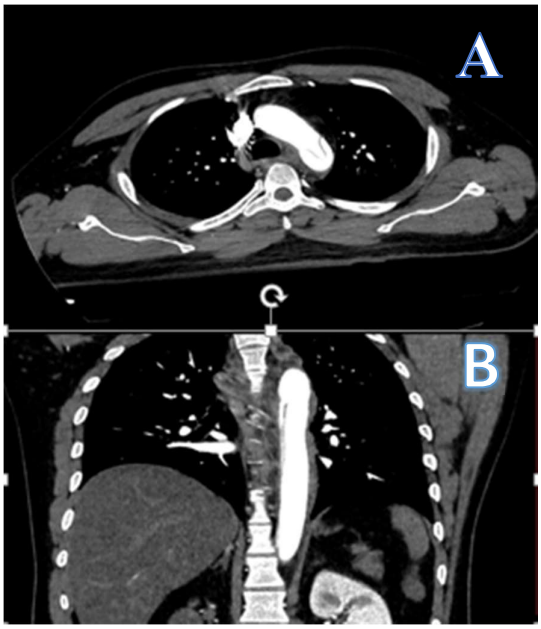

Figure 2A shows Axial Contrast CT image of a intimal flap causing double lumen appearance in the arch of aorta. 2B showing Coronal view of intimal flap is seen extending to the descending thoracic aorta.

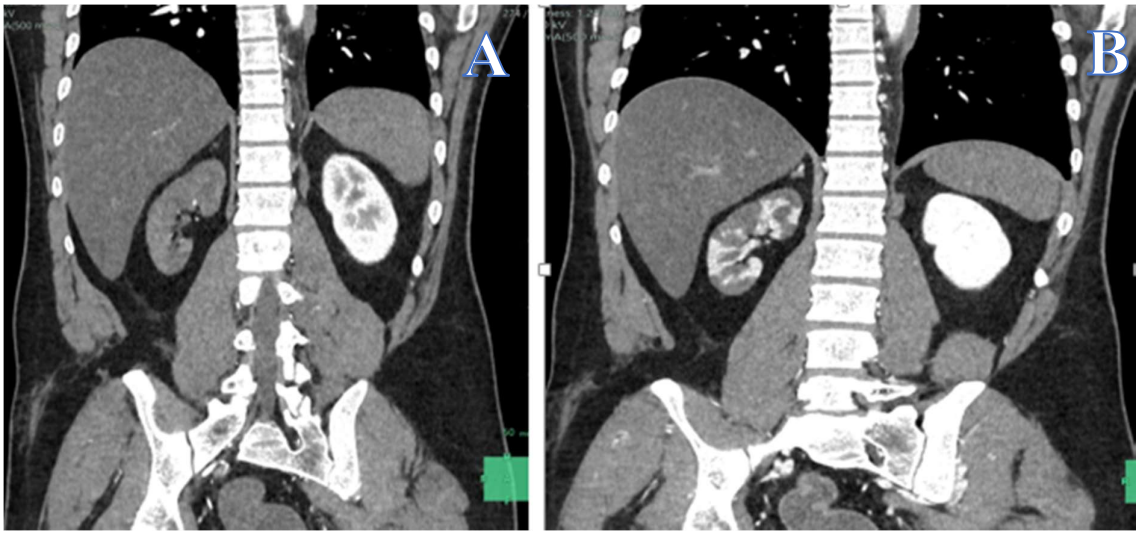

Figure 3A&B: CECT of abdomen showing reduced perfusion of the right kidney; right renal artery arises from false lumen. Left kidney shows normal perfusion

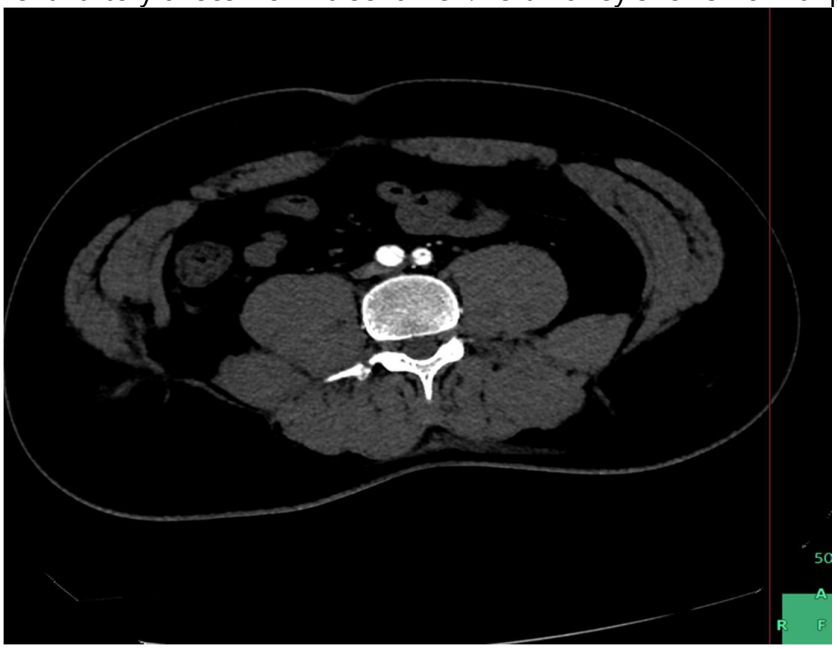

Figure 4: CECT abdomen showing dissection extending into the bilateral common iliac arteries.

Management: Intravenous labetalol infusion was commenced to maintain systolic blood pressure between 100–120 mmHg and heart rate below 60 bpm. Multidisciplinary input was obtained from General Surgery, Cardiothoracic Vascular Surgery, and Interventional Radiology.

Exploratory laparotomy identified serosanguinous peritoneal fluid, a pale right hepatic lobe with absent hepatic artery pulsations, ischemic distal ileum and caecum, feeble superior mesenteric artery pulsations, and contusion of the ascending colon without

perforation. Drains were inserted, the abdominal fascia was left open, and the skin approximated, with a second-look laparotomy planned after thoracic repair.

The patient subsequently underwent successful thoracic endovascular aortic repair (TEVAR) for the descending thoracic pseudoaneurysm and Stanford Type B dissection. Despite prompt surgical and endovascular interventions with intensive postoperative care, he died on the third postoperative day.

Discussion

Blunt traumatic aortic injury (BTAI) is among the most lethal sequelae of high-energy blunt trauma, with prehospital mortality reported at 80–85%. Survivors usually have contained ruptures stabilized by surrounding adventitial tissue or mediastinal structures.[3,4] The classical risk profile includes high-speed deceleration—most commonly from motor vehicle accidents—and injury localisation at the aortic isthmus due to its fixed position and shear stress susceptibility.[3,4,5]

Although certain clinical findings such as shock, differential blood pressures between upper and lower extremities, absent femoral pulses, or excessive chest tube output may suggest BTAI, their absence does not rule out the condition. Notably, nearly one-third of patients may lack external chest trauma, and coexisting rib fractures or other distracting injuries often obscure the diagnosis.[6,7]

Advances in imaging have transformed diagnostic strategies. Chest radiography, traditionally relied upon for signs such as mediastinal widening or loss of aortic silhouette, is now largely considered a preliminary screening tool. Computed tomography angiography (CTA) has become the diagnostic gold standard, offering excellent sensitivity and specificity.[8,9] Current recommendations from the Eastern Association for the Surgery of Trauma (EAST) advocate early CTA in patients with high-risk mechanisms, even when initial chest X-rays are unremarkable.

Management has also shifted significantly with the advent of thoracic endovascular aortic repair (TEVAR). In hemodynamically stable patients, TEVAR is now favored over open repair, as it reduces operative duration, blood loss, and risk of complications such as spinal cord ischemia.[6,9] In polytrauma settings, strict blood pressure control and prioritization of surgical interventions remain critical. Whenever feasible, early repair within the first 24 hours is recommended, since delays may heighten the risk of rupture.[8,9]

The present case underscores the diagnostic challenge of BTAI in the absence of classical signs, emphasizing the value of mechanism-based imaging protocols. Furthermore, it highlights the difficulty of sequencing interventions in polytrauma, where competing life-threatening injuries—such as bowel ischemia—may necessitate

emergent laparotomy prior to definitive aortic repair. Optimal outcomes in such scenarios require seamless coordination among trauma, vascular, and critical care teams to balance immediate hemodynamic needs with long-term survival strategies.

Conclusion

Blunt traumatic aortic injury remains a formidable challenge in trauma care, particularly when clinical manifestations are subtle or absent. Vigilance guided by the mechanism of injury, combined with early use of advanced imaging, is paramount for timely diagnosis. While endovascular repair has revolutionized management and improved outcomes, mortality continues to be substantial. Multidisciplinary collaboration is essential in polytrauma cases to ensure that life-saving priorities are balanced without compromising definitive aortic management.

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