

Case Report

Traumatic Aortic Injury in a 3-Year-Old Child - A Case Report and Literature Review

Aljohani M^{1*} and Alanazi S²¹King Abdullah University Hospital in Princess Noura Bint Abdulrahman University, Saudi Arabia²Ministry of Health Diabetes Center, Northern Borders Region, Saudi Arabia

*Corresponding author: Maram Aljohani, King Abdullah University Hospital in Princess Noura Bint Abdulrahman University, Saudi Arabia

Received: June 04, 2021; Accepted: June 25, 2021;

Published: July 02, 2021

Abstract

This case report describes a case of aortic injury with pseudo-aneurysm in a 3-year-old Saudi boy following a motor vehicle accident. The diagnosis was suspected on computed tomography scan, and emergency surgery was performed. A Dacron graft was inserted to repair the injured aorta. Postoperatively, absent femoral, and distal pulses were noted, and thrombo-embolectomy was performed with good outcome. We believe that our study makes a significant contribution to the literature because it raises awareness of aortic injury and rupture in pediatric patients with multi-organ trauma following motor vehicle accidents. A high index of suspicion and early intervention are essential in improving outcomes.

Case Presentation

A 3-year-old boy weighing 14 kg presented to our hospital following a high-speed collision with lateral impact trauma. He had been a non-restrained passenger, sitting on his father's lap in the front seat and, at the time of the crash, he hit the steering wheel and sustained lateral impact trauma but was not ejected from the car. He was known to have acute lymphoblastic leukemia and had received chemotherapy in the past. On arrival in the emergency room, his Glasgow Coma Scale was 15, pulse rate 116 beats/min, and blood pressure 109/52 mmHg. Initial management included intravenous lines and fluid replacement with normal saline at 20 ml/kg as a bolus. Rapid response was achieved. Whole-body Computed Tomography (CT) revealed an avulsion fracture of the left lateral mass superior facet of C1, bilateral lung contusions with a fracture of the right fifth rib, and an aortic flap into the descending aorta (Figure 1) with a pseudo-aneurysm. He maintained his blood pressure for 4 hours until transfer to the operation room for emergency intervention repair. During surgery, a mediastinal periaortic hematoma in the descending part of the thoracic aorta was detected; the surgeons opened this at the mid portion and found aortic disruption of about 1.5 cm. They excised the disrupted segment of the descending thoracic aorta and inserted a Dacron graft. After completion of repair, the patient was placed in a supine position but no pulse was detected in both the femoral arteries and the vessels distal to it. Intraoperatively, the patient's aorta had been clamped for more than 40 minutes to avoid bleeding, resulting in ischemia to the spinal cord with resultant lower motor weakness and spasticity. A decision was then made to perform bilateral femoral thrombo-embolectomy. The patient tolerated the procedure and was transferred to the pediatric intensive care unit in a stable condition. He was discharged home after 22 days in a stable condition with multidisciplinary follow-up.

Discussion

To the best of our knowledge, this is the first case report of traumatic aortic injury in a Saudi child under the age of 5 years. Most case reports in the available literature describe this condition in older children. Traumatic injury is one of the most common causes of

morbidity and mortality in the pediatric population, but injury to the abdominal vessels, especially the aorta, is very rare [1,2]. Motor vehicle accidents are the leading cause of pediatric aortic injuries, followed by motorcycle accidents [3,4]. The exact incidence of thoracic aortic rupture in pediatrics is unknown; however, despite its rarity, their incidence is rising due to the lack of safety precautions while driving [5]. Almost all pediatric aortic injuries are associated with other types of injury, such as pulmonary contusion (100%), long bones or pelvic fractures (50%), blunt head trauma (33%), and myocardial contusion (17%) [6]. The cause of death is primarily related to Acute Post-Traumatic Aortic Injury (ATAI) complications, and the mortality rate is increased if associated with severe head injury. The initial evaluation and management of pediatric aortic injuries is the same as those for adults. CT scan is used as the initial diagnostic and screening modality with a high sensitivity and specificity [7]. Surgeons decide on surgical intervention on the basis of chest CT findings consistent with aortic injury [8]. Aortography is essential when aortic injury and its complications are suspected and is still the gold standard diagnostic modality for the diagnosis of blunt thoracic aortic injury [9]. Delay in diagnosis, severity of the traumatic complications, multi-system involvement, as well as surgical complications all increase the risks of morbidity and mortality [10]. The most common complications in surviving patients include paraplegia, renal failure, recurrent laryngeal nerve injury, and pulmonary embolism [3]. Surgical treatment is



Figure 1: Thoracic aortic pseudo-aneurysm.

life-saving in an emergency situation with individualization of each case according to its severity and expertise of the surgical team; long-term plans can later be made for further prevention of chronic complications. Outcomes and prognosis are not predictable because of the variety of presentations and complications [11,12]. Fortunately, a high index of suspicion and a systematic approach to the diagnosis and management of injuries to the thoracic aorta can contribute to a good outcome in survivors [6].

Conclusion

We report this case to raise the index of suspicion regarding the possibility of life-threatening traumatic abdominal injury, especially rupture of the aorta, when clinicians are dealing with multi-organ injuries associated with blunt abdominal and chest trauma. A systematic approach and early detection and management of such injuries to the thoracic aorta can be a major factor for survival and good outcomes.

References

1. Bairdain S, Modi BP, Kim HB, Mooney DP, Durkin E, Vakili K. Pediatric blunt abdominal aortic injury and the use of intra-operative aortic ultrasound for surgical decision making. *J Pediatr Surg.* 2013; 48: 1584-1587.
2. Eddy AC, Misbach GA, Luna GK. Traumatic rupture of the thoracic aorta in the pediatric patient. *Pediatr Emerg Care.* 1989; 5: 228-230.
3. Anderson SA, Day M, Chen MK, et al. Traumatic aortic injuries in the pediatric population. *J Pediatr Surg.* 2008; 43: 1077-1081.
4. Mosquera VX, Marini M, Muñiz J, et al. Blunt traumatic aortic injuries of the ascending aorta and aortic arch: A clinical multicentre study. *Injury.* 2013; 44: 1191-1197.
5. Schulman CI, Carvajal D, Lopez PP, Soffer D, Habib F, Augenstein J. Incidence and crash mechanisms of aortic injury during the past decade. *J Trauma - Inj Infect Crit Care.* 2007; 62: 664-667.
6. Trachiotis GD, Sell JE, Pearson GD, Martin GR, Midgley FM. Traumatic thoracic aortic rupture in the pediatric patient. *Ann Thorac Surg.* 1996; 62: 724-731.
7. Ting JYS. Blunt Traumatic Aortic Injury. *Eur J Trauma.* 2003; 29: 1-12.
8. Pabon-Ramos WM, Williams DM, Strouse PJ. Radiologic evaluation of blunt thoracic aortic injury in pediatric patients. *Am J Roentgenol.* 2010; 194: 1197-1203.
9. Grajo GA, Sang Oh K, Young LW. Traumatic aneurysm of the ascending aorta in a child. *Pediatr Radiol.* 1979; 8: 263-265.
10. Townsend RN, Colella JJ, Diamond DL. Traumatic rupture of the aorta-critical decisions for trauma surgeons. *J Trauma - Inj Infect Crit Care.* 1990; 30: 1169-1174.
11. Di Marco L, Pacini D, Di Bartolomeo R. Acute Traumatic Thoracic Aortic Injury: Considerations and Reflections on the Endovascular Aneurysm Repair. *AORTA.* 2013; 1: 117-122.
12. Skotnicki SH, Vincent J, Buskens FGM, van der Meer JJ, Kuijpers PJ, Lacquet LK. Traumatic rupture of the thoracic aorta. *Acta Chir Belg.* 1982; 82: 485-491.