Traumatic Aortic Injury: Is the Seatbelt to Blame?

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Background

The most common cause of mortality in children (ages one to twenty-one) are trauma and accidental injury, with vascular and aortic injury being extremely rare. Traumatic aortic injury is most encountered within the thorax, and is relatively uncommon within the abdomen secondary to the relative protection provided by its location within the retroperitoneum.

Case Report

10-year-old female involved in a motor vehicle accident with a seatbelt sign. Exam revealed intact airway, BP 60/30, and HR 130s. She was emergently taken to the operating room for exploration, and she was found to have multiple bucket handle injuries of the small bowel, a non-expanding Zone III retroperitoneal hematoma, and a Morel-Lavallee lesion of the abdominal wall. After damage control laparotomy, she was taken to the CT scanner with imaging revealing multiple injuries, notable for aortic transection/dissection at L3 and poor/no perfusion below this level. She was immediately taken back to the operating room for exploration of her abdominal aortic injury. Dissection of the abdominal aorta involving all layers was noted just distal to the IMA and ending approximately 1 cm proximal to the bifurcation. This was repaired using a 12 x 7 mm Hemashield interposition graft.

Discussion

Repair of abdominal aortic injuries including techniques and materials have rarely been described and are even more rare in the pediatric population. Regarding abdominal aortic transections and dissections, most repairs are performed with Dacron, PTFE, or primary repair alone. Endovascular repair for abdominal aortic injuries including pseudoaneurysm, intimal flaps, and free rupture have been described and are an appealing option for patients with polytrauma and gross intraabdominal contamination.

One of the concerns with endovascular approach in the pediatric population is the fixed diameter of stents which can predispose patients to long-term adverse outcomes secondary to lack of growth with the child's increasing vascular diameter with age. Primary repair has shown positive outcomes over time; however, some injuries do not lend themselves to this type of repair. Autologous vein has been described as a potential conduit for repair of lower extremity arterial injuries in the pediatric population but has not been described for use within the abdominal aorta. This approach predisposes to the complication of late aneurysmal dilation secondary to the pressure the aorta withstands now being required of a venous conduit.

Conclusions

Abdominal aortic injury in pediatric populations can be challenging as it is frequently accompanied by multiple injuries including the spinal column, pelvic fractures, and devascularization injuries of the intestine. There is still research needed on long-term outcomes of these injuries.

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