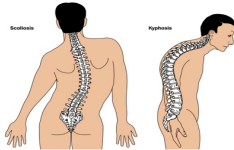


Screw (in) the Aorta
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Introduction

- Achondroplasia is the most common non-lethal skeletal dysplasia. Incidence is between 1 in 10,000 and 1 in 30,000.¹
- Achondroplasia, is caused by a mutation of fibroblast growth factor receptor-3².
- Orthopedic manifestations are exhibited in the spine and the extremities².
- Thoracolumbar kyphosis is seen in most infants, but typically it resolves when the child begins to walk².
- Anatomic anomalies of the vertebral column place the patient at risk for spinal stenosis as early as the first decade and especially during adulthood².
- In the pediatric population, symptomatic spinal stenosis occurs at all spinal levels due to the abnormally narrow bone canal³.
- Fusion procedures are recommended in patients with a large decompression overlying a thoracolumbar kyphosis to avoid progressive postoperative deformity.



Case Description

An 11 year old female with past medical history of Achondroplasia, thoracolumbar kyphosis, spinal stenosis and genu varum is status post T11-L4 fusion and instrumentation and L1-S1 decompression in 2015 at an outside facility, her family has since relocated and presented at our facility for continued follow up. On CT she was found to have a screw within the aorta at the T12 level. The patient denied any symptoms and was an active gymnast.

Intervention

- Pre-oxygenated with 100% O2 and standard ASA monitors were placed. General anesthesia was induced via IV with 150mg Propofol, 50mcg Fentanyl, 30mg Rocuronium and 40mg lidocaine 2%.
- The airway was then secured via direct laryngoscopy with a 5.5 ETT, and right lung isolation was achieved via bronchial blocker, placement confirmed via FBO.
- Two large bore IV were obtained in bilateral hands (16g), a left radial arterial line placed, and a left internal jugular central line was placed using ultrasound guided technique.
- Placed in the right lateral decubitus position, prepped and draped.
- Anesthesia was maintained with inhaled sevoflurane, ketamine infusion, boluses of fentanyl and neuromuscular block titrated to two twitches.
- Once the surgeons obtained adequate exposure of the screw, it was clearly noted the screw had gone through the posterior wall of the aorta into the aorta itself creating a fistula tract to the spine.
- 100units/kg of Heparin were administered and an ACT >200 was achieved.
- Surgeons slowly removed the screw through the back incision and then as the screw was backed out of the aorta, the aortic side was ligated with a 0-silk tie and then a second 0- silk tie was used to further ligate the fistulous tract.
- There was no evidence of bleeding and the patient remained hemodynamically stable.
- The patient received a full reversal of neuromuscular blockade, and long acting opioid narcotics were titrated.
- She was extubated and transported to the post anesthesia care unit. The patient did remarkably well and was discharged to home on POD #4.



Discussion

Although having a spinal screw migrate and penetrate the aorta is extremely rare, we approached this case similarly as one would for a thoracoabdominal aortic aneurysm repair (TAAA repair). During TAAA repair the heart is placed under significant hemodynamic stress by placement of aortic cross clamp, fluid shifts, and blood loss⁵.

Intraoperatively, during a TAAA repair, one must be prepared to treat fluid shifts and hemodynamic changes, therefore appropriate monitor placement for intraoperative management is essential. Aside from the standard ASA monitors, in a TAAA repair the following monitoring devices may be used: a radial a line, central venous access, a rapid infusion device, neuro-monitoring techniques including somatosensory-evoked potentials and motor evoked potentials to detect spinal cord ischemia, CSF drainage via spinal drain, cerebral oximetry monitoring and intentional hypothermia.

In this case, the use of a cross clamp was not determined until full surgical exposure was achieved at which time the surgeons opted to proceed without the cross clamp. However, preoperatively a discussion with the surgical team was held, and decision was made to proceed without a spinal drain due to spinal hardware and SSEP/MEP were not monitored due to surgeon preference. We chose to use a NIRS device over the right flank to monitor trends and assess collateral circulation in the event that cross clamping were necessary.

Conclusions

Achondroplastic patients present a series of anesthetic challenges and careful evaluation of each patient is necessary. This unique post spinal fusion complication also presented a unique set of challenges to the surgical team. With a care team model approach the patient was successfully and uneventfully treated.