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Case Report
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Innominate Artery Compression Syndrome after Extended End-To-End Repair of Aortic Coarctation: A Word of Caution

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Abstract

Extended End-to-End (EEE) repair of aortic coarctation is the preferred technique in the presence of concomitant arch hypoplasia. An airway complication after coarctation repair is not common. We are presenting a 3-month-old infant who presented with stridor secondary to tracheal compression after repair of his coarctation.

Keywords: Innominate artery compression; Coarctation repair; Tracheal compression; Stridor

Introduction

Repair of aortic coarctation *via* Extended-End-to-End (EEE) anastomosis is the preferred technique in the presence of arch hypoplasia. This technique requires extensive mobilization of the aortic arch and the descending aorta to ensure tension-free anastomosis. Airway compression has been reported more commonly after Norwood stage I palliation, but it has not been reported after simple coarctation repair. Here we present a 3-month infant, who underwent repair of a juxtaductal coarctation and presented with tracheal compression secondary to Innominate Artery (IA) compression.

Case Presentation

A 12-day-old neonate presented with post-natal diagnosis of aortic coarctation (Figure 1A). Prostaglandin infusion was initiated. Through a left posterolateral thoracotomy, an EEE repair was performed. His postoperative course was uneventful, and he was discharged on the 4th postoperative day. Two months later, he presented with stridor, which was thought to be related to his recent surgery with possibility of swollen vocal cords. Unfortunately, he was dismissed to return 3-days later after a sudden episode of respiratory arrest that required a brief period of chest compression. Still no cause of his arrest was identified at that moment and the patient was discharged home. A month later, due to persistent stridor, bronchoscopy showed 80% to 90% compression on the distal trachea with a pulsatile structure. Computed Tomography (CT) scan showed tracheal compression related to IA (Figure 1B and 1C). An upper mini-sternotomy was performed, and thymectomy followed by IA pexy to the left hemi-sternum. Bronchoscopy confirmed relief of airway compression and he was extubated intraoperatively with complete resolution the stridor (Figure 2A and 2B). Repeat CT scan showed widely patent trachea. He was discharged on the fifth postoperative day.

Discussion

Central airway compression in association with congenital heart defects has been described in the presence of aortic arch anomalies. Airway compression has been also described after repair of truncus arteriosus, right ventricular outflow tract reconstruction and arterial switch. After Norwood stage I palliation and interrupted aortic arch repair, it commonly affects the left main bronchus as it dives underneath the newly constructed arch. Occurrence of central airway compression after simple coarctation repair has not been described. Despite several techniques have been utilized for repair of coarctation, EEE repair has been the preferred strategy due to decrease recurrence. This technique requires extensive mobilization of the aortic arch and descending aorta to ensure tension-free anastomosis. The current case raises several questions. First, the creation of a tracheal compression after simple coarctation repair is quite unusual, especially when this compression

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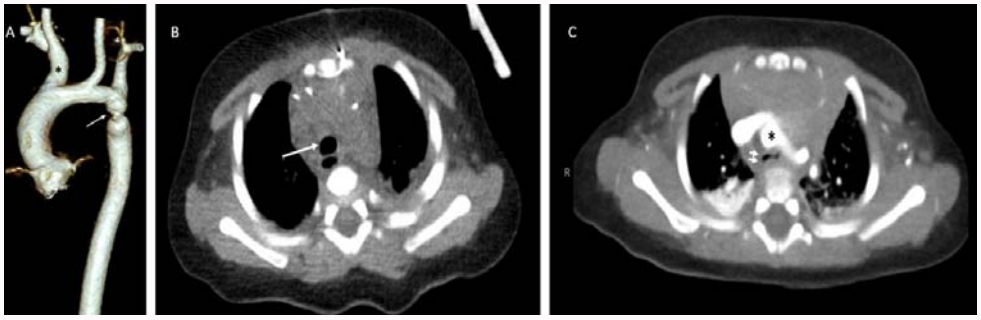

Figure 1A-1C: Computed tomography (CT) scan of the patient showing: (A) 3D reconstruction of the aorta with severe juxtaductal coarctation (arrow) and dilated innominate artery (*). (B) Post-coarctation repair CT showing patent upper trachea (arrow), and (C) Severely compressed distal portion (double arrow heads) related to anterior compression by the enlarged innominate artery (*).

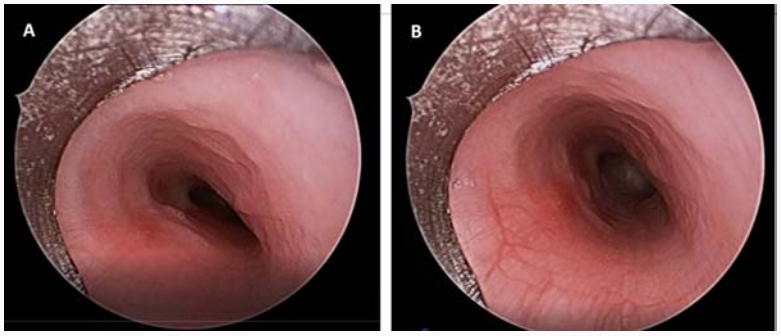

Figure 2A and 2B: Intraoperative rigid bronchoscopy showing: (A) The narrowing in the distal trachea. (B) Successful relief of the tracheal compression with a widely patent trachea after innominate arteriopexy.

is caused by the IA and the proximal arch. Did the patient have a predisposition for airway compression prior to his coarctation repair that was not recognized? We reevaluated his CT scan prior to his first surgery, and he had dilated IA and distal ascending aorta (Figure 1). Second, was EEE repairing the right technique for this patient with preoperative dilated IA? May be a simple resection with end-to-end anastomosis would have sufficed. This brings another question, in those with preoperative IA dilation and arch hypoplasia, repair via median sternotomy, and end-to-side anastomosis of the descending aorta to the undersurface of the aortic arch with a patch augmentation of the anastomosis anteriorly is a better strategy? More data will be needed to support this theory.

Conclusion

In conclusion, all new respiratory symptoms after aortic coarctation/arch repair in children should not be dismissed without proper and thorough evaluation. We do also recommend careful evaluation of the aortic arch anatomy and the size of the IA and distal ascending aorta prior to proceeding with coarctation repair in neonates and infants with possible alteration in the repair strategy to minimize airway complications after repair.

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