

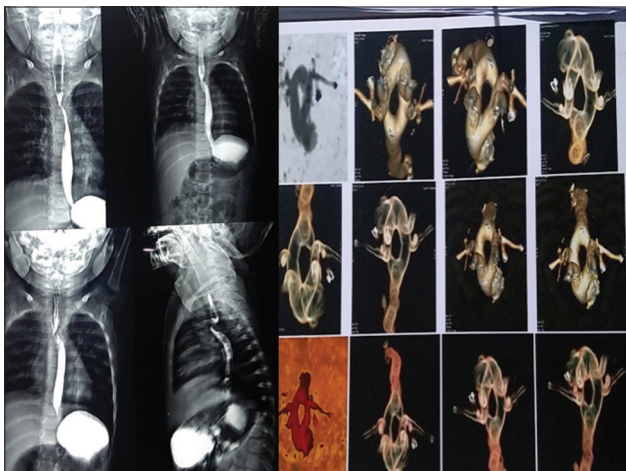
## A case of double aortic arch with tracheal stenosis and its anaesthetic management

Sir,

Vascular rings denote a group of anomalies of great vessels and their branches resulting from abnormal regression of the aortic arch complex and account for 1%–2% of all cardiovascular malformations. The majority (40%) are of double aortic arch type (DAA), which results from persistence of the fourth aortic arch.<sup>[1]</sup>

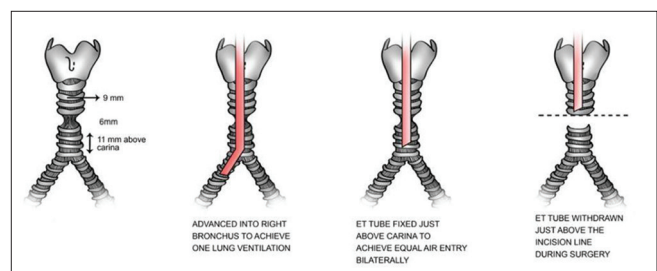
A 5-month-old female child was referred to our institution with noisy breathing, severe episodes of coughing, and audible wheeze since 1 week. Patient had a history of pneumonia 3 months back and was hospitalised and treated conservatively. Computerised tomography (CT) of the chest was done in view of repeated episodes of respiratory distress, which confirmed the diagnosis of DAA. The patient had mild tachypnoea and rest of the vitals including oxygen saturation were normal. Barium study showed external pressure effect and mild curvature in oesophagus at D4 level and CT angiography showed bilateral common carotid and subclavian arteries arising symmetrically from bilateral arches with separate origins [Figure 1]. The trachea and oesophagus were completely encircled by this arch at D3 level with compression and narrowing of the lumen of oesophagus and trachea.

On the day of surgery, the patient was taken into the operating room and multiparameter monitor



**Figure 1:** Contrast swallow and CT chest with angiography

was attached. Inhalational induction was done in titrated increments with sevoflurane up to 4%–5% with 100% oxygen while maintaining spontaneous ventilation. Once the patient was calm and relaxed, airway was secured with uncuffed endotracheal tube (ET) no. 4.5 and was advanced into the right bronchus to achieve one-lung ventilation and slowly withdrawn until bilateral air entry was achieved. The aim of doing this was to pass the ET beyond the stenotic area, so that its distal end sits just above the carina. The tube was fixed at 12 cm and inj. vecuronium 0.1 mg/kg was given after securing the airway [Figure 2]. Position of the ET was confirmed with 2.8-mm fiberscope (Olympus). Venovenous bypass through internal jugular vein was planned as a rescue method of maintaining oxygenation in case of airway collapse and failure of intubation. Right radial artery, right femoral, and right internal jugular venous cannulation was done. Caudal epidural analgesia was given with inj. bupivacaine 0.0625%, 7.5 mL with 15-mg tramadol as an adjuvant. After median sternotomy and vertical pericardiotomy, DAA was dissected, patent ductus arteriosus was divided and left aortic arch divided at its junction with descending aorta to open the vascular ring and both ends were oversewn. Trachea and oesophagus were dissected at the level of double aortic arch. Inj. heparin 400 IU/kg was given and cardiopulmonary bypass (CPB) was instituted after achieving activated clotting time more than 480 s. ET tube was withdrawn proximal to the stenotic area, stenotic portion was excised and anastomosis was done using V–Y plasty. Absence of air leak was confirmed by filling surgical field with normal saline and giving positive pressure ventilation. Patient was weaned off CPB. After completion of surgery, patient was shifted to intensive care unit (ICU) and extubated within 4 h. Inj. dexmedetomidine infusion was started at the rate of 0.3 µg/kg/h for postoperative analgesia for 6 h. Intermittent nasal CPAP was electively given for 2 days. Patient was shifted to step down ICU after 4 days.



**Figure 2:** Diagrammatic presentation of intubation technique

In DAA, right aortic arch joins left-sided descending aorta to form a complete vascular ring encircling both trachea and oesophagus. Infants often present with respiratory distress, stridor and swallowing difficulties.<sup>[2]</sup> Anaesthetic challenges include the risk of complete airway obstruction and rapid blood loss. Unlike the adult patient population, awake intubations are not practical for the majority of paediatric patients owing to their inability to cooperate.<sup>[3]</sup> During surgical correction, inhalational induction with spontaneous ventilation is recommended and neuromuscular blocking agents are given only when state of airway and response to positive pressure ventilation has been fully established. In case of difficult airway or failure to intubate, adequate oxygenation can be maintained by venovenous bypass, but our patient was a five months old child, so femoral venovenous bypass was not feasible, and cannulation through the right internal jugular vein was planned in a scenario of intubation failure. Placement of regional block prior to the start of surgery provides analgesia, reduces intraoperative anaesthetic drug requirements, ensures pain-free rapid emergence from anaesthesia, decreases stress response, and avoids deleterious adverse effects of narcotic drugs.<sup>[4]</sup> If tracheomalacia and stenosis are not a problem postoperatively, an anaesthetic plan allowing extubation at the end of the case is used.<sup>[5]</sup>

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has given his consent for images and other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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None.

#### Conflicts of interest

There are no conflicts of interest.

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