There's isoflurane in the stomach!  A case of possible tracheo-esophageal fistula diagnosed intraoperatively

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Learning Objectives:
- Review the clinical findings of the VACTERL association and the use of a VEPTR device
- Describe the use of multiple modes of gas analysis to investigate an unusual intraoperative finding of persistent air leak from an orogastric tube
- Recognize the risk of undiagnosed tracheo-esophageal fistula in patients who have experienced esophageal atresia repair

VACTERL Association:
VACTERL is an acronym:
- Vertebral anomalies (60-80%)
- Anal atresia
- Cardiac defects
- Tracheo-esophageal fistula (50-80%)
- Renal anomalies
- Limb defects (e.g. Radial dysplasia)

Incidence of 1 in 10,000-40,000 live births

VEPTR System:
VEPTR (Vertical Expandable Prosthetic Titanium Rib), is an implantable device used for the treatment of spine and chest wall deformities.

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Case Discussion:
We present the case of a 12 year old girl with a possible tracheoesophageal fistula (TEF) manifesting intra-operatively 11 years after surgical correction of a long-gap esophageal atresia (EA). The patient’s past medical history included the diagnosis of VACTERL association. She was born at 38 weeks GA ~ SGA with a long-gap EA which was repaired with a gastric pull up at age 3 months.

Intraoperative Management:
She had a PPI with sevoflurane and N₂O, followed by the placement of two 18g PIVs. She was ventilated by mask and after the administration of fentanyl and rocuronium a 5.5 cm cuffed ETT was placed easily. The cuff was inflated with a leak at 18cm H₂O. Placement was confirmed with bilateral auscultation, positive capnography and palpation of the cuff in the suprasternal notch. A 22g radial arterial catheter was placed at the suprasternal notch. A 22g radial arterial catheter was placed and an orogastric (OG) tube was passed easily, suctioned and capped.

Analysis:
Gas from this bag was removed and analyzed yielding the same isoflurane and oxygen concentration as end tidal values from the ETT. A separate gas analyzer confirmed the findings. Applying suction to the OG tube did change the tidal volume. A plain x-ray film of the spine was taken for surgical purposes, which showed the OG tube clearly ending below the diaphragm.

Explanations?
1. A leak around the ETT cuff allowed gases to escape the trachea, traveling down the esophagus and entering the gut – unlikely with an open mouth in the prone position
2. A TEF at the level of the original repair, coinciding with the level of the ETT cuff. When the airway pressures exceeded the cuff pressure, gas entrained through the fistula into the gut and the out through the OG tube. Recurrent TEF have been reported. However, we know of no similar presentation.

References: