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## CASE REPORTS

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# ANAESTHETIC MANAGEMENT OF CONGENITAL LARYNGEAL WEB PRESENTING WITH ACUTE UPPER AIRWAY OBSTRUCTION

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### Abstract

This is a case of failed intubation in a child of 15 months due to presence of laryngeal web. The airway was maintained by Cole Neonatal tube size 2 mm held at the available orifice of the glottis with maintenance of spontaneous respiration under general anesthesia till emergency tracheostomy was performed.

### Case Report

A fifteen month old child was brought to the Accident and Emergency Department with symptoms of cough and breathlessness. The child had a history of noisy breathing immediately after birth. Upper airway assessment had been done at the age of 8 months under general anesthesia. A thick laryngeal web had been found which was considered difficult to split at that age. The medical plan was for regular follow up in the ENT Department and for surgical correction to be done at the age of 3 years.

On examination, the child appeared distressed, with inspiratory stridor, tachypnea, flaring of the alae nasi and severe intercostals and subcostal chest retractions. He was however, alert and his hydration was adequate. Chest auscultation revealed conducted sounds from the upper airway and rhonchi all over the chest with reduced air entry bilaterally. Other systems were within normal. Vitals: pulse 154/min, temperature 38° C, respiratory rate 58/min. S<sub>p</sub>O<sub>2</sub> 88% with 2l/min oxygen. Arterial blood gases report showed: pH 7.28, PCO<sub>2</sub> 51.7 mmHg, PO<sub>2</sub> 53.7 mmHg, HCO<sub>3</sub> 23.6 mmol, Base excess -3.3 mmol. Other related investigations were within normal limits. Child was treated in Accident and Emergency Department with: Oxygen by nasal prongs 2l/min, Salbutamol 2.5 mg and adrenaline 1mg by nebulisation, hydrocortisone 40 mg IV, Ceftriaxone 0.75 g IV, paracetamol suppository 125 mg, and fluids for hydration.

Due to deterioration of the patient's sensorium and the increase in respiratory distress, airway assessment was scheduled with possibility of emergency tracheostomy. After informed written consent was obtained from parents, child was transported to the operation theatre with Oxygen 2l/min by nasal prongs. No premedication was advised.

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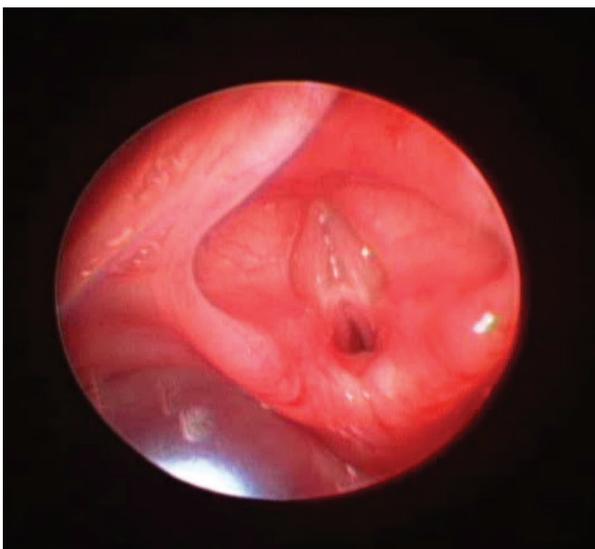
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In the operating theatre, the child was connected to standard monitoring of ECG,  $S_pO_2$  and NIBP. The anesthetic plan was inhalational induction and maintenance of spontaneous breathing throughout the procedure. Induction was done with sevoflurane 6% in oxygen with Ayre's T piece. After an adequate depth of anesthesia was reached, direct laryngoscopy was done and endotracheal intubation was attempted. The laryngeal web was found to cover most of the laryngeal inlet. There were also, edema and inflammation of the glottis. The anesthesiologist was unable to insert 2.5 mm endotracheal tube. Another trial was done with 2 mm Cole Neonatal tube that also, could not be inserted. Both tubes have the same external diameter of 3.5 mm. Due to unavailability of a rigid ventilating bronchoscope of a size less than 3 mm, a Cole Neonatal tube size 2 mm was kept at the orifice available in the laryngeal inlet for maintaining the airway and held in position by the anesthesiologist. Anesthesia was maintained by sevoflurane 3% in oxygen with spontaneous respiration. After local infiltration with lignocaine 2 %, the surgeon performed an emergency tracheostomy and 4 mm tracheostomy was inserted. The tracheostomy tube position was confirmed by end tidal  $CO_2$  and chest auscultation. Anaesthesia was maintained subsequently through the tracheostomy tube. Airway assessment was done which revealed thick laryngeal web covering 80% of laryngeal inlet and oedema of the false vocal cords (figure 1). Definitive surgery was deferred due to presence of infection.

*Fig. 1*

*Laryngeal web covering most of the laryngeal inlet*



## Discussion

The cause of difficult intubation in the presenting case is rare. The incidence of laryngeal webs has been described in children to be 1 in 10000 births. Congenital webs, usually symptomatic in infancy or early childhood, are the result of incomplete re-canalization of the primitive laryngeal airway<sup>1</sup>. Seventy five percent of laryngeal webs are located at the level of the vocal cords, the remainder being either sub or supraglottic. The majority of glottic webs lie anteriorly between the cords; only 1-2% are located posteriorly<sup>2</sup>. The disease is suggested by clinical symptoms such as stridor, weak crying and feeding problems, but endoscopic vision is essential for a definite diagnosis<sup>3</sup>. Usually the symptomatic laryngeal web is treated by one of the following surgical procedures: surgical division, endoscopic insertion of a keel or laser treatment<sup>3,4</sup>. Webs without any clinical symptoms are not treated as the incised and divided adjacent cords may adhere together because of scarring.

The less common thick glottic webs are more difficult to manage. They may be difficult or impossible to incise or dilate because of the associated subglottic-cricoid abnormality. The treatment required is tracheotomy followed by surgical excision of the glottic web and cartilaginous abnormality via a laryngo-fissure approach, followed by stenting with a glottic keel or placement of an anterior autogenous costal cartilage graft. The optimum age for surgery is not known, and the possibility of aggravating the situation by an ill-judged operation is a consideration. However, those infants with a severe obstruction above the tracheotomy are at greater risk of dying of cannula obstruction because of their decreased reserve airway above the tracheotomy. In such cases earlier reconstruction should be considered. Endoscopic placement of a keel in children is difficult, and the external approach is recommended for best results<sup>5</sup>.

In the present case, all measures available were kept ready for the expected difficult intubation. Due to a small laryngeal inlet, the smallest tube available which is the 2 mm Cole Neonatal tube with external diameter of 3.5 mm could not be inserted through the glottis and was held at the orifice for maintaining the airway. The smallest ventilating bronchoscope available was 3.5 mm and that was too big for the available laryngeal

chink to be used. The options of keeping the patient with an oro-pharyngeal airway and mask or laryngeal mask airway with spontaneous or assisted ventilation were not adequate for satisfactory ventilation with risk of gastric distension. Forced insertion of the tube when resistance was encountered was avoided to avoid

possibility of laryngospasm, trauma and iatrogenic airway obstruction. Cricothyroidotomy by the use of needle is not advised in paediatric patients as it is difficult to locate, in addition to difficulty to keep the needle in place due to highly kinetic larynx<sup>6</sup>.

## References

1. MOORE KL: *The developing Human*, 3rd ed. London: *WB Saunders*, 1982.
2. HOLINGER PH, BROWN WT: Congenital webs, cysts, laryngoceles and other anomalies of the larynx. *Annals of Otolaryngology and Laryngology*; 1967, 76:744-52.
3. CUMMINGS CW: *Otolaryngology Head and Neck Surgery*; London: CV Mosby; 1986.
4. DEWEESE DD, SAUNDERS WH: *Textbook of Otolaryngology*, 6th ed. London: CV Mosby; 1982.
5. COTTON, RT AND PRESCOTT CAJ: "Congenital Anomalies of the Larynx". *Practical Pediatric Otolaryngology*, Lippincott-Raven, Philadelphia; 1999, 497-513.
6. REDDY S: "Pediatric Airway Emergencies: Evaluation and Management". Dr. Quinn's Online Textbook of Otolaryngology. January 3, 2002. <http://www.utmb.edu/otoref/Grnds/Pedi-Airway-2001-01/Pedi-Airway-2002-01.pdf>.

