

# **Laryngeal suction tube: A novel technique for tracheal ventilation in an obstructed airway in a child with respiratory papillomatosis**

## **KEYPOINTS**

- Spontaneous ventilation is ideal to assess dynamic of the airway in a child that presents with upper airway obstruction, albeit challenging
- Novel, safe and cost-effective approach to temporary tracheal ventilation of the obstructed airway can use the laryngeal suction tube connected to general anaesthetic (GA) machine
- Close co-operation between the surgeon and anaesthetist is crucial in managing upper airway obstruction in a child
- In a child that presents with respiratory papillomatosis, direct laryngoscopy should be accompanied by tracheobronchoscopy to assess the extension of papilloma as well as to look for multilevel involvement of the papilloma
- During spontaneous ventilation, surgeon should be prepared that in case patient desatures endotracheal intubation should be performed

Juvenile-onset recurrent respiratory papillomatosis (JORRP) albeit a benign entity, poses a challenge both to the Otorhinolaryngology and Anaesthesiology team to safely manage the obstructed airway. Myriad techniques of ventilation using tube or tubeless technique has been reported. Tubeless supraglottic airway has been lauded as a safe technique while embarking on paediatric airway surgery.<sup>1</sup> Yet, the inadequate depth of anaesthesia has been reiterated in addition to higher risk of laryngospasm has been reported with supraglottic airway, hence favouring tracheal ventilation. We present a novel technique of tracheal ventilation using suction laryngeal tube attached to direct laryngoscope.

## Methods

After discussion with the Anaesthetist, we planned to maintain spontaneous breathing by the patient. Total intravenous anaesthesia (TIVA) technique with target control infusion (TCI) of propofol and remifentanyl was used to induced patient. Direct laryngoscopy performed revealed papillomatosis lesion with punctate haemorrhage occupying 90% of airway mainly over the bilateral false cord, true cord and subcordal region and topical anaesthesia using 2% Lignocaine (3mg/ kg) via a malleable oral atomizer (MADgic® Teleflex, USA) was used. However, due to the obstructed upper airway patient started to desaturate. Manual bag valve mask bagging attempted was unsuccessful and Lindholm laryngoscope was performed at once and patient was intubated with ETT size 4.0. However, the ETT was obstructing the surgical field, hence we opted to remove it and use a rigid laryngeal suction tube through the vocal cords. The rigid laryngeal suction tube was attached to the side-port of Lindholm laryngoscope and connected to the breathing circuit of GA machine by modification using suction tubing and ETT tube 15 mm male connector (Figure 1). Manual bagging ventilation by anaesthetist with 15L/min of 100% oxygen, adjustable pressure-limiting valve set at 30-40

cmH<sub>2</sub>O, at rate of 30-40 breaths per minutes, was able to maintain patient's oxygen saturation (SpO<sub>2</sub> 100%) throughout the debulking of the papilloma. Finally, telescopic examination was performed using 0-degree 2.6mm rigid endoscope which ruled out presence of papilloma over the trachea and bronchi. Child was then intubated with ETT size 4.5mm and extubated successfully in operation theatre.

## Discussion

Recurrent respiratory papillomatosis (RRP) is a benign, self-limiting disease caused by human papilloma virus (HPV). Key factors of HPV-related lesions lies in early dysregulation of the virus in the basal epithelial cells along with genomic instability resulting in secondary host genomic imbalance.<sup>2</sup> RRP is classically characterised by appearance of papillomatous lesion in the aero-digestive tract albeit laryngeal predominance.<sup>2</sup> A bimodal age of distribution (young children and young adults) was associated with RRP although recent studies have shown a trimodal age of distribution: with a first peak in children younger than 5 years of age, second one in adults between 20 and 40 and third involving elderly patients aged above 60.<sup>3</sup> JORRP traditionally involves children under 5 years of age and possesses an aggressive nature.

Modes of transmission of JORRP includes vertical transmission at birth, vertical transmission in utero, and horizontal transmission via child's environment.<sup>4</sup> Managing JORRP is arduous owing to its unpredictable course in addition to the possibility of airway compromise in florid growth of the papilloma requiring emergent debulking.

Ventilation of a child with JORRP in respiratory distress is a gruelling challenge both to the Anaesthesiology as well as the Otorhinolaryngology team. Tracheal intubation has been the favoured method owing to adequate control of ventilation. However, in an obstructed airway,

tracheal ventilation may be deemed impossible. Tracheostomy is not recommended in JORRP as this becomes the site for rapid viral colonization and serves as conduit for distal spread of disease.

Jet Ventilation applied via hand-triggered devices such as the Sander injector or Manujet III (VBM, Germany), through a rigid catheter (supraglottic or subglottic), can also achieved good oxygenation and ventilation and has been used widely in endolaryngeal laser surgery. However, it utilized much higher pressure (1-4 bar) compared to our technique (40-70cmH<sub>2</sub>O) and theoretically has higher risk of barotrauma, albeit able to provide better ventilation. Due to the massive leak in both jet ventilation and our technique, capnography monitoring is pointless, and we must monitor adequate ventilation via direct visualization of chest rise or periodic arterial blood gas sampling.

## Conclusion

In conclusion, our technique offers a significant advantage as it is safe, cheap, enables adequate oxygenation whilst the debulking of the papilloma is carried out with minimal obstruction of the surgical field. Furthermore, this technique enables telescopic examination of the lower airway to be performed while providing adequate depth of anaesthesia with TIVA technique without OT pollution with volatile agents.

## DISCLOSURE STATEMENT

All authors have no conflict of interest

## Reference

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