

Anesthesia management in a child with laryngeal papilloma causing near complete airway obstruction

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ABSTRACT

Recurrent respiratory papillomatosis (RRP) is a rare, chronic disease of viral etiology affecting most commonly larynx. A 5-year-old child with stridor was posted for microlaryngoscopic excision of laryngeal papilloma. We discuss the perioperative management of case with the various ventilation strategies. In child with stridor intubation remains the safest option. It is suggested to maintain spontaneous ventilation until intubation as mask ventilation could be difficult.

Key words: Anesthesia, laryngeal papilloma, stridor

INTRODUCTION

Recurrent respiratory papillomatosis (RRP) is a rare, benign and chronic disease caused by human papilloma virus (serotypes 6 and 11).^[1] The lesions which are exophytic growth of squamous epithelium is known to affect entire airway, but larynx is the most common site involved. Here, we report a case of child posted for excision of laryngeal papilloma which had completely obstructed the airway.

CASE REPORT

A 5-year-old boy weighing 15 kg came with a history of progressive difficulty in the breathing since 1 month. He had a history of aphonia since 2 months. He was evaluated in another hospital where flexible laryngoscopy was performed. It revealed large pedunculated polyp arising from glottis causing

ball valve kind of obstruction to the airway and multiple papillomas over both false vocal cords [Figures 1 and 2, Video 1]. He was referred to our hospital for excision of papilloma. Preoperative examination revealed poorly nourished, anxious child with grade III laryngeal obstruction. His respiratory rate was 30/min. Severe suprasternal retraction with inspiratory stridor was noted. On auscultation, bilateral air entry was reduced. His room air saturation was around 94%. His heart rate was 140/min and blood pressure was 100/62 mm of Hg. He was born full term by vaginal delivery and received routine immunization. He had no other comorbidities. Case was discussed with otorhinologist for airway strategy. Plan was made for inhalational induction maintaining spontaneous ventilation for as long as airway is secured.

Parents were explained about the risk of anesthesia and need for tracheostomy and written informed consent was taken. Child was accepted under American Society of Anesthesiologists III status for microlaryngoscopic excision of papilloma. Child was kept nil per the oral overnight. Preoperative medications were avoided. Anticipating difficult airway small sized endotracheal tube (ET), tracheostomy tubes, resuscitation equipment were kept ready. Inside the theater all routine monitors (electrocardiography, SpO₂, non-invasive blood pressure) were attached. Intravenous (IV) atropine 20 µg was given before induction. Induction was done with 100% oxygen with 6% sevoflurane. On achieving deeper plane of anesthesia ventilation worsened and there was poor chest

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Figure 1: Flexible laryngoscopy revealing laryngeal papilloma

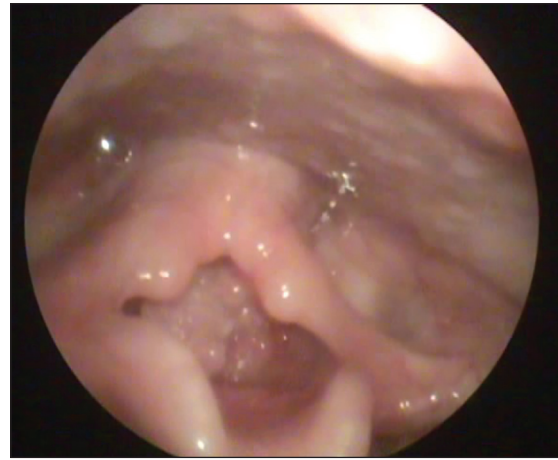


Figure 2: Flexible laryngoscopy revealing laryngeal papilloma with near complete airway obstruction

rise. Immediately direct laryngoscopy was performed, which revealed polyp completely occluding the glottis. We could negotiate plain 4 no. ET and its placement were confirmed by capnography. Anesthesia was maintained with oxygen, air and sevoflurane. IV fentanyl 30 µg and hydrocort 30 mg were given. Surgeon tried to excise the lesion, but ET tube was occluding their view and thus making access to the polyp difficult. The option of using a smaller sized ETT was offered to the surgeon, but he opined that a tracheostomy will give better access. A tracheostomy was done and a cuffed 5 no ETT was inserted through tracheostomy stoma. Anesthesia was maintained with sevoflurane and atracurium was given for akinesia. The papillomas arising from anterior third of right vocal cord, left vocal cord and subglottis were removed, only a small remnant on left vocal cord and right arytenoids region could not be excised. After surgery, a plain 5no tracheostomy tube was inserted into the stoma. Child was stable throughout the procedure and after achieving spontaneous ventilation child was reversed. Postoperatively he maintained 98% saturation with T-piece. Child was decannulated on 5th day and child was discharged on 6th day.

DISCUSSION

Recurrent respiratory papillomatosis commonly affects children age 2-4 years. The incidence of RRP reported is 4.3/100,000 children.^[2] Classic presentation of RRP in children is hoarseness, but it can progress to a potential life-threatening airway obstruction. The diagnosis of RRP itself is challenging and can be easily mistaken for croup, asthma. There is no definitive cure for this chronic condition. Surgical debulking by CO₂ laser, microlaryngoscopy in multiple settings is required for relief of obstruction with a care to preserve the vocal cord function. Adjuvant therapy in the form of interferon, acyclovir intralesional cidofovir injection has been used

with various success rate. Despite successful excision, recurrence is common with complications such as airway scarring, edema and stenosis.

Preoperatively the degree of obstruction should be evaluated. The quality of voice (hoarse or aphonia), heart rate, respiratory rate, use of accessory muscles, and room air oxygen saturation should be assessed. Stridor is a sign of significant laryngeal obstruction. Preoperative flexible laryngoscopic examination of the airway by an experienced otorhinologist is essential. Treatment essentially comprises of endoscopic stripping in our setting. As RRP can cause pulmonary hypertension, an echocardiogram should be done if there is a suspicion.^[3] Since the airway is shared by both anesthesiologist and surgeon, establishing an adequate airway and maintenance of anesthesia remains challenging. Alternative airway strategies should be immediately available in case of failure including cardiopulmonary bypass in patients with extensive airway involvement.^[4] Close communication between anesthetist, surgeon and operation room personal is essential for optimal care.

The goals of anesthesia are to provide adequate ventilation, provide the vocal cord relaxation, to avoid trauma, laryngospasm and to provide good surgical access. Tracheostomy is best to be avoided as they carry the risk of virus spread, and emphasis should be on early decannulation.^[5]

Basic ventilation strategies used in laryngeal surgery are spontaneous ventilation, intermittent positive pressure ventilation, apneic ventilation and jet ventilation.^[3,6,7] Total intravenous anesthesia with spontaneous ventilation via small sized tubes has been used for anaesthetizing children with grade I to III laryngeal obstruction.^[3] Subglottic jet ventilation offers advantage of unobstructed view but is invasive and complex, which precludes its use in child with

stridor. The complications associated with these tubeless techniques are hypoxia, hypercarbia and barotraumas making intubation as safest strategy. Advantage of intubation is control on airway, protection from aspiration and easier to maintain depth of anesthesia. The disadvantage is being inadequate surgical exposure and the risk of spread of the disease. In the rare occasion, papilloma can occlude the ETT lumen making ventilation difficult.^[8] Smaller size tube can be used to enhance surgical access, but it hampers the ventilation as well as volatile agent concentration. Loss of airway control is well known after induction of anesthesia requiring immediate intubation or rigid bronchoscopy.^[9] Regardless the anesthesia technique, maintenance of spontaneous ventilation and avoidance of muscle relaxants becomes vital until airway is secured. We preferred intubation over other strategies as there was difficulty in mask ventilation due to complete prolapse of papilloma. We avoided premedication and sedation. Atropine can worsen the stridor by drying of secretions. Hence, it was given just before induction.

CONCLUSION

Anesthetic management of laryngeal papilloma needs special attention as the lesion can obstruct already narrow pediatric airway, in addition anxiety and respiratory distress in the child makes it more challenging to the anesthesiologist.

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