

Anesthesia for Excision of Laryngeal and Tracheal Papillomatosis in a Pediatric Patient: A Case Report

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ABSTRACT

Laryngeal papillomatosis is a rare disease of viral etiology that can obstruct the airway. Symptomatic treatment is essentially surgical. Anesthetic management needs special attention due to a narrow airway that will be shared with the surgical team. We discuss the perioperative management of a child with recurrent papillomatosis and possible strategies to manage similar cases.

Keywords

Airway management, Airway obstruction, Anesthesia, Laryngeal papillomatosis, Recurrent respiratory papillomatosis.

Introduction

Laryngeal papillomatosis is a benign disease caused by the Human papillomavirus (HPV) and mainly affects children under 10 years of age, being an infection acquired in the birth canal. The incidence is about 4.3 cases per 100,000 children [1]. It is characterized by the appearance of tumors with exophytic growth that can affect the entire airway, with a predominance of the larynx [2]. The main signs and symptoms are hoarseness, stridor, and progressive dyspnea, depending on the degree of airway obstruction. The lesions are recurrent and, currently, there is no curative treatment, requiring periodic surgical removal of the lesions [3]. This report discusses anesthesia for the excision of laryngeal and tracheal papillomatous lesions in a pediatric tracheostomized patient with several previous approaches for this condition.

Case Report

A 11-year-old male patient, weight 35Kg, tracheostomized, diagnosed with airway papillomatosis, without other comorbidities. He was admitted with a report of hoarseness and dyspnea on moderate exertion. Flexible laryngoscopy showed papilloma in the larynx, trachea, and carina, with partial obstruction of the respiratory tract (Figures 1 and 2).



Figure 1: Flexible Laryngoscopy Showing Laryngeal Papilloma.

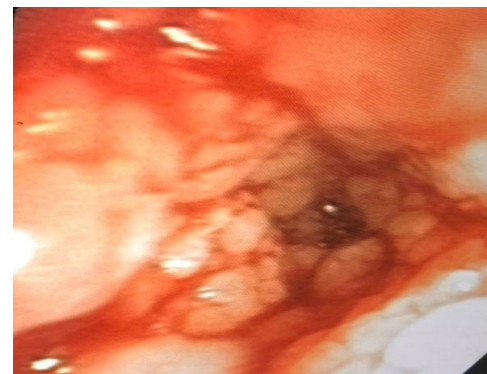


Figure 2: Laryngeal Papilloma with Partial Airway Obstruction.

He went to a laryngeal papillomatosis resection under general anesthesia. After pre-anesthetic evaluation and application of the informed consent, the patient was referred to the operating room. Opted for not performing premedication for potential respiratory depression. He was monitored with electrocardiography, non-invasive blood pressure, and pulse oximetry. Inhalational anesthetic induction was performed through the tracheostomy cannula with 100% oxygen and 6% sevoflurane. Peripheral venous access was obtained and target-controlled venous anesthesia was maintained with remifentanyl 3ng/ml and propofol 2.5mcg/ml to ensure an adequate level of anesthesia. The tracheostomy tube was replaced by a 5.0 mm endotracheal tube (ET) and controlled ventilation was used during the papilloma debulking near the glottis vera. During surgery, the tube was removed intermittently to remove lesions in the trachea and carina, and, during these periods, spontaneous ventilation or apneic technique was performed, based on the location of the papilloma. Faced with desaturation, the tube was reinserted to return controlled ventilation. Laryngeal lesions were removed by laryngoscopy. The procedure was uneventful, the child was stable throughout the surgery. In the end, 1g of dipyrone and 4mg of ondansetron were administered. After assuming spontaneous ventilation with a good breathing pattern, the tracheostomy tube was reinserted into the stoma, and drainage of secretions and residual blood was performed. The patient recovered without complaints and went to the recovery room, maintaining 97% saturation.

Discussion

Recurrent respiratory papillomatosis commonly affects children aged 2-8 years and there is no definitive cure for the condition [2]. Recurrent pediatric laryngeal papillomatosis has no specific and effective treatment, and some children develop severe airway obstruction and may require a tracheostomy [4]. Preoperative airway evaluation, appropriate choice of anesthesia induction, maintenance of an adequate depth of anesthesia, a flexible ventilation strategy, continuous and close monitoring, and prompt management of adverse effects are key points in perioperative airway management in pediatric patients with papillomatosis and severe laryngeal obstruction [5]. Anesthesia's goals include maintaining a patent airway during surgery, as well as ensuring adequate ventilation and surgical exposure. Premedication should be used with caution in cases of hoarseness or stridor due to the inhibition of respiration and the effect of the sedative on the respiratory tract [5]. To reduce secretions, anticholinergic drugs such as atropine or alpha 2 agonists such as dexmedetomidine may be used [4]. Anesthesia is typically induced based on the degree of laryngeal obstruction and the patient's cooperation, and both inhaled and intravenous anesthetics can be used. However, inducing general anesthesia may result in complete airway obstruction due to laryngeal muscle relaxation, papilloma prolapse, and increased secretions [5]. Adequate depth of anesthesia reduces the risk of complications such as breath holding, laryngospasm, and cough reflexes and helps to prevent the cardiovascular response because of the airway stimulus [5]. Bo et al. suggested the use of intravenous anesthesia with remifentanyl and propofol, as well as spontaneous ventilation to proceed to a laryngeal papillomatosis resection [4].

Endoscopic laryngeal surgery commonly employs four ventilation strategies:

Spontaneous ventilation, mechanical controlled ventilation, apneic intermittent ventilation, and subglottic jet ventilation [4]. During the debulking of the supraglottic papilloma, controlled ventilation is frequently used. The papilloma tissue in the hypo larynx and trachea is then removed using spontaneous breathing or the apneic technique to improve surgical access [5].

Intubation is advantageous because it protects the airway, but it can make surgical access difficult [2]. If intubation is chosen, a tube with a smaller diameter should be used for the age group, which makes ventilation difficult [2]. Regardless of the technique used, communication with the surgical team must be performed and, in case of loss of airway control, intubation or rigid bronchoscopy must be performed. In extreme cases, an emergency surgical airway may be necessary [6]. Resuscitation supplies should be readily available in the operating room and, in selected cases, extracorporeal oxygenation devices [7].

The patient of the case was already tracheostomized, which facilitated airway management by the anesthesiology team. Despite that, a tracheostomy can cause tracheal stenosis in children and interfere with tracheal development, so it should be avoided if possible. Laryngeal papilloma typically arise from the junctional zones of ciliated columnar and squamous epithelia. The tracheostomy incision site may result in the formation of a junctional zone, which promotes the growth of the papilloma around the stoma and into the trachea. Breathing through the incised trachea may mask symptoms of airway obstruction caused by tumor growth, and it is worth noting that even tracheostomized patients may have distal obstruction to the cannula [5].

After the surgery, blood and secretions of the laryngeal should be completely removed to avoid aspiration into the distal airway [4].

In conclusion, pediatric laryngeal papillomatosis with severe laryngeal obstruction is a life-threatening event and careful management of the ventilation mode transition, adequate anesthesia, close monitoring, and anticipation of complications should take into account to improve outcomes.

References

1. Lépine C, Voron T, Berrebi D, et al. Juvenile-onset recurrent respiratory papillomatosis aggressiveness: In situ study of the level of transcription of hpv e6 and e7. *Cancers (Basel)*. 2020; 12: 1-12.
2. Harshad PL, Pujari V, Channappa NM, et al. Anesthesia management in a child with laryngeal papilloma causing near complete airway obstruction. *Saudi J Anaesth*. 2015; 9: 86-88.
3. Derkay CS, Bluher AE. Recurrent respiratory papillomatosis: Update 2018. *Curr Opin Otolaryngol Head Neck Surg*. 2018; 26: 421-425.

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4. Bo L, Wang B, Shu SY. Anesthesia management in pediatric patients with laryngeal papillomatosis undergoing suspension laryngoscopic surgery and a review of the literature. *Int J Pediatr Otorhinolaryngol.* 2011; 75: 1442-1445.
 5. Li SQ, Chen JL, Fu H Bin, et al. Airway management in pediatric patients undergoing suspension laryngoscopic surgery for severe laryngeal obstruction caused by papillomatosis. *Paediatr Anaesth.* 2010; 20: 1084-1091.
 6. Hu X, Shen X. Airway loss during inhalation induction of anesthesia with sevoflurane in a pediatric patient with laryngeal papillomatosis: A case report. *Exp Ther Med.* 2015; 10: 2429-2431.
 7. Crastnopol P, Platt N, Phillips WR, et al. Resection of solitary tracheal papilloma using cardiopulmonary bypass. *N Y State J Med.* 1967; 67: 1166-1169.