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Difficult intubation in a patient with large vocal cord papillomatosis for laser surgery!: Serial dilatation of larynx to the rescue

Sir,

The incidence of laryngeal papillomatosis is estimated to be 4.3 per 100,000 in the paediatric age group and 1.8 per 100,000 in adults [1]. Papillomas recur frequently and may require repetitive surgery and antiviral therapy.

A 30 year old, 50 kg female patient with a known case of vocal cord papillomatosis was referred to the anaesthesia department for assessment before carbon dioxide laser ablation. She presented with hoarseness and strained voice and was having a history of microlaryngeal surgery (MLS) for the same complaints at the age of 12. Preoperative evaluation with flexible nasendoscopy by an otolaryngologist showed a large pedunculated vocal cord papilloma attached to her left vocal cord obscuring about 80% of the laryngeal inlet (Fig. 1) (Video 1). The patient was of ASA physical status I and was having Modified Mallampatti Class I on airway examination. She was having inspiratory stridor with bilateral equal air entry on auscultation.

Supplementary video related to this article can be found at https://doi.org/10.1016/j.tacc.2019.06.001.

The patient was kept nil by mouth overnight. Preoperative medications were avoided. Anticipating difficult airway small-sized endotracheal tubes (ETT), emergency cricothyrotomy set, tracheostomy set and resuscitation equipment were kept ready. As a paediatric bronchoscope was not available, we preferred general anaesthesia for intubation in this patient. Standard monitoring was attached and the patient was preoxygenated with 100% oxygen. Induction was done with 100μg fentanyl and 70 mg of a graded dose of propofol along with sevoflurane to maintain spontaneous respiration. Direct laryngoscopy was done and intubation was attempted with a 5.5mm (ID) laserflex endotracheal tube (ETT), which failed due to a narrow glottic opening. In the second attempt, the negotiation of even 4.5mm (ID) laser tube in this patient failed. A 3.5mm uncuffed portex ETT was later negotiated with little resistance. Serial dilatation of the larynx was then attempted with portex ETT of sizes 4mm (uncuffed), 4.5mm (uncuffed), 5mm (cuffed), 5.5mm (cuffed) after lubricating distal part of the tube with water soluble jelly. In between intubation attempts, a deeper plane of anaesthesia was maintained with sevoflurane concentration of 3–4%. Finally, we were able to intubate the patient with a 5.5mm(ID) laserflex tube (Fig. 2). Anaesthesia was maintained with oxygen, air, sevoflurane, and atracurium. Intraoperatively 7.5mg dexamethasone was given intravenously. Papilloma was excised completely and we were able to extubate the trachea without any complication.

Preoperative assessment of the degree of obstruction is of utmost importance in patients with vocal cord papillomatosis and flexible nasendoscopy is the gold standard for dynamic assessment of the preoperative airway. The goals of anaesthesia are to provide adequate ventilation, vocal cord relaxation, good surgical access and avoid complications like trauma and laryngospasm. Basic ventilation strategies used in laryngeal surgery are intermittent positive pressure ventilation, jet ventilation, spontaneous ventilation, and apnoeic ventilation [2]. Jet ventilation has the disadvantages of barotrauma and limitation in using increased FiO_2 during laser. Subglottic jet ventilation offers the advantage of an unobstructed view but is invasive and complex [3]. Surgery on a moving target during spontaneous ventilation strategy requires greater precision and skills. Offering an ideal view for the surgeon, apnoeic ventilation may be time limited. However with the advent of high-flow oxygenation, this apnoeic period has been significantly extended [4]. Complications associated with these tubeless techniques are hypoxia, hypercarbia and barotrauma thus making intubation the safest strategy. The advantage of intubation is control on the airway, protection from aspiration and easier to maintain the depth of anaesthesia. The disadvantage is an inadequate surgical exposure and risk of the spread of the disease.

Airway management of the patient with vocal cord papilloma producing dynamic, airway occlusion (ball-valve effect) requires a specialized management plan. Induction of general anaesthesia, loss of hypopharyngeal tone and abolition of spontaneous ventilation can promote total airway obstruction and result in the inability to ventilate and/or intubate. Regardless of anaesthetic agents used, maintenance of spontaneous ventilation and avoidance of muscle relaxants until the airway is secured is the key. In the majority of these cases, intubation is difficult despite a good glottis view because of the narrow glottic opening. A very small endotracheal tube will cause an increase in airway pressure and hypercarbia intraoperatively. Awake tracheostomy may be considered in this scenario but may be quite unpleasant for patients with a narrowed airway due to the 'cork in bottle' phenomenon, where the fibrescope passage precipitates complete airway occlusion [2]. Tracheostomy is best to be avoided as they carry the risk of virus spread and if performed early decannulation should be planned. Serial dilatation is a well-accepted technique of percutaneous tracheostomy. Serial dilatation in this case created a space for ETT by displacing the pedunculated mass and we were able to intubate the trachea with the desired size of laserflex ETT and prevented a possible tracheostomy. Alternative techniques of dilatation like the use

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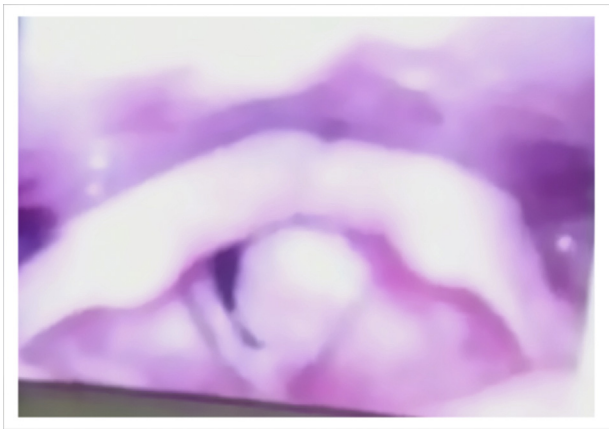

Fig. 1. Nasendoscopy showing a large vocal cord papilloma obscuring about 80% of the laryngeal inlet.

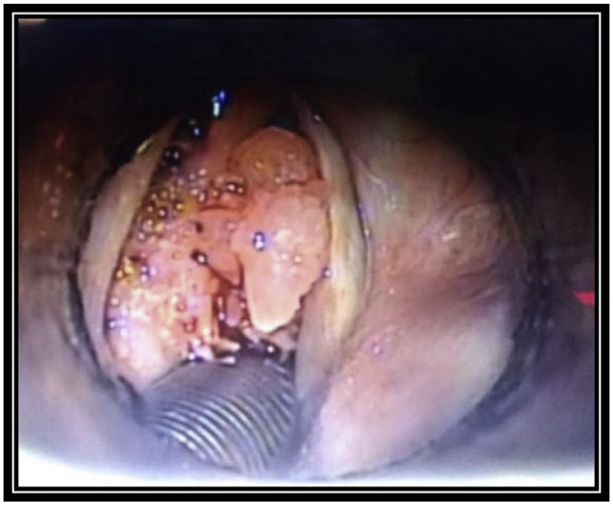

Fig. 2. View of vocal cord after intubation with laserflex tube.

of a single tapered dilator can be tried in these cases. Repeated intubations of pedunculated papilloma carry a danger of haemorrhage and dislodgement. Thus dilatation should be done gently with proper lubrication.

Difficult airway, complications associated with laser surgery and airway sharing with surgeons make these surgeries always challenging to the anaesthesiologist. Alternative airway strategies should be immediately available in case of failure of one plan. In these subsets of patients having large pedunculated papilloma, serial dilatation of the larynx for intubation can be given a thought.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tacc.2019.06.001.

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Kumar Abhyuday*, Naaz Shagufta
Dept. of Anaesthesiology, AIIMS Patna, India

Bhavana Kranti
Dept. of Otorhinolaryngology, AIIMS Patna, India

Shadab Madiha
Dept. of Anaesthesiology, AIIMS Patna, India

* Corresponding author. A-3, Ashokpuri Colony, Khajpura, Patna, 800014, India.
E-mail address: drabhyu@gmail.com (K. Abhyuday).

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