CASE REPORTS

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Nasotracheal Intubation in the Presence of a Pharyngeal Flap in Children and Adults

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NASOTRACHEAL intubation (NTI) may facilitate intraoral and maxillofacial surgery. Nasal placement of the endotracheal tube improves surgical exposure and increases tube stability during intraoral manipulation of facial structures and thus is requested often by oral and maxillofacial surgeons. For postoperative airway maintenance and/or ventilation, a nasal endotracheal tube is well tolerated and potentially less hazardous to the surgical repair.

In the absence of a pharyngeal flap, NTI usually can be performed without difficulty. Proper preparation of the nasopharynx is necessary to reduce bleeding from mucous membrane trauma. In the presence of a pharyngeal flap, NTI can be traumatic, difficult, and time-consuming. A careful, stepwise approach must be employed while securing the airway in such patients.

In this report, we describe an NTI technique suitable for children and adults who have intact pharyngeal flaps. It is simple and adaptable and does not require a flexible fiberoptic bronchoscope (FFB).

Case Report

After induction of general anesthesia and administration of glycopyrrolate and muscle relaxants, an oral RAE endotracheal tube (Mallinckrodt) is placed under direct visualization to secure the airway (fig. 1.1). Both nasal passages are prepared with local anesthetic solution containing a vasoconstrictor to minimize bleeding. A flexible whistle-tipped suction catheter is advanced gently to explore the patency of each naris and the contiguous pharyngeal flap passage (fig. 1.2). Direct palpation of the palate with a gloved finger facilitates guidance of the catheter to the patent ostium of the pharyngeal flap. Visualization of the oropharynx is facilitated by using a lighted laryngoscope as a tongue depressor. Once the catheter tip is seen emerging through the ostium, it is grasped with a clamp and held in place. The whistle-tip end of the catheter is cut, and the soft hollow

Fig. 1. The sequence for nasotracheal intubation in the presence of a pharyngeal flap. (1) The airway is secured using an oral RAE tube. (2) A suction catheter is advanced via a patent naris behind the pharyngeal flap, and the flap ostium is identified. (3) The catheter is used as a stylet to guide advancement of a nasal RAE tube before it is withdrawn. (4) The oral tube remains in the trachea while the stomach and oropharynx are prepared for oral extubation. (5) The oral tube is withdrawn, and the nasal tube is advanced into the trachea under direct visualization.

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catheter is left in place to serve as a stylet. An appropriately sized nasal RAE endotracheal tube then is advanced over the stylet into the naris and under the pharyngeal flap (Fig. 1.5). To improve endotracheal tube softness and further minimize bleeding, all nasal tubes are soaked in warm saline before use.

Once the endotracheal tube is through the pharyngeal flap ostium, the catheter is removed, and the nasal endotracheal tube is advanced toward the trachea, with Magill forceps as needed (Fig. 1.4). After suctioning the oropharynx and stomach, cricoid pressure is applied, and the oral RAE endotracheal tube is removed; simultaneously, the nasal RAE endotracheal tube is advanced into the trachea under direct visualization (Fig. 1.5).

Discussion

Patients with a cleft palate often require pharyngeal flap pharyngoplasty. This usually is performed in childhood to improve pharyngeal dynamics and speech quality. Over time, scarring behind the flap can make NTI for subsequent facial, orthognathic, or dental surgery difficult. Because blind insertion of a nasal endotracheal tube, division of the pharyngeal flap to allow nasal intubation, and tracheostomy are unacceptable options, a safe method for NTI remains desirable.

Becker et al. described a technique that uses the tight fit of an endotracheal tube into the fluted end of a red rubber catheter to pull the tube through the naris into the oropharynx. They did not describe the frequency of tube-catheter separation or degree of flap trauma in their report. Bell et al. described preoperative nasendoscopy to assess the size of flap ostia in this patient population. There are no reports of FFB use as an adjunct to intubation in this patient population.

The technique we describe has advantages over Becker et al.'s technique. The risk of catheter-tube detachment is eliminated. The risk of rupturing the cuff on a cuffed tube by trying to secure a red rubber catheter over the balloon also is eliminated. The widest point for passage through the ostium is reduced to the external diameter of the tube rather than the overlapping thickness of the red rubber catheter attached to the endotracheal tube tip. Because the catheter remains in place as a stylet, different-sized endotracheal tubes can be tried without losing the track through the cannulated passage. Instead of red rubber catheters, our technique employs suction catheters that are readily available in well-equipped anesthesia carts. Also, suction catheters can be used simultaneously to clear secretions and blood or adapted to blow air or oxygen to help clear secretions or open passages during catheter advancement.

Our technique has similar advantages over the use of an FFB to visualize and penetrate the pharyngeal flap ostium. In very young patients for whom uncuffed nasal RAE endotracheal tubes are used, the pharyngeal flap ostium is usually large enough to allow atraumatic passage of both the catheter or FFB and the tube. In older patients, however, bleeding and difficulty passing the catheter or FFB and cuffed endotracheal tubes through a scarred or narrowed passage are encountered more often. Leaving the catheter in situ as a stylet allows selection of a smaller but still adequate nasal endotracheal tube without reexploration of the nasopharynx for a passage. This is not possible using either Becker et al.'s technique or the FFB. If the FFB is used as the stylet, it must be removed to change the tube size. With FFB use, any bleeding makes revisualization more difficult. If visualization is not necessary or possible, the need for FFB is obviated.

In summary, we report a technique of NTI for use in patients with intact pharyngeal flap pharyngoplasty. It avoids the limitations of previously described techniques and possesses the advantages of simplicity and adaptability for use in settings, such as in field hospitals in developing countries, where an FFB may not be available.

References