Intubation in a pediatric difficult airway using an adult flexible fiber-optic bronchoscope and a j-tipped guidewire: An innovation in adversity

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ABSTRACT

Management of an anticipated difficult airway relies heavily on flexible fiber-optic bronchoscope (FFB) guided awake intubations. In a pediatric patient with difficult airway, doing an awake procedure may be difficult, and hence the child is either deeply sedated or anesthesia is induced before attempting intubation with an appropriate sized FFB. We present the anesthetic management of a 6-year-old child with a lacerated tongue and fractured mandibular condyle, with subsequent inability to open his mouth, who was posted for urgent exploration and open reduction under anesthesia. Unhindered by a damaged pediatric FFB, we innovated by positioning the tip of an adult FFB just outside the larynx, passing a j-tipped guidewire through the working channel of the FFB, and successfully railroaded a naso-tracheal tube over the guidewire. The surgery, reversal and extubation, and the postoperative period were uneventful.

Key words: Flexible fiber-optic bronchoscope, guidewire, pediatric difficult airway, working channel

INTRODUCTION

Flexible fiber-optic bronchoscopes (FFBs) are important means for performing awake tracheal intubation in patients with anticipated difficult airway. In a pediatric patient with difficult airway, doing an awake procedure may be difficult and requires deep sedation or anesthesia, before attempting intubation with a pediatric FFB. Unavailability of appropriate sized FFB becomes an added challenge while confronted with a pediatric patient with a difficult airway. We present a case where an innovative way was devised for tracheal intubation of a child with fractured mandibular condyle with the help of an adult FFB and a j-tipped guidewire.

CASE REPORT

A 6-year-old child was brought to the emergency room with a history of fall on face and subsequent intraoral bleeding and an inability to open his mouth. Radiological examination showed a fractured mandibular condyle. The child was posted for an urgent open reduction and exploration of oral cavity under general anesthesia (GA). The child weighed 20 kg, and airway examination revealed an inter-incisor gap (IIG) of 0.5 cm, thyromental distance of 4 finger breadths, thyomental distance of 3 finger breadths, and adequate neck extension. Keeping the anticipated difficult airway in mind, a difficult airway cart was prepared. The anesthetic plan was to do a pediatric FFB-guided nasal intubation under GA, with the child breathing spontaneously. A written informed consent was taken from the parents. The child was shifted to the operation theater and standard monitors were applied. An intravenous access was established and a drip of lactated ringer was started. Standard pre-medication consisting of an antiemetic and an antacid were given to the patient. Xylometazoline decongestant drops were instilled through both nostrils, and gentle dilatation was done with increasing sizes of nasopharyngeal airways after adequate lubrication.

Unfortunately, the pediatric FFB was found damaged and unusable. A new anesthetic plan to utilize the adult FFB and a j-tipped guidewire for intubation was made. Written consent was again taken from the parents of the child after
explaining the situation to them in detail. Anesthesia was induced with sevoflurane in oxygen, the concentration of which was increased incrementally from 2 to 7%, and titrated to effect. The gases were delivered, while assisting the child's spontaneous breaths, first with a size 2 anatomical face mask and then by way of a size 5.0 mm internal diameter (ID) nasopharyngeal airway connected to the anesthesia circuit with a 5.0-mm-ID universal connector. A provision was kept in the anesthetic plan to withdraw the anesthetic agents at any point in time and awaken the child, if required. Equipment and personnel for rapidly establishing a surgical airway were also kept ready. After attaining adequate depth, an adult FFB, with an outer diameter (OD) of 4.5 mm, was inserted through the nostril, maneuvered through the nasal, nasopharyngeal and oropharyngeal structures, and finally placed directly in front of the larynx. Keeping the laryngeal inlet directly in the center of the viewing field, a 145-cm-long, 1-mm-OD, j-tipped, metallic guidewire (commonly used during gastric endoscopies) was inserted through the working channel of the FFB and manipulated to enter the larynx [Figure 1]. After pushing it 5–6 cm beyond the laryngeal inlet, the FFB was withdrawn, keeping the guidewire in place. A size 5.0 mm ID cuffed flexo-metallic tube was successfully threaded through the guidewire into the trachea, the guidewire subsequently withdrawn completely, and the tube fixed at 17 cm at the nares after confirming the position by auscultation and capnography. At this juncture, 2 mg vecuronium bromide was given intravenously for neuromuscular blockade. Mechanical ventilation was started, and the surgery was allowed to proceed. An oropharyngeal pack was inserted after the surgeons enabled the mouth to be opened, which was subsequently removed before reversal of anesthesia. Apart from the fracture, the child also had a laceration in the tongue, which was sutured and hemostasis achieved. The surgery was uneventful and child was extubated in the end. The postoperative period was also uneventful. The child was followed up for 15 days and was discharged thereafter without any airway related complications.

**DISCUSSION**

The overall incidence of a difficult airway is 1–3%, but the incidence in the pediatric population is unknown. The reliance on FFBS for management of difficult airway is almost universal, although a lot of new intubating devices, specifically aimed at difficult intubations, have been introduced in the last two decades. In our case, since the IIG, which was 0.5 cm to begin with, did not improve even after pain relief and induction of anesthesia, supraglottic devices like the laryngeal mask airway (LMA) family were not an option. Other options included blind nasal intubation, retrograde intubation, and FFB-guided intubation. Since we were not experts in the first two options, we decided to go with the FFB. As the pediatric FFB was damaged, we decided to utilize the adult FFB and j-tipped wire guided nasal intubation. Creation of a surgical airway, or awakening the patient and postponing for a later date, when the pediatric FFB could be made available, were the other options in case of failure. In our case, an adult FFB (OD 4.5 mm) could be inserted through the nostril to visualize the glottis and 1 mm OD j-tipped metallic guidewire was manipulated to enter the larynx. A size 5.0 mm ID cuffed flexo-metallic tube was successfully threaded through the guidewire into the trachea.

Guidewires have been used for assisting in tracheal intubation in a variety of roles. These have been used extensively for railroading of tracheal tubes after retrograde insertion via the crico-thyroid membrane. Anterograde insertion of guidewires has been done through Laryngeal Mask Airways for subsequent endotracheal intubation, and also through endotracheal tubes (ETTs) for changing oral to nasal tube, and vice-versa, and for changing the type of ETT. Rodriguez et al. used a guidewire via the working channel of the FFB for railroading of the ETT in a case of Treacher Collins syndrome. Scherlitz and Peters reported two cases with difficult airway, where a guidewire was left in the trachea postoperatively for assisting in rapid reintubation in the immediate postoperative period, if required. To the best of our knowledge, this is the first time when pediatric difficult airway was managed with adult FFB without actually entering the glottic opening.

We would like to conclude on the note that at all points in time, an anesthesiologist should have a backup plan in mind to fall back upon, in case the primary plan fails. Nothing can replace a sound knowledge of the established techniques, but flair to innovate should also be present in
the right balance. We present this technique for critical appraisal by the learned readers.

REFERENCES

1. Practice guidelines for management of the difficult airway. A report by the American Society of Anesthesiologists Task Force for the Management of the Difficult Airway. Anesthesiology 1993;78:597-602.

2. Kurachek SC, Newth CJ, Quasney MW, Rice T, Sachdeva RC, Patel NR, et al. Extubation failure in pediatric intensive care: A multiple-center study of risk factors and outcomes. Crit Care Med 2003;31:2657-64.

3. Nitahara K, Watanabe R, Katori K, Yamasato M, Matsunaga M, Dan K. Intubation of a child with a difficult airway using a laryngeal mask airway and a guidewire and jet stylet. Anesthesiology 1999;91:330-1.

4. John B, Linga-Nathan P, Mendonca C. Tracheal intubation through a single use laryngeal mask airway using a guidewire technique. Can J Anaesth 2007;54:775-6.

5. Sharma R, Kumar A, Panda A. Using a central venous pressure guidewire and suction catheter to facilitate oral to nasal tracheal tube change in a child with a difficult airway. Anesth Analg 2009;108:1716-7.

6. Rodriguez AM, Etxaniz A, Rey AM, Perez J, Nieto CM. Use of a metal guide in the working channel of a fiberoptic scope to insert a tracheal tube in an infant with Treacher Collins syndrome and choanal atresia. Rev Esp Anestesiol Reanim 2010;57:115-8.

7. Scherlitz A, Peters J. A guidewire as a reintubation aid. Translaryngeal fiberoptic insertion of a guidewire into the trachea to assist fiberoptic reintubation in patients difficult to intubate. Anaesthesist 1994;43:618-20.

How to cite this article: Naithani M, Jain A, Chaudhary Z. Intubation in a pediatric difficult airway using an adult flexible fiberoptic bronchoscope and a j-tipped guidewire: An innovation in adversity. Saudi J Anaesth 2011;5:414-6.

Source of Support: Nil, Conflict of Interest: None declared.