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Original Article

Retrograde intubation through nasal route in patients with limited mouth opening undergoing oral and maxillofacial surgery

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ABSTRACT

Background: Patients with limited mouth opening (LMO) often associated with difficult intubation. Retrograde intubation is an alternative technique of establishing definitive airway in these patients when blind nasal intubation fails and fiberoptic bronchoscope is not available. We tested the retrograde intubation through nasal route in patients with LMO less than 2 cm.

Materials and methods: The procedure was performed with some modification with regard to retrograde guide on 18 patients requiring maxillofacial surgical procedures to increase mouth opening. Indications for this technique were mandibular fracture (n = 6), oral submucous fibrosis (OSMF; n = 6), temporomandibular joint (TMJ) ankylosis (n = 4) and internal derangement of TMJ (n = 2). All patients were assessed for preoperative interincisal opening; during intubation through specific parameters and; also postoperative findings were observed.

Results: Mean time taken for successful intubation was 5.6 min ± 1.66. One patient had subcutaneous emphysema which was managed conservatively. Postoperatively, four patients had sore throat which resolved in few days. No other complications were encountered.

Conclusion: In conclusion, retrograde nasotracheal intubation is an effective and useful technique for airway control in patients with LMO and with only a small risk potential.

1. Introduction

Maxillofacial surgical patients present a specific challenge to the anaesthetist. They commonly come across patients with limited mouth opening (LMO) conditions, which increase the difficulty in securing the airway.[1,2] There are numerous causes for LMO and are categorised as intra-articular or extra-articular.[3] Blind nasal intubation remains an important adjunct in establishing airway in these patients when expensive instrument like fiberoptic bronchoscope is not available.[4–6] It is easier to describe than to perform and may require multiple attempts.[2] The solution in these situations is to perform an elective short-term tracheostomy before the operation, but it carries a high incidence of complications.[7] Other methods are to introduce the tracheal tube through a submental[8] or a submandibular approach;[9] however, it can be impossible in TMJ ankylosis with deformed airway anatomy and is associated with complications such as scar formation, superficial skin infection, salivary gland damage and damage to nerves. Also, the standard orotracheal intubation can be unsuitable for these patients; the nasal route is more preferable as these patients require surgical procedures either intraoral, extraoral or both.[10] Retrograde intubation is an alternative technique of establishing definitive airway in these patients when other methods of providing airway are not suitable. We tested the retrograde intubation through nasal route as an alternative method for airway management in patients with LMO less than 2 cm.

2. Materials and methods

The study was performed on 18 patients with LMO posted for elective surgery under general anaesthesia at department of oral and maxillofacial surgery in our unit. Patients who underwent awake retrograde nasotracheal intubation under regional airway anaesthesia were included. Criteria for inclusion in the study were as follows: a) Patients with LMO less than 2 cm having difficult airway; b) nasal intubation suitable for surgical procedures. Patients with TMJ ankylosis who had failed 3 attempts of blind nasal intubation, underwent retrograde intubation were also

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included. Exclusion criteria were: a) oral intubation was suitable for surgical procedures; b) patients required a more invasive and surgical techniques for securing the airway; c) local infection in the nose or pathological abnormalities of airway; d) significantly deviated nasal septum and previous nasal surgeries. The institutional ethics committee approved the protocol. After detailed discussion, written informed consent was obtained from each patient for regional airway anaesthesia and retrograde nasotracheal intubation.

Demographic data was noted. The preoperative medical assessment included routine surgical profile, electrocardiography, and chest radiography followed by pre-anaesthetic evaluation. Previous history of surgery under general anaesthesia, difficulty in intubation and complications during surgery was enquired for each patient and noted.

Patients were explained about the need of awake nasotracheal intubation, its complications, the type of airway anaesthesia and need of any airway intervention in emergency. After detail explanation of the technique was provided; questions were answered. The patient's active participation in the process of intubation was asked. The patient was informed of what he or she has do, to assist in a smooth intubation. For example, maintaining the head position, taking deep breaths, or swallowing secretions when requested. On the night before surgery, we gave ranitidine 150 mg and metoclopramide 5 mg orally for prophylaxis against acid aspiration and laxative 10 mg orally. Patients were kept under nil by mouth 6 hrs before surgery. On the morning of surgery, intravenous access was established and premedication was given 1 hr prior to procedure. It included Inj amoxicillin with clavulanic acid 1.2 gm, Inj. Metronidazole 100 ml 500 mg (antibiotic), Inj. Decadron 8 mg (steroid), Inj. Ondansetron 4 mg (antiemetic), Inj. Pantacid 40 mg (antacid), Inj. Glycopyrrolate 0.2 mg (Antisialagogue) and a nasal decongestant (Xylometazoline 2%). Because the mouth was closed we could not anaesthetize the oral and pharyngeal mucosa with lignocaine spray. Instead, lignocaine 2%, 3 ml was nebulized over 10 min. The patient was then asked to gargle and swish around 10 ml of lignocaine viscous 4% without swallowing. Following preparation of the neck with 10% povidone iodine, the cricothyroid puncture site was infiltrated with lignocaine 2%, 0.5 ml. Bilateral superior laryngeal nerve block and transtracheal injection of the local anaesthetic was given.[11,12] Cook Retrograde Intubation Set (Cook Medical, Bloomington, IN, USA) was used. The procedure was performed as described by David Burbulys and Kianusch Kiai.[13] The technique proceed by an initial percutaneous puncture through the cricothyroid membrane made with the introducer needle and catheter at a 30 to 40 degrees angle to the skin in a cephalad direction. The free flow of air bubbles in the syringe confirms entry into the trachea. Holding the catheter in place, the needle and syringe are removed (Fig. 1). The J-tip of the wire was passed up the trachea until it retrieved from the nose with fingers (Fig. 1). A black proximal positioning mark on the wire should be visible at the skin access site, ensuring that enough was exposed nasally to facilitate the subsequent passage of the guiding catheter (custom made guide by Cook) and endotracheal tube from the other end. The catheter sheath at the skin was removed and the wire is clamped at this site to stabilize its entry into the skin at the cricothyroid membrane. The guiding catheter was advanced anterograde over the wire, by way of the nose, into the trachea until tenting is noted at the cricothyroid access site (Fig. 2). The needle holder was unclamped and the wire was removed to prevent damage to cricothyroid membrane. The flexometallic endotracheal tube was then passed (railroaded) over guiding catheter into position below the level of the vocal cords (Fig. 3) and guiding catheter was removed, as the endotracheal tube was further advanced into final position. Later, tracheal tube position was confirmed by observing the movements of reservoir bag of breathing circuit, capnography and pulse oximeter. The balloon cuff was inflated, and tube was taped and secured. Endotracheal tube was connected to boyle's machine and induction of anaesthetic drugs done as usual fashion.

Size of endotracheal tube, nare intubated (right or left), exchange from one nare to another, number of attempts, time taken for successful intubation, tip of wire manipulation – manipulation of the tip of the instrument to obtain successful intubation (include 1. *Not difficult* – on initial introduction, little or no manipulation of the wire was needed, 2. *moderately difficult* – moderate manipulation of the wire needed, 3. *difficult* –extensive manipulation of the wire including correction of wire to bring it out of nose and often with changes in position of the operator), patient comfort (Grade I – no movement observed, Grade II – coughing observed, Grade III – extremity movement observed, Grade IV – violent movement observed), surgeon and anaesthetist's comfort and time saving (no surgical intervention needed to intubate the patient), post operative complications (nose pain, neck pain, sore throat) and patient satisfaction (excellent, good, fair) were noted.

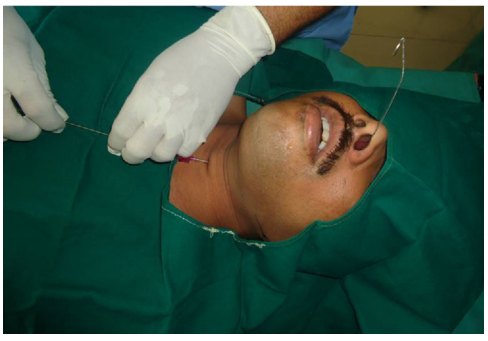

Fig. 1. An initial percutaneous puncture through the cricothyroid membrane and J-tip of the wire was passed up the trachea until it retrieved from the nose.

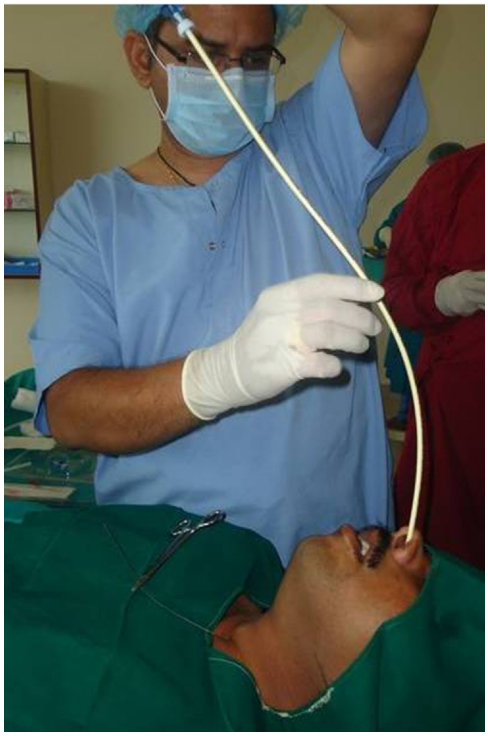

Fig. 2. Guiding catheter advanced anterograde over the wire.

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