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Case Report

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An alternative method of oral to nasal endotracheal intubation in patients undergoing maxillofacial surgery

Hasan Kutluk PAMPAL*, Metin ALKAN, Cengiz Bekir DEMİREL, Gökçen EMMEZ, Nurdan BEDİRLİ
Department of Anesthesiology and Reanimation, Faculty of Medicine, Gazi University, Ankara, Turkey

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Abstract: Patients undergoing maxillofacial surgery frequently require nasal intubation. Although awake fiberoptic intubation is the procedure of choice, a fiberoptic bronchoscope (FOB) may not be available in all clinics. Furthermore, the procedure itself requires skill and experience, and cannot be used when the view is obstructed by bleeding or secretions. Herein we describe 3 patients in whom oral to nasal endotracheal tube exchange was accomplished with the aid of a nasogastric tube after placement of an LMA CTrach™, as no FOB was available.

Key words: Maxillofacial surgery, nasal intubation, endotracheal tube exchange

1. Introduction

Airway patency is usually achieved with nasal intubation during maxillofacial surgery in order to eliminate problems related to oral intubation. A distorted airway is frequently encountered in such patients, and airway management is usually maintained by planned awake fiberoptic intubation. Although it is the procedure of choice in difficult airway algorithms, awake fiberoptic intubation requires skill and experience to be considered the safest means. Furthermore, a fiberoptic bronchoscope (FOB) may not be available in all clinics. Herein we describe 3 patients in whom oral to nasal endotracheal tube exchange was accomplished with the aid of a nasogastric tube after the placement of an LMA CTrach™ (The Laryngeal Mask Company Limited, Le Rocher, Victoria, Mahe, Seychelles).

2. Case report

2.1. Case report 1

A 22-year-old man who had had previous surgery for mandibular fracture was scheduled for removal of the implants. The surgical team requested nasal intubation. Preoperative evaluation of the patient revealed a limited mouth opening of 2 cm.

On arrival in the operating room, an intravenous line was established with an 18 G cannula. After monitoring the heart rate, peripheral oxygen saturation, and blood pressure, the patient was preoxygenated with 100% oxygen for 3 min. Following induction of anesthesia with 150 mg of propofol, an LMA CTrach (size 4) was inserted easily. Ventilation through the LMA CTrach was uneventful. After connecting the monitor and obtaining a clear view of the chordae vocalis, 0.6 mg kg^{-1} rocuronium was used to facilitate endotracheal intubation.

2.2. Case report 2

A 47-year-old man was scheduled for correction of temporomandibular joint ankylosis, and nasal intubation was required. Preoperative evaluation revealed a difficult airway due to a limited mouth opening of 2 cm. On arrival in the operating room, an intravenous line was established with an 18 G cannula, and routine monitoring was conducted. Following induction of anesthesia with 200 mg of propofol, an LMA CTrach (size 4) was inserted easily. Ventilation through the LMA CTrach was uneventful. After connecting the monitor and obtaining a clear view of the chordae vocalis, 0.6 mg kg^{-1} rocuronium was used to facilitate endotracheal intubation.

2.3. Case report 3

A 33-year-old man was scheduled for correction of malocclusion of the teeth. He had undergone surgery for mandibular fractures twice. Another surgical intervention was performed for LeFort I osteotomy and the placement of an external mandibular distractor. During the second operation, the patient could not be intubated, and an emergency tracheotomy was performed. Preoperative laboratory and radiological findings were normal. Temporomandibular joint movements were minimally

* Correspondence: kutlukpampal@yahoo.com

limited, but his Mallampati score was 4. On arrival in the operating room, an intravenous line was established with an 18 G cannula. After monitoring the heart rate, peripheral oxygen, saturation, and blood pressure, the patient was preoxygenated with 100% oxygen for 3 min. Following induction of anesthesia with 200 mg of propofol, direct laryngoscopy was performed and the Cormack–Lehane grade was found to be 4. Thereafter, an LMA CTrach (size 5) was inserted easily. Ventilation through the LMA CTrach was uneventful. After connecting the monitor and obtaining a clear view of the chordae vocalis, 0.6 mg kg^{-1} rocuronium was used to facilitate endotracheal intubation.

2.4. Tube exchange procedure

For orotracheal intubation, a polyvinyl chloride endotracheal tube (ETT) with an inner diameter of 7 mm was used through the LMA CTrach. After intubation, the LMA CTrach was removed. An 18 F nasogastric tube, which was passed through a lubricated spiral ETT, was inserted via the nostril, and the tip of the tube was brought out through the mouth with the help of an index finger. The end of the nasogastric tube was again transferred through the orotracheal tube to the lungs. The ETT was slid over the nasogastric tube and cut longitudinally and released. The connector of the ETT was attached to the nasogastric tube, and the patients were ventilated through the nasogastric tube and end tidal carbon dioxide levels were observed. Breathing sounds were audible only on the left side in the 1st patient, and only on the right side in the 2nd and 3rd patients. Afterwards, the nasogastric tube was used as a guide and the patient was intubated by the nasal route, as in Seldinger's technique (Figure). The correct placement of the ETT was confirmed by hearing the breathing sounds equally on both sides, and by observing the end tidal carbon dioxide level. Throughout the tube exchange procedure, which lasted 80, 65, and 70 s for the 1st, 2nd, and 3rd patients, respectively, peripheral oxygen saturation remained over 98% without any complication. After surgery, the 1st and 2nd patients were extubated following reversal of the muscle relaxant with atropine and neostigmine. The 3rd patient's mouth opening was 1.5 cm after surgery. Although he was stable and breathing spontaneously, he was sent to the intensive care unit for overnight observation. After 12 h of observation, the 3rd patient was also extubated without any complications.

3. Discussion

Maxillofacial surgery may sometimes present extreme difficulties for the anesthesia team, not only because of the difficulty in managing the distorted airway, but also because of the impossibility of sharing the same place with the surgical team. The nasal route generally necessitates the avoidance of possible complications related to sharing the oral cavity with surgeon, such as displacement of the ETT. Factors causing a difficult airway, such as limited mouth opening, are another challenge for the anesthetist. Despite being the first choice in such patients, awake fiberoptic intubation may not be possible for several reasons (1). The lack of either equipment or experience in its usage is the major factor limiting the use of FOB during a difficult airway approach. Moreover, bleeding in the airway makes the use of FOB extremely difficult and sometimes impossible (2). In case of a limitation in FOB usage, alternative approaches to a difficult airway such as LMA should be considered (3). In the cases presented here, as our FOB was out of order, we were not able to use it. During physical examination of the patients, we observed limited mouth openings of 2 cm, which were difficult routes for an oral intubation but possible routes for placement of an LMA CTrach. Therefore, LMA CTrachs were placed after uneventful mask ventilation,

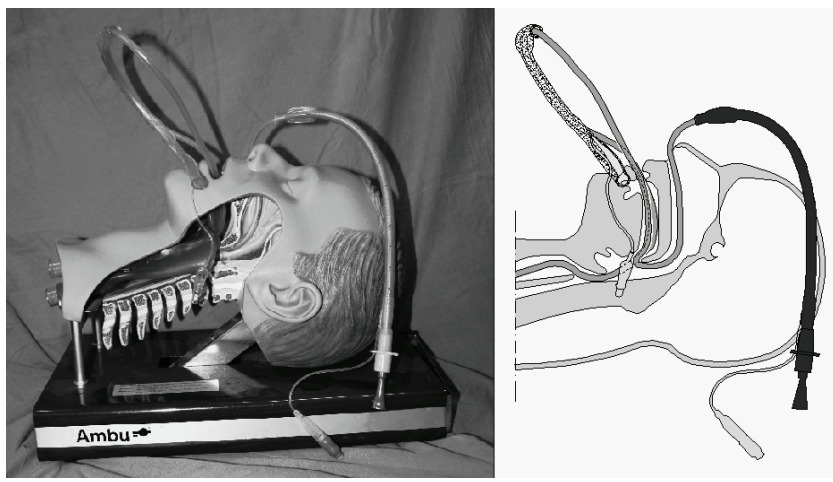

Figure. Demonstration of the tube exchange procedure.

and the patients were intubated through LMA CTrach with polyvinyl chloride ETTs having an internal diameter of 7 mm, after connection to the monitor and achievement of a clear view. The LMA CTrach provides a clear view of the trachea and provides an opportunity for intubation under direct vision (4).

Some authors use FOB as a guide to nasal intubation (5). However, there are some techniques described for oral to nasal endotracheal intubation exchange when fiberoptic bronchoscopy is unavailable or has failed (6). In 2 studies, the authors used a tube exchanger as a guide for nasal intubation and performed the procedure successfully (6,7). In our cases, we used an 18 F nasogastric tube, and the procedure was completed without any complications.

We made an interesting and helpful observation during the procedures in which we were able to ventilate the patients with the nasogastric tube. Once the tube was passed to the lungs through the orotracheal intubation tube, we attached the connector of an ETT to the nasogastric tube, and we were able to ventilate the patients manually and observe end tidal carbon dioxide levels. Although the duration of the procedures was short, this observation encouraged us concerning the use of this technique when optimal conditions for a difficult airway are not available.

The procedure is easy to perform, but an LMA CTrach may not be available in all clinics. Although it too is sophisticated equipment, it is much easier to obtain an LMA CTrach than a FOB. Furthermore, alternative materials other than the LMA CTrach for difficult airways, such as the LMA Fasttrach™, can also be obtained easily in anesthesiology clinics.

The technique described here is not an alternative method for awake fiberoptic intubation. However, the procedure is easy to perform and does not require much experience. Therefore, we believe that it can easily be performed when fiberoptic bronchoscopy is unavailable and the usage of LMA is not contraindicated.

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