

Mordified Submental Endotracheal Intubation Technique in Maxillofacial Injuries

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SUMMARY

Submental endotracheal intubation was carried out in five patients over a two-year period. Each patient required maxillo-mandibular fixation following trauma. A common feature in these patients was depressed fracture of the frontonasal bone which could not permit nasal intubation. These patients were reluctant to have tracheostomy if there was an alternative option of securing their airway.

Following a normal orotracheal intubation, a submand incision was made and the proximal endotracheal tube (ETT) exteriorized through it. At the end of anaesthesia and surgery, the tube was left insitu for six to forty-eight hours before extubation. The incision was closed following local anaesthetic (LA) infiltration and no airway compromise was noted. Submental intubation is a simple and useful technique with low morbidity in cases of craniomaxillofacial trauma and the authors' clinical experience with this technique is described.

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INTRODUCTION

Standard anaesthetic techniques often prove inadequate in securing the airway during maxillofacial and orthognatic surgeries. Nasotracheal intubation is usually contraindicated in the presence of fracture of base of the skull.¹ Passage of nasotracheal tube can be difficult or impossible when there is comminuted midfacial fractures due to physical obstruction.² Achieving the necessary dental occlusion involves maxillo-mandibular fixation with wires of high tensile strength in the intraoperative period. This precludes the use of oral endotracheal intubation.

In these conditions tracheostomy may be indicated but it carries a significant morbidity.³⁻⁵ Submental endotracheal intubation has been described as an useful alternative to

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tracheostomy with minimal complications in these conditions.⁶⁻

⁹ Submental intubation is a form of orotracheal intubation where the proximal end is exteriorized via the submental space. It is useful for airway management following maxillofacial surgeries that involve maxillomandibular fixation especially where nasotracheal intubation is either contraindicated or impossible. It also avoids a tracheostomy, especially when long-term ventilatory support is not required in the postoperative period. Report of submental intubation is either scarce or not existent in our environment. We report our experience with our modified technique of submental intubation for the first time in our environment in patients with maxillofacial trauma in whom oral and nasal intubations were not possible, and tracheostomy was the only apparent alternative. With this technique, the potential complications associated with a short-term tracheostomy were avoided.

METHODOLOGY

Five patients, over a two-year period with maxillofacial injuries requiring maxillomandibular fixation benefitted from this technique. These patients were characterized by being adults with fractures of the frontonasal, zygomatic, Le Forte II, and symphysiomandibular bones. One patient had cerebrospinal fluid rhinorrhoea and otorrhoea.

Orotracheal intubation was assessed to be easy based on a minimum of Mallampati II, adequate mouth opening and thyromental distances greater than 7cm.^{10,11} However, airway management in the immediate postoperative period was a dilemma as maxillomandibular fixation was planned by the surgeons to check dental occlusion. Because of the LeFort II fractures, and depressed fracture of the nasal bone, nasal intubation was excluded.

Elective tracheostomy was judged an appropriate option to secure the airway postoperatively. However, the otherwise healthy patients objected to the idea. Submental intubation was considered as a suitable alternative. The procedure was explained in detail to each patient and an informed consent was obtained for the procedure.

Preoperative preparations of the patients included 6-hour fasting, and aspiration prophylaxis with oral ranitidine 150 mg and metoclopramide 10 mg the night before and 2 hours before surgery with a sip of water. An intramuscular injection of glycopyrrolate 0.4 mg was used as an antisialagogue. On arrival in the operating room, routine monitoring (electrocardiography, pulse oximetry, and automated noninvasive blood pressure cuff) were applied. Intravenous lines were secured and an injection of morphine sulfate 7.5 mg was administered to produce mild sedation and anxiolysis.

MODIFIED SUBMENTAL ENDOTRACHEAL INTUBATION TECHNIQUE IN MAXILLOFACIAL INJURIES

Anaesthesia was induced with 100 - 150mg of propofol and with loss of consciousness, suxamethonium 100mg was given intravenously to aid laryngoscopy. An orotracheal reinforced cuffed endotracheal tube was used to secure their airway (figure 1). General anaesthesia was maintained with a total intravenous technique using propofol, and fentanyl for analgesia. Pancuronium was used to achieve muscle relaxation and the patient ventilated with 30% oxygen in 70% medical grade air.

A 5-cm skin crease incision was subsequently made in the submental region by the operating surgeon, just medial to the lower border of the mandible, approximately one-third of the way from the symphysis to the angle of mandible, as described by Altemir et al. and Amin et al. Blunt dissection with a pair of curved artery forceps was carefully performed to enter the oral cavity, and proper haemostasis was achieved. The patient was temporarily ventilated with 50:50 mixture of oxygen in medical grade air for 5 minutes. The endotracheal tube was then briefly disconnected from the breathing circuit and the tube connector was removed from the tube. The pilot balloon followed by endotracheal tube were gently pulled out through the incision. The tube connector was reattached and the endotracheal tube reconnected to anaesthesia breathing circuit (figure 2). Bilateral air entry was rechecked and found to be equal and the tube was fixed with 1.0 silk suture.

Fig 1:



Fig 2:

Intraoperatively, the endotracheal tube was away from the surgical field which aided the intermaxillary fixations and dental occlusion check. There were no episode of arterial desaturation while converting oral intubation to submental intubation and vice-versa. The endotracheal tube connector could be easily removed and reattached firmly. Care was taken not to damage the pilot balloon. Endotracheal suctioning was easy through the submental route. The maxillomandibular fixations were subsequently completed with acceptable dental occlusion achieved without airway compromise.

At the end of the surgery, the residual neuromuscular blockade was reversed and the patients were monitored until full recovery when they were extubated. The submental incisions were closed using monofilament skin sutures, and sterile dressings applied.(figure3) The patient received intravenous clindamycin 300mg eight hourly for five days and was advised to do oral washes with hydrogen peroxide mouthwash. The submental incision healed with good cosmetic appearance and without specific complications.



Fig 3:

DISCUSSION

The anesthetic management of patients with maxillofacial fractures presents the anesthesiologist with serious challenges in the perioperative period. Nasal intubation in these patients is difficult when there is an associated depressed fracture of the nasal bone. Further restoration of dental occlusion by means of intraoperative maxillomandibular fixation poses further airway challenge in the immediate postoperative period. The technique of submental intubation has been established as a suitable alternative to a short-term tracheostomy in such situations.

Submental tracheal intubation was first described by Altemir in 1986.⁶ Various authors have reported less morbidity in case series of submental intubation in comparison with a standard tracheostomy.^{6,7,9} They described it as a useful, safe, and effective airway management technique during maxillofacial surgery, especially to avoid a short-term tracheostomy and its attending morbidity. There have been several articles in the literature describing and modifying the technique.^{1,6,8,9,12} Adequate mouth opening is a prerequisite for the techniques used

for this procedure. There are technical problems with the technique described. Because of the tight seal of the connector with the reinforced ETT, it may be difficult to separate the connector and tube during the transfer from the oropharynx through the submandibular tract. Moreover, damage to the ETT and pneumatic cuff as a result of being grabbed with forceps during retrieval through the submental tract has been reported.¹³

We did not tracheally extubate our patients in the postoperative period until they were fully awake and able to protect their airway, considering the maxillomandibular fixation and the possibility of soft tissue edema. During ETT suction, difficulty was encountered in negotiating the suction catheter because of the acute curvature of the ETT. This was overcome by extension of the patients' head and lubricating the suction catheter.

Gordon and Tolstunov have reported a case in which the submental tube was left in place for 3 days without complications.⁸ In the series of 25 submental intubations reported by Caron et al., two patients had their tubes maintained postoperatively for approximately 30 hours.⁷

The indications and contraindications for conventional submental intubation are outlined by Chandu et al.⁹ and Meyer et al.¹⁴ They described this technique as contraindicated when long-term control of the airway is required postoperatively. In our case there was no indication for prolonged postoperative airway control or risk of losing the airway; hence, preventing a short-term tracheostomy by submental intubation was justified.

In conclusion, the submental method is an uncommon technique of securing the airway in patients in whom naso/orotracheal intubation may not be possible. We have described submental intubation technique in five patients with maxillo-mandibular fractures, in whom oral and nasal intubations were both contraindicated and not possible in the immediate postoperative period. It also avoided the option of tracheostomy. The technique is easy to use, rapid and free of complications compared to 'alternative' intubation methods like tracheostomy. Submental scarring is acceptable. It is recommended for maxillomandibular fixations in selected cases. Further studies will be needed to compare the relative morbidity associated with both procedures. We conclude that this technique is a useful option, and may not only be limited to trauma patients, but extended to a wide spectrum of patients and may avoid some of the problems inherent with a tracheostomy.

CONSENT

“Written informed consent was obtained from the patients

for publication of this case report and accompanying images.”

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