Submental intubation in oral maxillofacial surgery: Review of the literature and analysis of 13 cases

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Abstract

Objectives: Various different methods of intubation are suitable for facial trauma cases. A choice often has to be made between orotracheal and nasotracheal when surgical access to the nasal or oral cavity is necessary. This work presents our current experience using submental intubation in the airway management of facial trauma patients.
Study design: From July 2003 to February 2005, 13 sufferers from facial trauma benefited from submental intubation. All the patients were males and the ages ranged from 19 to 35 years (mean, 27 years).
Results: In all the patients, the submental intubation permitted simultaneous reduction and fixation of all fractures and intraoperative control of the dental occlusion without interference from the tube during the operation. There was only one intra-operative complication, when the tracheal pressure increased as a result of deviation and compression of the tube. No post-operative complications were reported.
Conclusion: Submental intubation is a simple, secure and effective procedure for operative airway control in major maxillofacial traumas.

Key words: *Intubation, submental, maxillofacial injury.*

Introduction

Management of the airways in the presence of midface or panfacial injuries with mandibular involvement requires special consideration. Different methods of intubation and surgical airways are described in the literature (1). No consensus exists to date as to the best way of controlling the airway when orotracheal or nasotracheal intubations are contraindicated (2).

Tracheostomy remains an excellent procedure for establishing a formal surgical airway. This procedure may involve a significant risk of iatrogenic complications, such as tracheal stenosis, internal emphysema, damage to the laryngeal nerves, tracheoesophageal fistula and scarring (3,4).

An alternative to the classic methods is the submental route for tracheal intubation. The technique consists of diverting the proximal end of an orotracheal tube through the floor of the mouth and submental region. This allows free intraoperative access to the dental occlusion and nasal pyramid without endangering patients with skull base trauma, and at the same time avoids transtracheal dissection (5-7).

Table 1. Type of fractures.

Name	Gender	Age	Type of fracture
A.D.	M	21	Mandible – Maxilla Le Fort II –Nose
J.H.	M	25	Mandible – Maxilla Le Fort III
M.S.	M	29	Mandible – Maxilla Le Fort II – Nose
R.C.	M	19	Mandible – Maxilla Le Fort I - NOE*
H.L.	M	32	Mandible – Maxilla Le Fort III
D.G.	M	22	Mandible – Maxilla Le Fort I – Nose
A.S.	M	28	Mandible – Maxilla Le Fort I – Nose
L.T.	M	35	Mandible – Maxilla Le Fort II – Nose
S.C.	M	26	Mandible – Maxilla Le Fort II – Nose
J.M.	M	21	Mandible – Maxilla Le Fort II – NOE
S.M.	M	25	Mandible – Maxilla Le Fort I – NOE
M.R.	M	27	Mandible – Maxilla Le Fort II – NOE
R.B.	M	29	Mandible – Maxilla Le Fort III

*NOE=Naso-orbit-ethmoidal.

In this study we present an analysis of 13 consecutive cases with a review of the literature, emphasizing technical details, indications and complications of this technique.

Material and Methods

From July 2003 to February 2005, 13 patients benefited from submental intubation (Table 1). All the patients were males and ages ranged from 19 to 35 years (mean 27 years). All patients were victims of facial trauma. Most of the facial injuries were a combination of fractures affecting the dental occlusion (maxillary fractures of Le Fort I type, mandibular fractures or alveolar fractures) and associated with another fracture dislocating either the anterior skull base (Le Fort II or III fractures) or the nasal pyramid (nasoorbitethmoidal fractures).

The technique used for submental intubation was an adaptation of the general principles published by Hernandez Altemir (1986). After a standard orotracheal intubation, a temporary draping of the mouth and chin was carried out. Subsequently, a 2-cm skin incision was made in the median region of the submental area, directly adjacent to the lower border of the mandible. The muscular layers (platisma and mylohyoid muscles) were traversed by blunt dissection using a Kelly forceps that was always in contact with the lingual cortex of the mandible. The mucosal layer on the floor of the mouth was incised over the distal end of the forceps, located in front of the sublingual caruncle and the forceps were then opened, creating a tunnel. (Figure 1)

During the dissection it is important that the width of the submental access should be sufficient to pass the tube without any interference. A good parameter is that the internal planes should be dissected in such a way as to ensure the same size of the skin incision.

Fig. 1. Orotraqueal intubation and surgical procedure to obtain the submental route.

After the surgical access was made, the tube cuff was first introduced into the mouth, being passed through the tunnel with the forceps. The tube was then disconnected from the ventilator and the connection tube and a glove finger was placed on the proximal end of the tube and the same maneuver carried out.

Finally, the tube was positioned, the connection tube restored and the circuit reestablished. Sutures were used to fix the tube in position. It is important to make sure that the tube has not been displaced during its passage through the submental tunnel. This can be checked using the position of the tube with regard to the teeth before and after submental procedure and by using the laryngoscope at the end of intubation and verifying whether the airway is patent. (Figure 2)

After the surgery, the submental intubation was converted to an orotracheal intubation by replacing the tube in the mouth and carrying out extubation in the classical manner. If the patient needed long-period postoperative ventilation, the orotracheal intubation was maintained until extubation was complete.

The suture was done with 5-0 nylon in the skin and 4-0 vycril in the internal layers.

Fig. 2. Submental intubation.

Fig. 3. Minimal scar postoperative.

Results

In all patients submental intubation permitted simultaneous reduction and fixation of all fractures and intraoperative control of the dental occlusion without interference from the tube during the operation.

No motor or sensory deficit was found. Normal healing in the mucosa of the floor of the mouth was observed. No bleeding or infection in the area was reported. The salivary duct was preserved and a normal level of saliva fluids was maintained. The scar has normally been well accepted by the patients. No cases of hypertrophic scarring have been reported. (Figure 3)

During the procedure no additional difficulties in passing the tube through the floor of the mouth were encountered and the total duration of the procedure was less than 10 minutes. Disconnection time from the ventilator was approximately 2 min. There was no significant oxygen desaturation in any patient during the procedure.

Only one intra-operative complication was reported. In one case the tracheal pressure increased as a result of deviation and compression of the tube and after the reposition of the tube the problem was solved.

No postoperative complications were reported. Eight patients were extubated in the operating room and only two patients needed postoperative ventilation and this was maintained with orotracheal intubation. The mean duration of postoperative ventilation was two days. There were no late tracheal complications.

Discussion

Submental intubation was first described as an alternative route for oral or nasal intubation, especially in cases of major facial trauma. Other indications, such as systemic pathology or cases of simultaneous orthognathic and plastic surgery, are reported (8).

Since the first application of this technique, less than twenty years ago, many authors have studied the clinical use of this procedure. Very low rates of complications have been reported. Many trials have shown the submental route to be a simple, quick and safe approach to airway management (1,2,4-6).

Submental intubation combines the advantages of nasotracheal intubation, which allows the mobilization of the dental occlusion, and those of orotracheal intubation, which allows access to frontonasal fractures. It also avoids the risks of iatrogenic meningitis or trauma of the anterior skull base after nasotracheal intubation, as well as complications, such as tracheal stenosis, injury to cervical vessels or the thyroid gland, related to tracheotomy (9).

The limitation of this technique is for patients who also present a neurological deficit or thoracic trauma and need more than 7-14 days of postoperative ventilatory support. In such cases a tracheotomy is known to be a safer procedure than endotracheal intubation. It is therefore difficult to propose it to patients suffering from an isolated facial trauma who will not require prolonged airway management (8).

This method of intubation is contraindicated for patients who require a long period of assisted ventilation, i.e. multitrauma patients presenting with severe neurological damage or major thoracic trauma, and patients expected to need repeated operations (1).

The only case of intra-operative complication was reported after an increase in tracheal pressure that probably could have been prevented by the use of a smaller tube than the one used in the operation. We recommend the use of 7.0 or 7.5 diameter tubes because they seem to reduce the risk of deviation or compression of the tube.

Other authors recommend the use of lateral incision through the body of the mandible (8,10). We use the median approach for two reasons: first, in this area only a few anatomic structures are present and there is a minimum risk of nerve or vascular damage; second, the scar is less visible behind the simphiseal region.

Intubating a patient through the nose and switching the tube intraoperatively to an oral route is another approach to airway management. This method relies on the separate skills of nasally intubating a patient in the presence of nasal injuries and subsequently inserting the tube by an oral route after the release of temporary maxillo-mandibular fixation (4). Our series used an orotraqueal tube through a submental route during the entire surgery. These techniques appear to have a more secure control of the airway and no interference in the surgical field.

In this case series there was no problem in disconnecting the tube and passing it through surgical access. All the tubes used in this study were manufactured to enable easy removal of the universal connector. We believe that the use of two tubes increases the duration of the submental intubation and that the use of a single tube minimizes the possibility of extubation during the submental procedure (7).

No salivary fistula, bleeding or infection were found. Scar formation is a disadvantage of the technique; however, it is by far less visible than a tracheotomy scar and has been well tolerated in our series.

Conclusion

Submental intubation should be chosen whenever possible in cases of purely maxillofacial trauma. It demands a certain surgical skill, but it is simple, safe and quick to execute.

It also allows operative control of the dental occlusion and concomitant surgery of the nasal pyramid in major maxillofacial traumas and avoids iatrogenic placement of the tube in skull base fractures.

Finally, it presents a low incidence of operative and postoperative complications and eliminates the risks and side effects of tracheotomy.

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