



Use of Submental Intubation in Patients with Facio-Maxillary Trauma

KEYWORDS

Faciomaxillary injuries; Submental intubation

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ABSTRACT Airway management in faciomaxillary injuries though challenging, constitutes an important part of the management. Treatment entails intermaxillary fixation but oral intubation significantly impedes this. In certain cases, nasal intubation is also contraindicated. In these circumstances, newer technique of airway management with retromolar and submental intubation helps in avoiding potential complications associated with nasal intubation and tracheostomy. At the same time, retromolar and submental intubation allows an unobstructed surgical field for adequate reduction and fixation of midfacial and panfacial fractures.

We present case reports of 2 patients with facial trauma in whom we used submental intubation for airway access and ventilation.

Introduction

Securing an airway in a patient with faciomaxillary injury remains a challenge and forms an important part of the management of such injuries.¹ The treatment of faciomaxillary injuries requires reduction and stabilization of maxillary and mandibular fractures by placing the patients teeth in proper occlusion. But oral intubation significantly impedes this.² Usually, nasotracheal intubation would be the alternative for airway management. However, nasotracheal intubation is contraindicated in some faciomaxillary injuries (fracture of the base of the skull, fracture of the naso-orbital and ethmoid bones) because of potential complications like intracranial intubation, meningitis, epistaxis and sino-nasal infections.³ Under such circumstances, retromolar intubation and submental intubation are procedures of choice for securing the airway.

When neither nasal nor orotracheal intubation is deemed suitable, the submental route offers an alternative to tracheostomy during surgical repair of severe craniomaxillofacial trauma¹. The technique involves exteriorizing the free end of an orotracheal tube (universal connector removed) through a submental incision. Ideally, this maneuver is performed by using a reinforced tube. Unfortunately, some reinforced tracheal tubes are manufactured with nondetachable connectors. Removing them forcefully may be possible, but they will then stay dangerously loose after reconnection.

We report 2 patients in whom we used submental intubation during surgery for facial trauma.

Case Reports:

Case no. 1: A 19 year old male patient, presented with history of trauma to the face. Following the trauma, there was momentary loss of consciousness & he developed a nasal twang to the voice. There was no head injury. On examination the nasoethmoid area was depressed, the maxilla was mobile and some teeth were missing.

The patient was thinly built and hemodynamic parameters were normal. The routine blood investigations were normal except for increased WBC count. The radiographs revealed fracture of the nasoethmoid complex & Le Fort I fracture of the maxilla. Ultrasonography of the submandibular region revealed small hematoma/collection in right submandibular

region. CT scan of the brain revealed mild cerebral edema with bilateral maxillary & ethmoid hemossinus. There was no evidence of intracerebral or subdural hemorrhage or extradural/subdural hematoma. The patient underwent preanesthetic evaluation where various options were discussed. After premedication, induction was done with propofol & succinylcholine and patient was intubated orotracheally with a cuffed armoured endotracheal tube (ETT) no. 32. The ETT was then directed submentally and connected to the ventilation circuit. At the end of the surgery, extubation was done.

Case no. 2: A 24 year old male patient, presented with history of road traffic accident and trauma to the cheek. Following the trauma, there was momentary loss of consciousness. There was no head injury. On examination, there was a contused lacerated wound on left cheek. The patient was well built and hemodynamic parameters were normal. The routine blood investigations were normal. The radiographs revealed fracture of the bilateral mandible, lateral wall of nose and Le Fort II fracture of the maxilla and floor of orbit. CT scan of the brain was normal with left maxillary hemossinus. There was no evidence of intracerebral or subdural hemorrhage or extradural/subdural hematoma. The patient underwent preanesthetic evaluation where various options were discussed. After premedication, induction was done with propofol & succinylcholine and patient was intubated orotracheally with a cuffed armoured portex ETT. The ETT was then directed submentally and connected to the ventilation circuit. At the end of the surgery, the ETT was left in situ at the submental location as inter-mandibular wiring was done. A nasal airway was inserted in the left nostril, to prevent collapse of left lateral nasal wall. Patient was extubated next day.

Technique of Submental Intubation:

The technique of submental intubation was originally described by Hernandez Altamir in 1986³. Adequate mouth opening is a pre-requisite for this procedure. Submental intubation is always a second step after oral intubation is done. During this technique, the patient is intubated orally with armored tracheal tube (which has a detachable connector). Following this, under all aseptic precautions, a skin incision is taken in the submental region, about 1.5 cms in length, just medial to the lower border of mandible. The incision starts approximately at the point joining anterior one thirds

and posterior two thirds of a line drawn between the symphysis mentum and the angle of the mandible. Whenever possible, the right side of the jaw is chosen because it allows better visualization of the intraoral position of the tube with direct laryngoscopy. The next step is to introduce a medium size artery forceps through the submental incision, while keeping the mouth open. The direction of the forceps is towards the floor of the mouth, staying close to the inner aspect of the mandible to avoid damage to the sublingual gland, submandibular duct and lingual nerve. An incision is taken on the oral mucosa (which is tented by the forceps) of the floor of the mouth. The patient is ventilated with 100% oxygen before the connector is taken out from the tube. The deflated pilot tube cuff is held with artery forceps and is pulled out through the submental incision. The tip of the artery forceps is quickly reinserted through the submental incision. The proximal end of the endotracheal tube is grasped by the forceps and taken out through the same incision. The tube comes out through the submental incision, instead of the oral cavity. The connector is reattached and the patient is ventilated through a breathing circuit. The tube is then secured to the skin with sutures.

Discussion:

We used submental intubation, to secure the airway and for ventilation, in two patients with faciomaxillary trauma, who underwent surgery. Case no.1 was extubated at the end of surgery, after converting the submental endotracheal tube back to the orotracheal route. Case no. 2 was extubated the next day. The advantage of the submental endotracheal route is that it avoids the potential complications associated with nasal intubation and tracheostomy. At the same time it allows an unobstructed surgical field for adequate reduction and fixation of midfacial and panfacial fractures.

Indications of submental intubation:

- i) Patients undergoing surgery for faciomaxillary injuries,
- ii) patients with fracture of the mandible,
- iii) patients undergoing rhinoplasty, and
- iv) patients with cleft lip and/or cleft palate undergoing orthognathic surgery, in whom nasal intubation is not possible.

Different techniques of submental intubation have been described, according to the site of incision. The incision may be placed further posteriorly in the submandibular region⁴ or it may be a midline submental incision. Use of laryngeal mask airway via the submental route has also been tried.⁵

Complications of submental intubation: include

- i) Infection,
- ii) damage to adjacent structure such as the submandibular and sublingual gland, the sublingual duct and the lingual nerve,
- iii) oro-cutaneous fistula, and
- iv) scar formation.

Many reinforced tubes are not well suited for submental intubation, because their connectors are nonremovable. To allow their use in such circumstances, Green and Moore suggested inserting the tracheal end of a reinforced tube from the outside of the submental incision and grabbing it with forceps to direct it into the trachea during direct laryngoscopy.⁶ We felt that this technique was not the best suited for our patient, because it involved performing direct laryngoscopy. Grabbing the tracheal end of the tube and directing it with the forceps may also damage the cuff. The midline submental intubation technique is a simple & useful technique with low morbidity.⁷ It can be chosen in selected cases of maxillofacial trauma & is an excellent substitute to tracheostomy where postoperative mechanical ventilation is not required.

Disadvantages:

Certain disadvantages can be anticipated with the submental route of endotracheal intubation.

- i) Damage to important structures of the floor of the mouth: it can be avoided by careful dissection and use of proper technique, and
- ii) skin infection.

Although most authors favor removing the endotracheal tube quickly postoperatively, there has been a report where the tube was left in place for three days without complications.⁸

Both, submental intubation and percutaneous tracheostomy can secure the airway in complex oromaxillofacial fracture reduction surgery. Both techniques allow uninterrupted surgical access to the operative field. But the submental intubation technique gives an imperceptible scar which is aesthetically more acceptable when compared to the tracheostomy; which is functionally challenging and unsightly besides posing an enormous stress to the patient. The complications associated with tracheostomy are at times difficult to manage.⁹

Conclusion

Submental intubation is a useful alternative technique of airway management in selected cases of craniomaxillofacial injuries. It avoids some of the complication associated with nasal intubation and tracheostomy. For this technique good communication is required between the operating surgeon and the anesthesiologist.

Though submental intubation is easily performed, the selection of a particular technique should take into consideration factors other than preoperative airway assessment.

Figure 1-Case no. 1



Figure 2-Case no. 1



Figure 3- Case no. 2



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