

Submental endotracheal intubation in patient with panfacial fracture: a useful alternative to tracheostomy

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Abstract:

Submental intubation is a simple safe and useful technique for air way management during maxillofacial surgery when both nasal and oral tracheal intubation are deemed unsuitable. This technique offers an optimal operating field and an opportunity to check the dental occlusion. It avoids the need for tracheostomy and its consequent morbidity. We present a case of multiple facial fractures where we avoided tracheostomy by the use of submental endotracheal intubation.

Key words: *Submental endotracheal intubation, maxillofacial trauma.*

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Introduction

The anaesthetic management of maxillofacial surgical patients present a specific challenge to the anaesthetist in the perioperative period.

Nasal intubation is often contraindicated in the presence of fracture of the base of the skull ¹or Nasal bone.^{2,3} Surgical reconstruction often involves maxillo-mandibular fixation in the intraoperative period to restore patient's dental occlusion. This precludes the use of standard oral endotracheal intubation in such cases. The standard solution in these situation is to perform an elective short-term tracheostomy before the operation, but it carries a significant morbidity.^{4,5-9} Submental endotracheal intubation in these conditions has been described as an useful alternative to tracheostomy with minimal complications ¹⁰⁻¹³.

Case Report

A 25 year old male (60 kg, ASA physical status-1) met with a road traffic accident and was admitted to the maxillo-facial surgical department of Dhaka Dental College & Hospital for reconstruction of faciomaxillary injuries sustained 1 week earlier in road traffic-accident.

On examination, there was multiple cut injury over left lateral nose and depression of nasal bridge, facial swelling, bilateral periorbital oedema, subconjunctival haemorrhage and loss of teeth. Radiological examination confirmed the presence of fracture, right parasymphysis of mandible, right zygomatic body, right zygomatic arch, left infraorbital rim.

The patient was scheduled for surgical correction of multiple facial (panfacial) fractures. Nasal endotracheal intubation was contraindicated due to depressed nasal bridge. Oral intubation was not suitable because the surgical procedure involved intra operative maxillo mandibular fixation to check dental occlusion. So, to avoid tracheostomy submental endotracheal intubation was planned. Then after detailed discussion, informed consent obtained from the patient and mouth opening was checked.

The first step in performing the technique was preparing an appropriate size armoured tracheal tube by careful removal of its universal fixed connector to transform it into a removable but fitting connector. (Fig. 1,2)

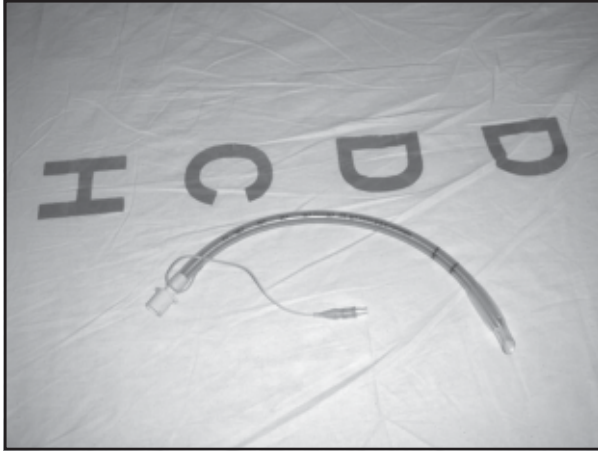


Fig 1 Appropriate size armoured tracheal tube



Fig 2 Tube preparations (removable but fitting connector)

Patient was kept fasting for 6 hours. He was premedicated with ranitidine 150mg Hs, and 1 hours before surgery injection metaclopramide 10mg and injection hydrocortisone 100mg was given intravenously.

In the operation theatre patient was preoxygenated with 100% oxygen for three minutes after which anaesthesia was induced with injection thiopentone 5 mg/kg intravenously. After induction mask ventilation was checked and found to be adequate. Then injection suxamethonium 1.5mg/kg intravenously was administered. Oral endotracheal intubation then was performed with prepared armoured tube by direct laryngoscopy. Anaesthesia was maintained with 33% oxygen in nitrous oxide and halothane. Intraoperative analgesia was maintained with injection fentanyl 1µg/kg intravenously and muscle relaxation was

maintained by vecorunium 0.1 mg/kg intravenously.

After ordinary orotracheal intubation using the prepared armoured tracheal tube a temporary draping of the mouth and the submandibular area was carried out. A 2 cm incision was then made in left sub mental region parallel and medial to inferior border of mandible by the surgeon. It was extended intraorally through the mylohyoid muscle by blunt dissection. The endotracheal tube was 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. (Fig: 3)



Fig 3 Transforming oral intubation to submental intubation

The tube connector was reattached and the endotracheal tube reconnected to anaesthesia breathing circuit. Bilateral air entry was rechecked and found to be equal and the tube was fixed with silk suture. Intraoperatively the endotracheal tube was away from the surgical field and the surgeons could easily do the intermaxillary fixation to check dental occlusion. The total duration of surgery was six hours. At the end of the surgery, submental intubation was converted to oral intubation. First the pilot balloon and then the endotracheal tube were pulled intraorally. The submental incision was closed not so tightly with two skin sutures so as to allow certain degree of drainage. Direct laryngoscopy was performed again routinely and showed no bleeding or airway edema. So neuromuscular blockade was reversed with injection atropine 0.02mg/kg and injection

neostigmine 0.05mg/kg intravenously. Patient was allowed to regain consciousness and endotracheal tube was extubated after the return of protective reflexes.

Intraoperative and postoperative period was uneventful. There was no episode of arterial desaturation while converting oral intubation to submental intubation and vice-versa. Care was taken not to damage the pilot balloon. Endotracheal suction could be easily done through the submental route. Perioperatively the patient received routine antibiotic and oral hygiene was maintained. No any other complication was noted.

Discussion

The method of tracheal intubation, via the submental route was first described by Hernandez altemir in 1686.¹⁰ This technique provides a secure airway, an unobstructed intraoral surgical field and allowed maxillomandibular fixation while avoiding the complications of nasotracheal intubation and tracheostomy^{4,5}. Nasotracheal intubation is usually contraindicated in the presence of nasal bone fractures seen either in isolation or as a component of Lefort maxillary fractures^{2,14-16}. Achieving dental occlusion is one of the fundamental aims of most oromaxillo-facial surgery. Oral intubation precludes this surgical prerequisite of checking dental occlusion. Our patient had fracture nasal bone and requires to establish the dental occlusion, all of which precluded both nasotracheal and oral intubation.

Tracheostomy, an alternate technique preferred by some surgeons and anaesthesiologists has many inherent complications like haemorrhage, subcutaneous emphysema, pneumomediastinum, pneumothorax, recurrent laryngeal nerve damage, stomal and respiratory tract infection, tracheal stenosis, tracheal erosions, dysphasia and excessive scarring.⁷⁻⁹ The significant morbidity that can result after tracheostomy necessitates that it should not be used indiscriminately.

Submental intubation is a solution for most of these problems. The advantages of this technique are manifold and it is appreciated by all members of the team. To the anaesthetist it offers a secure airway, to the surgeon, an optimal operating field and the opportunity to check the dental occlusion and to the patient, minimal morbidity.

But submental intubation is not completely free of adverse events and complications. Adverse events can occur while the endotracheal tube is passed through the incision from interior to exterior. It may be difficult to pass the tube through the incision or reattaching the connector to endotracheal tube. These adverse events can be overcome by Green and Moore's modification to the original technique. They used two endotracheal tubes in their technique. They first secured the airway with conventionally placed oral tracheal tube, reinforced endotracheal tube was then drawn in from exterior to interior through the submental incision. The original oral tube was withdrawn and reinforced tube substituted. At the end of the procedure, the process may be reversed. This technique is also useful when manufacturers design specifically prevents the removal of tube connector.¹⁷ However, grasping and drawing in the tracheal end of the endotracheal tube can damage the cuff.

Accidental extubation, tube obstruction and damaged tube (leaking cuff) are more difficult to manage in submental route. Endotracheal tube exchanger has been used successfully to replace the damaged tracheal tube by the submental approach.¹⁸ Other potential complications are superficial infection of the submental wound, trauma to submandibular and sublingual glands or ducts, damage to lingual nerve, orocutaneous fistula and hypertrophic scar¹⁰. However, no complication occurred in our patient. Perioperative antibiotic cover, good oral hygiene and not so tight closure of submental incision resulted in prevention of infectious complications.

When submental tracheal tube has been kept in situ for short period then it is mandatory that an immediate access to oral airway is ensured at all times and maxillomandibular fixation should not be used until after extubation and confirmation of secure airway^{11,12}. In our patient we did not keep the endotracheal tube in situ.

So, with severe maxillofacial trauma, Submental endotracheal intubation is a useful and relatively harmless alternative to tracheostomy for securing airway in selected group of patients.

Conclusion

We conclude that submental endotracheal intubation technique is a useful option in severe

maxillofacial trauma patients for securing the airway. This technique should 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.

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