

Fiberoptic Assisted Submental Endo-Tracheal Intubation - A Good and Safe Alternative to Tracheostomy

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Abstract

In maxillofacial trauma patients, need for nasal exploration and nasal packing or fractured base of skull and Intermaxillary fixation precludes both nasal and oral endotracheal intubation. In these cases, submental route of endotracheal intubation is simple and safe alternative to tracheostomy and its consequent morbidity. We present a case of multiple facial fractures (Leefort-II) were later on converted to submental intubation which avoided the need for tracheostomy.

Introduction

Surgical repair of maxillofacial trauma requires modification of the standard anaesthesia technique. Nasal endotracheal intubation is often contraindicated in the presence of fracture of base of the skull.¹⁻³ Comminuted midfacial fractures cause physical obstruction to the passage of nasotracheal tube. Further the presence of nasotracheal tube can interfere with surgical reconstruction of fractures of the naso-orbital ethmoid (NOE) complex. Surgical reconstruction often involves maxillomandibular fixation in the intraoperative period to restore patient's dental occlusion. This precludes the use of oral endotracheal intubation in such cases. During induction of general anaesthesia mask holding during bag and mask ventilation can cause displacement of comminuted fracture fragments of anterior walls of maxillary sinuses and nasal bones. It may induce fresh nasal

bleed. In these conditions, tracheostomy may be indicated but it is having many inherent complications and significant morbidity.¹²⁻¹⁴ Submental endotracheal intubation has been described as an useful alternative to tracheostomy with minimal complications,^{4,11} in maxillo-facial trauma patients.¹² To prevent chances of fresh nasal bleed or displacement of comminuted fracture fragments of maxilla due to mask holding during mask ventilation, we performed awake fiberoptic orotracheal intubation. The orotracheal intubation later on under anaesthesia was converted to submental intubation.

Case Report

A 26 year old, 47 kg male met with a road traffic accident and was referred to our Institute from private hospital.

After mishap, patient had nasal bleed and loss of consciousness for 7-8 hours. After that, patient was complaining of inability to close mouth completely, inability to chew and right eye diplopia. On examination there was swelling over bilateral maxilla and right zygomatic region. There was anosmia and hypoesthesia over right infraorbital region. There was 4 cm mouth opening but impaired occlusion in the form of premature cuspal contact with antero-lateral open bite. Radiological examination confirmed the

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presence of bilateral Lefort- II fracture. Radiological finding was displaced comminuted fracture of anterior wall of bilateral maxillary sinuses, lateral wall of left orbit and lateral walls of bilateral nasal cavities.

The patient was scheduled for surgical correction of multiple facial fracture. Nasal as well as oral endotracheal intubation was not possible in the case, because the surgical procedure involved intraoperative intermaxillary fixation to check occlusion. To prevent chances of fresh nasal bleed or displacement of comminuted fracture fragments of maxilla during mask ventilation, we planned awake fibreoptic orotracheal intubation. In order to avoid tracheostomy, under anaesthesia conversion of this orotracheal intubation into sub mental endotracheal intubation was planned.

Patient was kept fasting for 8 hours preoperatively. He was premedicated with Inj. Ranitidine 150 mg; Inj. Ondansetron 4 mg. and Inj. Glycopyrrolate 0.2 mg. intravenously 1 hour before shifting patient to operation room. The procedure was explained to the patient. Inj. Midazolam 0.03 mg/kg was given IV for anxiolysis. The patient was prepared for fibreoptic bronchoscopy by giving him 2% Lignocaine viscous for gargling, 4% Lignocaine nebulisation, superior laryngeal nerve block and transtracheal application of 2 ml of 2 per cent Lignocaine. The total dose of Lignocaine was carefully controlled to avoid toxicity. The oxygenation started with nasal prongs (4lpm). The fibreoptic bronchoscope lubricated well with 2% Lignocaine gel. It was confirmed that connector of flexometallic tube could be removed. The no. 34 FG (8 mm) flexometallic endotracheal tube mounted over the shaft of fibreoptic scope and secured to the bevelled end of bronchoscope handle with small adhesive tape. The patient was instructed to hold bite block between his incisors. The fibreoptic bronchoscopy was carried out and scope advanced until carina was visualised. The Flexometallic tube was loosened from bronchoscope handle by removing adhesive tape. The Flexometallic tube was advanced into the trachea over the bronchoscope shaft until 24 cm mark on the tube was at the teeth. While removing fibreoptic bronchoscope, position of the Flexometallic endotracheal tube was confirmed. The patient was much comfortable. Bag movement with respiration was confirmed after attaching bain's circuit to endotracheal tube and also ETCO₂ level confirmed. Incremental doses of Inj. Propofol given (90 mg) intravenously and positive pressure ventilation with bag as well as bilaterally

equal air entry was confirmed. Bite block removed by briefly detaching connector of the endotracheal tube and Endotracheal tube secured with adhesive tape. Muscle relaxation achieved by giving Inj. Vecuronium 4 mg intravenously, Inj. Fentanyl (2 microgm/kg) and inj. Dexamethasone 8 mg given intravenously Anaesthesia was maintained with 40% oxygen with Nitrous oxide and Sevoflurane. A 2 cm incision was made in sub-mental region in the midline by the surgeon. It was extended intra-orally 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. the tube connector was reattached and endotracheal tube reconnected to anaesthesia breathing circuit. Bilateral air entry was rechecked and found to be equal and the tube was fixed with 1'0 silk suture. The total duration of surgery was five hours. Surgeon decided to keep maxillary pack for 24 hours postoperatively and maintain intermaxillary fixation for four weeks. Considering postoperative airway oedema because of surgical procedure and also the presence of intermaxillary fixation, we decided to keep submental endotracheal tube in situ for 48 hours. So neuromuscular blockade was reversed with Injection Glycopyrrolate 8 micro gm/kg and Injection Neostigmine 0.05 mg/kg intravenously. Patient was allowed to regain consciousness and spontaneous respiration. Then patient was shifted to ICU for observation with submental endotracheal tube in situ and 'T'-piece attached for oxygenation. In the ICU endotracheal tube care was taken to prevent blockage by secretions. The wire cutter was kept at bedside alongwith the patient to cut open maxillo-mandibular fixation if in case, immediate access to oral airway was required e.g. Tube obstruction, accidental extubation or cuff leak. Surgeons removed maxillary antral pack 24 hrs. postoperatively. The extubation of the patient was carried out in the operation theatre 48 hours after surgery. Wire cutter was kept ready during extubation in operation room. The submental incision was closed with two skin sutures.

Intraoperative and postoperative period was uneventful. Perioperatively the patient received routine antibiotic coverage for trauma surgery procedure and oral hygiene was maintained. Regular mouthwash with 0.2% chlorhexidine gluconate solution was done. No complication like infection or orocutaneous fistula was noted.



Submental Intubation



Post Extubation in O.R.

Discussion

Altemir, a maxillofacial surgeon, in 1986, first described the submental route of endotracheal intubation.⁴ This technique provided a secure airway, optimal field, allowed maxillo-mandibular fixation while avoiding drawbacks and complications of nasotracheal intubation and tracheostomy. Nasotracheal intubation is not possible in the presence of fractures of nasal bones, skull base fractures and cerebrospinal fluid rhinorrhoea. Any attempt towards nasotracheal intubation can lead to passage of tube into the cranium, meningitis, sepsis, sinusitis, epistaxis³ and dislodgement of bony fragments by tube. Our patient had nasal bone fractures which precluded nasotracheal intubation.

Tracheostomy, an alternate technique, is associated with complications like haemorrhage, subcutaneous emphysema, pneumomediastinum, pneumothorax, recurrent laryngeal nerve damage, tracheal stenosis, tracheomalacia and excessive scarring leading to disfigurement.¹²⁻¹⁴

Submental endotracheal intubation is not free of adverse events and complications.¹⁵ Adverse events can occur while 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. Green and Moore overcame this problem by using two endotracheal tubes.¹⁶

Macinnis and Baig reported that their experience with standard technique as described by Altemir was less than satisfactory because of bleeding, difficult tube passage and sublingual gland involvement. Instead of slight lateral exit wound submentally, they modified the technique to strict midline approach in 15 patients with satisfactory results.¹¹ We also followed the midline approach without any complication.

Accidental extubation, tube obstruction and damaged cuff are more difficult to manage in submental route. Endotracheal tube exchanger has been used successfully to replace the tracheal tube by submental approach.¹⁷

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 scar.¹⁵ However no

complication occurred in our patient. Submental tracheal tube has been kept in situ for up to two or three days postoperatively. In such cases 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. In our case, we kept endotracheal tube in situ for two days in view of airway oedema, surgeon's decision to keep maxillo-mandibular fixation in immediate postoperative period and to keep maxillary pack for 24 hours. The wire cutter was kept ready with the patient till patient got extubated. This was done to cut open the maxillomandibular fixation and get immediate access to oral airway in case need arises. But patient remained comfortable with sub-mental tube in situ. We extubated our patient in operation room two days after surgery and submental incision was closed with two skin sutures.

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Corrigendum

In the Special Issue of 2011, article on page 468, 'Meningeal Haemangiopericytoma (M-HPC)' by Velho Vernol L., Binayke Rachana, Sisodia S.M., Sharma Mayur S, the correct sequence of authors **should read as Velho Vernol L., Sharma Mayur S, Binayke Rachana, Sisodia S. M.** The inadvertent error is regretted.