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Case Note

Submental tracheal intubation in a case of panfacial trauma

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Abstract
Airway management of panfacial fractures is complicated. Treatment of fractures of such bones presents a certain difficulty as in not only do the fracture fragments have to be aligned but the teeth have to be kept in proper occlusion as well. To achieve a proper pre-traumatic occlusion, the occlusion has to be maintained and checked at all times during the surgery. There are many options for the airway management of such cases. We present a case of panfacial fracture which was managed successfully with submental intubation.

A 52 year old male presented to the emergency room with history of fall from height. The patient had sustained trauma to the face and the left lower limb. Examination of face revealed periorbital and palatal hematoma and multiple fractures of facial bones. Mouth opening was restricted (modified mallampatti grade IV). Clinical examination did not reveal any neurological deficit or cardiorespiratory instability.

CT scan report of head

- Displaced fracture of body of mandible on either side of symphysis menti.
- Fracture of the nasal septum and fracture of bilateral maxillary sinuses with haemosinus and adjacent subcutaneous oedema.
- Fracture of medial and lateral walls of the orbit bilaterally with preseptal oedema and emphysema. Haemosinus involving bilateral ethmoidal and sphenoid sinus.
- Fracture of bilateral frontal bones involving bilateral basifrontal region, anterior and lateral aspects with frontal haemosinus and pneumocephalus.

Patient was planned for open reduction and internal fixation of panfacial fracture under general anaesthesia.

Anaesthesia technique

All preparations for difficult airway were taken. Pre-induction monitoring included pulse oximetry, ECG, non-invasive blood pressure measurement and CVP. The patient was premedicated with atropine, ranitidine and ondansetron, preoxygenated and anaesthesia induced with pethidine and propofol. Mask ventilation was possible after insertion of an oropharyngeal airway. Hundred mg of suxamethonium chloride was administered. Cormack-lehane grade II vision was obtained while performing laryngoscopy using a #4 size Macintosh blade. Oral intubation was done with 8.5 mm cuffed flexometallic endotracheal tube. Pharyngeal pack was inserted. The machine end of the endotracheal tube was brought out through the submental route. Anaesthesia was maintained using oxygen/air/propofol infusion/halothane/ vecuronium. No critical event occurred during the surgery. At the end of surgery, the endotracheal tube was brought out orally, the submental skin incision closed. The mucosal wound was left to heal by secondary intention. Neuromuscular blockade was antagonized with neostigmine and atropine and trachea extubated. Post-operative period was uneventful.

Surgery performed

A below to above approach to fix the facial fractures was used. Thus the mandible fractures were fixed first through intraoral vestibular approach. 2 mini-plates were used with tension band wiring. Occlusion was achieved using the mandibular teeth as guide and temporary intermaxillary fixation was attained using erich arch bars and wires. Mid face fracture was then reduced and fixed with mini plates, while floor of orbit was fixed through infra-orbital approach. Finally the Fronto-Nasal fracture was approached through a flying bird incision and reduced and fixed with a mini plate. Frontal sinus was obliterated to prevent spread of infection intracranially.

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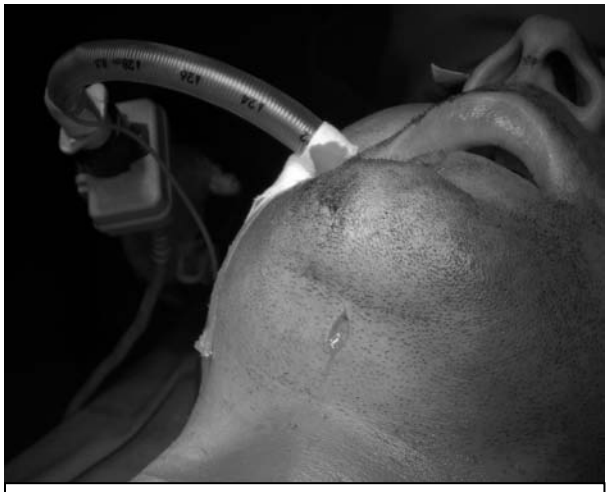

Fig 1: Orotracheal tube in situ. Note submental incision.

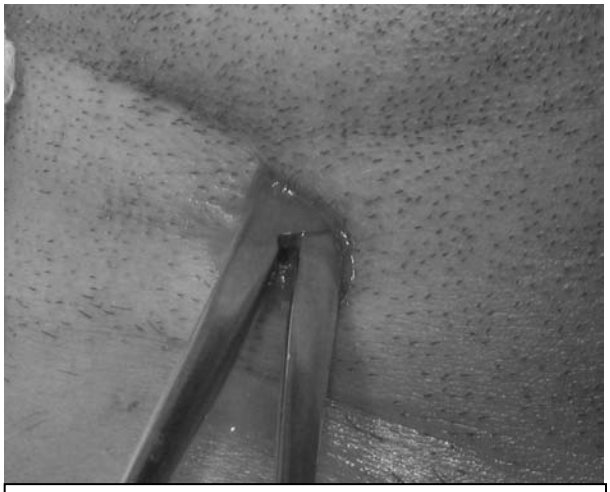

Fig 2: Kelly forceps used to create submental tunnel

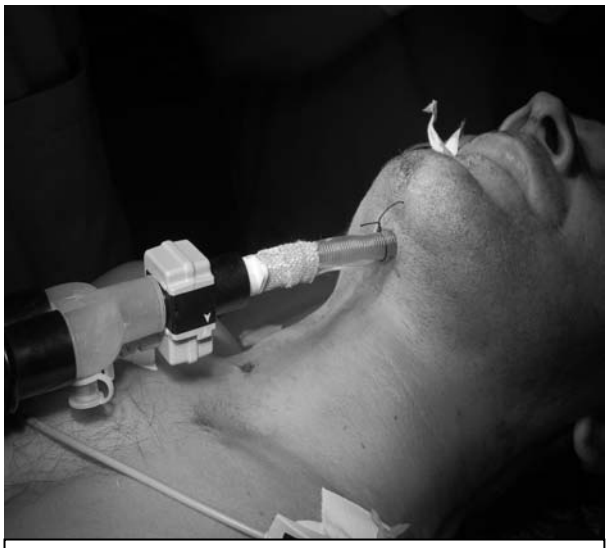

Fig 3: Submental intubation in situ.

Table 1: Comparison of tracheostomy, nasal intubation and submental intubation[1]

	Tracheostomy	Nasal intubation using fibrescope	Submental intubation
Advantages	Avoids nasal route Allows dental occlusion intra and postoperatively Better for long term ventilation	Allows dental occlusion intraoperatively Avoids extra surgical procedure Avoids surgical scar	Technically easy Allows dental occlusion intra and postoperatively Low complication rate Cosmetically acceptable scar
Disadvantages	Most invasive technique Extra procedure Risks of haemorrhage, scarring and tracheal damage – stenosis, tracheomalacia, infection	Requires a fibre-optic scope. Poor for prolonged postoperative ventilation Nose must not be blocked Risks of nasal bleeding, sinusitis and possible meningitis	Unfamiliarity of technique Poor in prolonged ventilation and weaning Increased risk of tube movement (bronchial intubation and tracheal extubation)

Discussion

Airway management for patients who suffer panfacial fractures is complicated. Facial bones, i.e. maxilla and mandible are unique because they have teeth embedded in them. Thus treatment of fractures of such bones presents a certain difficulty as in not only do the fracture fragments have to be aligned but the teeth have to be kept in proper occlusion as well. To achieve a proper pre-traumatic occlusion, the occlusion has to be maintained and checked at all times during the surgery. When only the mandible or maxilla is fractured, a nasal intubation suffices to achieve the goal. However, a panfacial fracture can present its problems with regards to occlusion. Tracheostomy and nasotracheal intubation may lead to other complications. Nasal intubation can interfere with centralization and stabilization of nasal fractures. An orotracheal tube may compromise the reduction and maintenance of panfacial fractures[2]. When neither nasotracheal nor orotracheal intubation is suitable, temporary tracheostomy is frequently the option of choice. This technique, however, is associated with significant morbidity. Complications include haemorrhage, recurrent laryngeal nerve damage, subcutaneous emphysema, tracheal stenosis, and a cosmetically undesirable scar. In 1998 Martinez–Lage et al proposed an alternative to nasotracheal intubation and tracheostomy during treatment of craniofacial traumas and cranial base approaches. In this technique, called retromolar intubation, a semilunar osteotomy is made in the retromolar space[3]. The orotracheal tube is then placed in the retromolar area, lying below the occlusal plane. This intubation technique offers an unobstructed intraoral surgical field with secure airway management, and intermaxillary fixation can be performed without any impediments. However bone anatomy must be destroyed to make space for the tube, and the procedure requires a mean of 25 minutes to perform. Besides, evaluation of the restoration of an individual occlusion can be partially impaired by the presence of the tube in the oral vestibule[3].

In contrast, the submental route for endotracheal intubation represents a fast and low–morbidity alternative and allows for checking dental occlusion intraoperatively. Tracheal intubation *via* the submental route was first described by Altemir in 1986[4]. Many modifications of the original technique are available[3, 5, 6].

In our patient, we opted for submental intubation using a single flexometallic endotracheal tube. Pre-operatively, the flexometallic had to be modified for this purpose. The part of the tube which encloses the connector lacks the metallic spirals and the connector is held in place with an adhesive. A one cm incision was placed on that part of the tube which encloses the connector. The connector was easily prised off the tube. The connector was then kept back in its original place and fastened with elastoplast. We started with a regular intravenous anaesthetic induction. The prepared 8.5 mm flexometallic endotracheal tube was placed orally. The surgeon made a 1-cm incision posterior to the symphysis menti in the midline (Fig. 1). A Kelly forceps was introduced through the skin incision and into the floor of the mouth by blunt dissection (Fig. 2). The forceps was kept close to the inner side of the mandible. After establishment of the submental tract, the elastoplast over the connector was removed and the connector was detached from the endotracheal tube. The pilot balloon and then the free end of the endotracheal tube were pulled out through the submental incision with the forceps. The connector was attached to the free end of the endotracheal tube and refastened with elastoplast and reconnected to the anaesthetic circuit (Fig. 3). The tracheal tube was anchored in place using stay sutures. Careful attention was paid to capnography to ensure the tube has not been pulled out of the trachea. The submental intubation procedure took 5 minutes to perform. The exercise was repeated at the end of the surgery to return the endotracheal tube to the oral position. We opted for a propofol based total intravenous anaesthesia as the nitrous oxide is contraindicated in pnemocephalus.

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