



SUBMENTAL INTUBATION FOR MAXILLOFACIAL SURGERY

Puneet Verma

MD, Anaesthesiologist. District Hospital, Mandi, Himachal Pradesh.

ABSTRACT Maxillofacial trauma with any contraindication to nasotracheal intubation presents a challenging situation. In this case report, I present my experience with one such patient. Here submental intubation was done using a flexometallic tube and fiberoptic bronchoscope. The various precautions to be taken are discussed in detail.

KEYWORDS : Submental intubation, fiberoptic bronchoscope, difficult intubation.

INTRODUCTION

Maxillofacial trauma is an important cause of morbidity and mortality in young population. Intubation in these trauma patients poses a special challenge to the anaesthesiologist. Sometimes the surgeon needs a clear view of both maxilla and mandible, but nasopharyngeal intubation is contraindicated. This necessitates submental intubation which is discussed in this case report.

CASE REPORT

A 32 years old, male, R/O Moorang, Kinnour (H.P). Presented with LeFort 1 fracture with midpalatal split with fracture right parasymphysis of mandible with fracture bilateral Zygomaticomaxillary complex with fracture Right condyle of mandible with fracture Nasoorbitoethmoid complex (LeFort 3). With CSF rhinorrhea consequent to road side accident.

Surgery planned: Open Reduction and internal fixation with plates and screws.

Pre Anaesthetic Check-up :

- Casual smoker.
- Occasional alcohol consumption.
- History of surgery for fracture right humerus under general anaesthesia 3 years back, which was uneventful.
- No associated co-morbid conditions like hypertension or diabetes.

Medications:

Inj. Ceftriaxone 1g IV BD since 5 days.
Inj. Ornidazole 500mg IV BD since 5 days.
Inj. Dexamethasone 8mg IM BD since 5 days.
Inj. Diclofenac 75 mg IM BD since 5 days.
Tab. Acetazolamide 250 mg BD orally since 3 days.

Vitals:

- Pulse- 92/minute, regular.
- BP – 136/90 mm of Hg.
- RR- 16/min.
- Temperature- Afebrile.
- Height- 160 cm.
- Weight- 51 kg.
- BMI- 19.92
- Venous access - Dorsum of left hand.
- Systemic examination- NAD

Airway Examination:

- Mouth opening: 3cm/2FB
- Protrusion of lower jaw: Can't be protruded
- TMD: 6.5 cm
- Neck Movements: Adequate flexion, extension and tilting of neck.



Figure 1: Mouth opening during PAC.

Imaging:

- Comminuted, displaced fracture of body of mandible in midline.
- subluxation of bilateral TM joint.
- Comminuted, displaced fracture of maxillary alveolar process and hard palate.
- Fracture of nasal bone and bony nasal septum.
- Comminuted displaced fracture of bilateral zygomatic arch, wall of bilateral maxillary sinus with blood collection within.
- Displaced fracture of floor, medial and lateral wall of bilateral orbit.
- No injury to cervical spine.

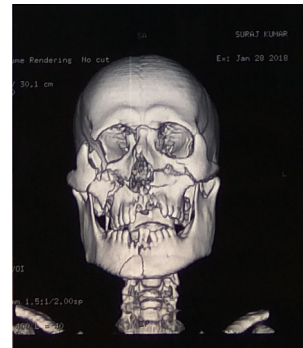


Figure 2: 3D reconstruction of face showing fractures.

Premedication:

- The patient was counselled for awake fiberoptic intubation and the procedure explained to him. Alternative management strategies were also explained.
- Consent was taken including that for tracheostomy.
- NPO: 8 hours.
- Injection Glycopyrrolate 0.3mg was given intramuscularly in recovery room after confirming identity at 9 am for antisialogogue effect.
- Patient shifted to the OT at 930 am. Identity re confirmed.
- Monitors: ECG, NIBP, Pulse oxymetry attached. Baseline vitals noted.
- IV Line: 18 gauge peripheral IV catheter in dorsum of left hand.
- Injection midazolam 1mg IV was given.
- Inj. Fentanyl 150mcg I/V.

Induction and Intubation:

- Bilateral superior laryngeal and transtracheal blocks were performed under aseptic conditions.
- Oral spray with 4% lignocaine was given for topical anaesthesia of posterior pharyngeal wall, hard palate and base of tongue.
- Inj. Propofol 60mg I/V.
- A reinforced cuffed endotracheal tube of 7mm internal diameter, whose connector was loosened was inserted orotracheally using fiberoptic bronchoscope.
- Bilateral air entry was checked and tube fixed and cuff inflated.
- After ensuring ventilation

Inj. Propofol 60 mg I/V.

Inj. Vecuronium 6mg I/V was given.

- The connector of ET tube was then removed and the proximal/machine end of the tube was moved to submandibular location.
- Bilateral air entry was again checked and tube was fixed at 22cm.



Figure 3: Patient being positioned after intubation.

Maintenance of Anaesthesia:

- With inhalational agents (O₂: N₂O: Halothane = 33%:66%: 0.2-1%) and intermittent vecuronium, Inj fentanyl incremental doses, and I/V fluids.
- Injection dexamethasone 8mg IV given to prevent airway oedema.
- Patient kept in supine position.
- Maintained SpO₂ 98-100%
- Total duration of surgery was 7 hours 30 minutes.
- Vitals stable through surgery.

Extubation:

- The machine end of tube was moved to normal orotracheal position before extubation.
- The submental defect was closed by the surgeons before extubation.
- Muscle relaxation was reversed with neostigmine and glycopyrrolate.
- Awake extubation was done.
- Patient maintained SpO₂ above 95% with ventimask in propped up position.
- Patient was observed for 30 minutes after extubation and shifted to ward.

Post-op assessment:

- Patient was fully conscious.
- HR – 110/min.
- BP – 126/70 mm of Hg.
- SPO₂ – 96%.
- There was clear phonation and no airway obstruction.
- No fresh complaints 2 hours after extubation.
- 24 hours post op: uneventful.

DISCUSSION

- The le-fort classification for facial fractures²:
- Le-fort 1: Horizontal fracture line above the level of floor of the nose involving lower third of septum and the mobile fragment consists of the palate, the maxillary alveolar process and lower third of pterygoid plates and associated portion of palatine bone.
- Lefort II Fracture: From the nasal bridge the fracture enters the medial wall of the orbit, involving the lacrimal bone and then recrosses the orbital rim at the junction of the middle third and the lateral two third, striking medial to, or through infra orbital foramen. The fracture line runs beneath the zygomatico maxillary suture, transversing the lateral wall of the antrum to extend backward horizontally through the pterygoid plate.
- Lefort III Fracture:
 - The fracture line runs parallel with the base of the skull separating midfacial skeleton from the cranial base,
 - The fracture extends through the
 - Nasal base
 - Full depth of ethmoid bone
 - Lesser wing of sphenoid
 - Optic foramen
 - Pterygomaxillary fissure
 - Sphenopalatine fossa
 - Inferior orbital fissure
 - Greater wing of sphenoid bone
 - Zygomatic bone
 - Zygomatic suture
 - Root of pterygoid plates.
- Nasotracheal intubation is contraindicated in Le Fort II or III

fractures because the cribriform plate of the ethmoid bone may be involved. Foreign material from the nasopharynx may result in meningitis or, even more devastating, the endotracheal tube can enter the cranial cavity. Even positive pressure bag and mask ventilation can force foreign material or air into the skull. CT scan sequential cuts with 3D reconstruction imaging should be done prior to nasotracheal intubation whenever trauma to the skull base is suspected.

- Cervical spine fractures occurs in 1-2% of high-velocity injuries. Upper face injuries are associated with mid to lower cervical spine injuries, whereas unilateral mandibular injuries involve the upper cervical spine. Therefore radiological evaluation of cervical spine in the form of x-ray and if required CT scan is necessary. Also due precaution during tracheal intubation should be taken.

Other intubation options:

- In this case we preferred awake fibreoptic intubation under nerve blocks and local anaesthetic sprays so as to avoid displacement of fracture segments due to mask holding and also to avoid possible forcing of air into intracranial cavity. As the patient was suspected of having CSF rhinorrhea.
- Tracheal intubation under general anaesthesia with muscle relaxants (succinylcholine/ rocuronium) and IV induction was an option but it carried the risks of positive pressure ventilation.
- Tracheal intubation with direct laryngoscopy carried risks of intracranial complications of mask ventilation and a can't intubate can't ventilate situation. Also the risk of displacing the upper alveolar (maxillary) process and segments in this patient.
- Retrograde intubation through oral route was yet another possible option but pulling of the tracheal tube through oral cavity could entail risk of injury to larynx due to acute curvature.
- Light wand intubation can also be considered in such patient but again this will require local anesthesia and sedation as used for fibreoptic intubation. But this again is a blind procedure and would be difficult because of oedema of submandibular region due to fracture.
- Rescue cricothyrotomy and tracheostomy provides options for front of neck access in such patients but due to immediate and long term complications these options should be used only in case of life saving circumstances.

REFERENCES

1. Hagberg, Carin A. Miller's Anesthesia. Edited by Ronald D. Miller, 8th ed. p-1658.
2. Hopper, R. A., et al. (2006). Diagnosis of Midface Fractures with CT: What the Surgeon Needs to Know. Radiographics 26(3): 783-793.