

Faciomaxillary Surgery - Our Experience: Anaesthesiologist's Perspective

M Sarkar, V Puri, D Kumar, Dewoolkar, C Shastri, M Shakeel

Citation

M Sarkar, V Puri, D Kumar, Dewoolkar, C Shastri, M Shakeel. *Faciomaxillary Surgery - Our Experience: Anaesthesiologist's Perspective*. The Internet Journal of Anesthesiology. 2006 Volume 12 Number 1.

Abstract

This retrospective study evaluates patient management with special reference to airway options for the management of maxillofacial trauma. The medical records of 241 patients who underwent elective surgeries for maxillofacial injuries out of total 478 patients treated from August 2002 to July 2005 were reviewed. Wherever possible tracheal intubation was performed orally or nasally. If intra oral surgical manipulation is required and the patient had associated Lefort's fracture, neither oral nor nasal intubation is possible. In such cases submental intubation was performed to avoid the complications of tracheotomy. In cases where mouth opening was restricted, tracheotomy was performed.

INTRODUCTION

Various treatment modalities for panfacial fracture management are conservative with splints, closed reduction, external fixators, open reduction with internal fixation using screws and plates, bone grafts etc. Surgical repair of maxillofacial trauma requires modification of the standard anaesthesia techniques. Oral, nasal intubation and tracheostomy is the established method for the management of airway. But most of the time oral intubation not possible if dental occlusion is surgical necessity¹, nasal intubation is contraindicated because of associated Lefort's fractures², and tracheostomy is not preferred because of its complications³. So we were in search of other ways to manage the airway. Mode of intubation in such cases is a controversial issue. Submental intubation has solved the problem. Submental intubation is an useful alternative to tracheostomy with minimal complications in these conditions⁷. This technique does not compromise the airway.

The aims of the study was to find out the possible ways of airway management and complications encountered. Inclusion criteria were all faciomaxillary trauma that came for surgery. Exclusion criteria were all soft tissue injury treated on OPD basis.

MATERIALS AND METHODS

The medical records of 241 patients who underwent elective surgeries for maxillofacial injuries from August 2002 to July 2005 in the department of plastic surgery, KEM hospital

were reviewed.

Airway access techniques were Oral intubation, Nasal intubation, Submental intubation and Tracheostomy.

The following variables were also observed in our study

- Trauma during the procedure, accidental extubation, postoperative complications (hemorrhage, injury to sublingual glands, wharton's duct or lingual nerve, orotracheal fistula and infection) and healing of scars.

TECHNIQUES OF AIRWAY ACCESS

Orototracheal Intubation – After induction and muscle relaxation with the patient in sniffing the morning air position, using appropriate sized laryngoscopes and tubes, orotracheal airway was secured.

Nasotracheal Intubation - After induction and muscle relaxation with the patient in neutral position, either blindly or using Magill's forceps after laryngoscopy , airway was secured nasotracheally.

Submental Intubation - After a normal orotracheal intubation was performed with a reinforced (spiral embedded) 7.5 or 8.5 mm diameter tube, a 2–cm skin incision was made in the paramedian region, about 1 cm from the lower mandibular margin and parallel to it on the midline. Using a curved hemostat, a passage was created by blunt dissection near the

lingual surface of the mandible. While the tongue was pushed backward, the tip of the hemostat was visible just below the mucosa of the floor of the mouth, anterior to Wharton's duct papillae. A mucosal incision was made parallel with the gingival margin on top of the lips. A passage for the tube was created from the mouth, through the mylohyoid muscle to the submental incision. The orotracheal tube was secured in the mouth to avoid accidental extubation. It was then disconnected from the breathing circuit. The end was grasped with the hemostat and withdrawn through the submental tunnel and reconnected. When capnography and lungs auscultation confirm the correct tracheal position of the tube, the tube is fixed at the submental level with 2-0 silk suture, in a similar fashion as a drainage tube.

At the end of the procedure, anesthesia is discontinued and the patient is extubated in the operating room. The submental access is sutured.

Tracheostomy – Conventional elective tracheostomy was done.

OBSERVATION AND RESULTS

Figure 1

Table 1: Age And Sex Distribution Of Study Population

AGE	MALE	FEMALE	TOTAL
0- 10	5	7	12
11 – 20	28	10	38
21 – 30	100	13	113
31 – 40	36	9	45
41 – 50	21	5	26
51 – 60	6	0	6
>60	0	1	1
TOTAL	196	49	241

Out of 241 cases age range was 2 yrs to 65 yrs, overwhelming male prepondance with a peak in 3rd decade ,most required age group of the society.Male and female ratio was 4:1.

Figure 2

Table 2: Type Of Fractures

mandible	117
maxilla	9
zygomatic	59
Pure nasal bone	8
Midface + mandible	15
panfacial	30
Fronto naso ethmoido orbital	3
	241

Commonest fracture was mandibular fracture followed by zygomatico maxillary complex and midface fracture. 12 % accounted was panfacial.

Figure 3

Table 3: Modes Of Securing Airway

Oral intubation	56
Nasal intubation	158
Submental intubation	15
Tracheostomy	12

Most common way of intubation required was nasal intubation. Submental intubation was chosen over tracheostomy because of surgeon's need for oral manipulation and to reduce morbidity. Out of 241 patients, 158 patients had nasal intubation , among these 20 patients had epistaxis. 56 patients had oral intubation out of which 2 patients had injury to teeth.15 patients had submental intubation out of which 4 patients had infection resulting in fistula in one patient which took three weeks to heal with conservative management. The remaining 12 patients had tracheostomy. Wound healing was adequate in all.

DISCUSSION

Airway management in complex craniomaxillofacial trauma is often difficult. The choice of intubation technique requires good assessment from multidisciplinary team that includes maxillofacial surgeons, anaesthesiologists as well as good communication between the surgeons and anaesthetist. If the extent of injury is minimal as in isolated zygomatic arch fracture or ramus of mandible fracture, mere nasotracheal or orotracheal intubation would be adequate. In many conditions such as craniomaxillofacial trauma, neither nasal nor orotracheal intubation is possible. In fact, nasotracheal intubation precludes the treatment of nasal fractures. Also in patients with frontobasilar fracture associated with maxillofacial trauma, blind ETT or nasogastric tube can directly go into the anterior cranial fossa because of fracture

of cribriform plate resulting in major complications like meningitis, hemorrhage, and CSF leakage.^{2, 3, 4, 5, 6} Therefore, nasotracheal intubation is contraindicated in the presence of fracture of nasal skeleton, skull base fracture and CSF rhinorrhoea.

Conversely, an orotracheal tube interferes with maxillomandibular fixation, compromising the reduction and stabilization of maxillary and mandibular fractures.⁷ Often neither nasal nor orotracheal intubation is suitable for transfacial approaches to the cranial base.⁸ In fact, during transmaxillary approaches the orotracheal tube can obstruct the downward retraction of the maxilla after a Le Fort I osteotomy, limiting the exposure of the cranial base.^{6, 8} The tube can also be clamped between the teeth, reducing the airway lumen.^{6, 8} At the end of surgery, restoring an individual occlusion may not be tested and, if needed, intermaxillary fixation cannot be performed. In these situations, which require teamwork from several disciplines,⁸ submental intubation or tracheostomy can be performed but submental intubation is preferred to avoid the complications of tracheostomy.^{9,10,11} When mouth opening itself is inadequate, tracheostomy remains the only option.

Description of submental intubation dates back to 1986 by Altemir, a maxillofacial surgeon.¹² This technique offers a secure airway to the anaesthesiologist, optimal operating field and opportunity to check dental occlusion to the surgeon and less morbidity to the patient. So this technique was appreciated, well deservedly, by all the members of the team.

Submental intubation though has few complications like infection, orocutaneous fistula, In our study one patient had palatal fistula. It can be at times challenging if attention is not paid to proper selection of tube.¹⁷ Connector should be loose enough to facilitate easy disconnection, yet tight enough not to allow accidental disconnection or continued leak. We have surpassed this problem by having separate tubes, with written labels, which are checked routinely prior to intubation.

Amin et al describes the use of capnography during the process of converting orotracheal to submental and also throughout the surgery, to confirm the position of tube and to serve as warning tool against accidental extubation.¹⁸ Our experience also matches the authors' opinion. Drolet et al described the use of tracheal tube exchanger in case of limited mouth opening.⁹ But associated complications were thought to be too high and they are not used in our institute.

MacInnis et al described the use of midline incision to avoid excess bleeding, but since our previous experience with paramedian approach was uneventful, we went ahead with paramedian approach.²¹ Contraindications to submental orotracheal intubation are infection at the site of incision, mandibular symphysis fracture, inability to open mouth, etc. The list of procedures, where submental intubation can be used safely wherever orotracheal or nasotracheal tube hinders surgical access are innumerable, like oral surgeries in patients with nasal obstruction, plastic surgery for cleft lip correction, rhinoplasty, etc.²⁰ Altemir et al described the use of laryngeal mask airway via submental approach, in conditions where endotracheal tube has to be avoided, or simply is not desired.²² Though tracheostomy has many inbuilt complications it is indicated in few cases as first option eg. to bypass obstruction, to provide a long-term route for mechanical ventilation.

To conclude we feel management of panfacial fractures is a very complex issue. Optimal choice of airway management is directed by thorough preoperative evaluation including radiological study, surgical requirement of maxillomandibular fixation and experience of anaesthesiologist. Wherever possible submental intubation should be considered over tracheostomy to reduce morbidity.

ADDRESS FOR CORRESPONDENCE

DR. Manjula S Sarkar, M.D., Professor, Department of Anaesthesia, Seth G.S. Medical college and KEM Hospital, Mumbai. Ph. No.:9820340135 Fax No.:91222413435 E-mail id: drmanjusarkar@yahoo.com

References

1. Caron G, Pasquin R, Lessard M, Trepanier C, Landry PE, Submental endotracheal intubation: an alternative to tracheostomy in patients with midfacial and panfacial fractures. *J Trauma*. 2000;48:235-240.
2. Hall D, Nasotracheal intubation with facial fractures. *JAMA*. 1989;261:1198.
3. Schultz RC, Nasotracheal intubation in the presence of facial fractures. *Plast Reconstr Surg*. 1990;86:1046.
4. Muzzi DM, Losasso TJ, Cucchiara RF, Complications from a nasopharyngeal airway in a patient with a basilar skull fractures. *Anesthesiology*. 1991;74:366-372.
5. Bahr W, Stoll P, Nasal intubation in the presence of frontobasal fractures. *J Oral Maxillofac Surg*. 1992;50:445-451.
6. Martinez-Lage J, Esclava JM, Cebrecos AI, Marcos O, Retromolar intubation. *J Oral Maxillofac Surg*. 1998;56:302-306.
7. Paetkau D, Strand M, Onc B, Submental orotracheal intubation for maxillofacial surgery. *Anesthesiology*. 2000;92:912-914.
8. Sekkar LN, Janeka IP, Surgery of the cranial base tumors. New York: Raven Press. 1993:235-240.
9. Chew JY, Cantrell RW. Tracheostomy, complications and

- their management. Arch Otolaryngol 1972; 96: 538-45.
10. Walker DG. Complications of tracheostomy : their prevention and treatment J Oral Surg 1973 ; 31 :480
 11. stauffer JL , Olson DE, Petty TL. Complications and consequences of endotracheal intubation and tracheostomy. Am J Med 1981 ; 70; 65-76
 12. Altemir FH. The submental route for endotracheal intubation new technique. J Maxillofac Surg 1986; 14 : 64-5.
 13. Davis C. Submental intubation in complex craniomaxillofacial trauma. ANZ J Surg 2004; 74 (5) : 379-81.
 14. Koudstall MJ, vander Wall KG, Mallior C, Ruprecht J. Submental intubation: surgical and anaesthesiological aspects. Ned Tijdschr Geneesk 2003; 147 (19) : 945.
 15. Johnson TR. Submental versus tracheostomy. Br J Anaesth 2002; 89 (2) : 344-5.
 16. Callahan V, O Connor AFF. Adult and paediatric tracheostomy - technique, complications and alternatives. Curr Pract Surg 1994; 6 : 219-22.
 17. Ahmed FB, Mitchel V. Hazards of submental tracheal intubation. Anaesthesia 2004; 59 (4) : 410-1.
 18. Amin M, Dill-Russel P, Manisali M, Lee R, Sinton I. Facial fractures and submental intubation. Anaesthesia 2002; 57 : 1195.
 19. Drolet P, Girard M, Poirier J, Grenier Y. Facilitating submental tracheal intubation with an endotracheal tube exchanger. Analg 2000; 90 (1) : 222-3.
 20. Nwoku AL, Al Balawi HA, Al-Zahrani SA. A modified method of submental tracheal intubation. Saudi Med J 2002; 23 (1) : 73-6.
 21. MacInnis E, Baig M. A modified submental approach for oral endotracheal intubation. Int J Oral Maxillofac Surg 1999; 28 (5) : 344-6.
 22. Altemir FH, Montero SA. Submental route revisited using the laryngeal mask airway, a technical note. J Craniomaxillofac Surg 2000; 28 (6) : 343-4.
 23. Goettler CE, Fugo JR, Bard MR, Newell MA, Sagraves SG, Toschlog EA, Schenarts PJ, Rotondo MF. Predicting the need for early tracheostomy: a multifactorial analysis of 992 intubated trauma patients. J Trauma. 2006 May;60(5):991-6.

Author Information

Manjula S. Sarkar, M.D.

Professor, Department of Anaesthesia, Seth G.S.Medical college and KEM Hospital

Vinita Puri, M.Ch.

Associate Professor, Department of Plastic surgery and burns, Seth G.S.Medical college and KEM Hospital

Dilip B. Kumar, MDS, DNB (Oral and Maxillofacial Surgery)

Department of Dentistry, Seth G.S.Medical college and KEM Hospital

Dewoolkar, M.D.

Professor and H.O.D., Department of Anaesthesia, Seth G.S.Medical college and KEM Hospital

Chandan Shastri, M.B.B.S.

Resident, Department of Anaesthesia, Seth G.S.Medical college and KEM Hospital

Mohammed Shakeel, M.B.B.S.

Resident, Department of Anaesthesia, Seth G.S.Medical college and KEM Hospital