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Role of Submental Intubation During the Management of Airway in Midface and Pan Facial Fractures

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INTRODUCTION

Panfacial fractures always present a challenging situation to an Oral and Maxillofacial Surgeon. Accessibility to the fractured sites in and around oral and nasal apparatus is the main requirement to facilitate adequate reduction of fractured segments. The choice of intubation technique in panfacial fractures requires good communication between the team of oral and maxillofacial surgeons and anesthesiologists. In certain situations where the need for good accessibility and achievement of proper occlusion is a prime requisite, the classical methods of airway management methods like naso-tracheal and oro-tracheal intubations may be contraindicated or not employable(1).

Tracheostomy remains as an alternative method of establishing airway during oral and maxillofacial surgeries, allowing accessibility and achievement of proper dental occlusion. Still, tracheostomy has its own complications, post-operative care and leaving behind an unesthetic scar(2). Under such circumstances sub-mental intubation is one excellent alternative in maintaining airway during oral and maxillofacial surgeries, with access to fracture sites and intra operative management of dental occlusion, with minimal or no complications(3).

MATERIALS AND METHODS

In this retrospective descriptive study, the medical records of 8 patients from December 2013 to February 2015 who underwent oral and maxillofacial surgical procedures under general anesthesia through submental intubation were reviewed systematically.All the surgeries were performed by consultant grade oral and maxillofacial surgeons. The follow up was also recorded by the same oral and maxillofacial surgeons.The inclusion criteria were

1. Patients with midface and panfacial fractures requiring submental intubation.
2. Patients who were graded as ASA I and II in preanesthetic assessment.
3. Clear well documented cases with regular follow up as below

Post-operative follow up sequence

a. 1st follow up – 1st week
b. 2nd follow up – 2nd week
c. 3rd follow up – 4th week (1st month)
d. 4th follow up – 12th week (3rd month)

Surgical technique

In the operating theatre after the patient is intubated orally, under thorough aseptic conditions – 2 cm skin incision is placed laterally in the submental region, just medial to the lower border

of the mandible approximately one third the way from the symphysis to the angle of mandible. The side of submental skin incision is dictated by the presence of concurrent mandibular fractures. Mouth opening being maintained with a mouth prop, the tongue is retracted exposing the floor of mouth. A closed Kelly's forceps is used to traverse the muscle layers of platysma and mylohyoid muscles by blunt dissection. The mucosal layer of the mouth was incised directly over the forceps, infront of the sublingual caruncle after which the forceps was opened to create a tunnel.

It is important to maintain the width of the internal layers (tunnel) to match the skin incision and to allow uninterrupted passage of tube. The endotracheal tube is disconnected from the main breathing circuit and introduced into the mouth through the tunnel using forceps, following which the pilot balloon is passed and pulled out through the skin incision. The endotracheal tube is then connected to the main circuit, bilateral air entry is checked and the tube secured in position using 3 – 0 silk suture.

After the completion of surgical procedure, submental intubation was converted to oral intubation by replacing the tube in mouth. A 4 – 0 vicryl suture was used to close the internal layers and a 5 – 0 ethilon suture was used to close the skin incision. Extubation was done in classical manner.

Ethical consideration

Individual written consent was obtained from all the patients and in situations when the patients were not able to give the consent, consent was got from their legal guardian.

RESULTS

Study participants

There were 8 patients who underwent oral and maxillofacial surgical procedures under submental intubation, during the period from December 2013 to February 2015. All 8 patients were male between the age group of 18 years to 59 years. The etiology for injuries to the maxillofacial region is road traffic accident in all the cases. All patients were treated by open reduction and internal fixation of the fractured segments according to individual treatment plans.

Injury types

Submental intubation permitted the proper reduction of all fractured segments, while simultaneously allowing intraoperative control of dental occlusion without any interference to the surgical procedure.

Classification of injuries

Type of fracture	Number of cases	%
Lefort – I with associated fractures	2	25
Lefort – II with associated fractures	1	12.5
Lefort – III with associated fractures	1	12.5
Panfacial fractures	2	25
Nasal bone with associated fractures	2	25
Total	8	100.0

The total time taken for submental intubation was less than 10 mins. There was no difficulty while passing the tube through the floor of mouth and enough care was taken not to damage the pilot balloon and endotracheal tube connector during removal and reattachment. There was no significant changes in the oxygen saturation while converting the oral intubation to submental intubation and vice versa.

Postoperative follow up

a. 1st week – mild pain at the incision site
b. 2nd week – surgical site healthy, mild scar tenderness
c. 4th week – no scar tenderness, patients comfortable
d. 12th week – scar almost invisible

Complications

There were no untoward events during the intraoperative and immediate post operative periods. There were no other complications encountered in the postoperative follow up.

DISCUSSION

Submental intubation technique was first described and published by Altemir Hernandez,

an Oral and Maxillofacial Surgeon in the year 1986[4]. Since then the submental intubation technique has undergone various modifications, becoming an alternative method of airway management to the routine methods like naso-tracheal and oro-tracheal intubations during surgical procedures of the oral and maxillofacial region especially in panfacial fractures and other challenging situations[5].Other indications for submental intubation are pathological conditions of the maxillofacial region, orthognathic and plastic surgeries.

Naso-tracheal intubation is contraindicated in cases of skullbase fractures, NOE fractures because of the potential complications like intracranial intubation, meningitis, epistaxis, sinonasal infection etc[7].Treatment of maxillofacial fractures requires the proper reduction and stabilization of maxillary and mandibular fractures which also requisites the placement of patients teeth in proper occlusion, butan oro-tracheal intubation always impedes this.

Tracheostomy may present itself with its own complications such as haemorrhage, pneuomediastinum, pneumothorax, recurrent laryngeal nerve damage, stomal and respiratory tract infection, tracheal stenosis, dysphagia, excessive scarring[8].

Martinez-Lage et al in the year 1998 described an alternative technique called retromolar intubation for securing airway in similar situations, in which a semilunar osteotomy is made in the retromolar region [9]. However there are a few disadvantages, mainly the destruction of bone anatomy to create space for introduction of tube, the time taken for the procedure is about 30 mins and finally this method of airway management partially impedes in the achievement of occlusion.

Submental intubation is an excellent and useful alternative technique of intubation, than all the above mentioned methods of intubation during various oral and maxillofacial surgical procedures. Submental intubation can be safely done in patients with panfacial, midface and skull base fractures, also in orthognathic and other pathological situations where the classical methods of intubation does not hold good.

There are a few contraindications to the employment of submental intubation technique such as infection at the site of insicion, bleeding diathesis, disrupted laryngotracheal anatomy, requirement for prolonged maintenance of airway or permanent airway.

CONCLUSION

Submental intubation is an interesting, simple and valuable technique of securing an airway in the management of many oral and maxillofacial surgical procedures, especially when short term postoperative control of airway is foreseeable, with a complete control of dental occlusion and comfortable access to the nasal and oral apparatus. Our experience with submental intubation technique in oral and maxillofacial surgical procedures, presents this method with low or no incidence of operative and postoperative complications simultaneously eliminating the risks and drawbacks involved in other methods of endotracheal intubation. Submental intubation technique is easy, less technique sensitive and less time consuming techniquewhich can be handy to be employed in challenging situations. Submental intubation can become a better alternative concurrently avoiding further complications in a patient who is already in agony.

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