

Submental Approach for Oral Endotracheal Intubation in Maxillofacial Trauma : A Prospective Study

Dr. Swapna Nayan

Professor
Dept. of Oral & Maxillofacial Surgery
Dr. D.Y. Patil Dental College
& Hospital, Sec-7,
Nerul, Navi Mumbai

Dr. S.M. Kotrashetti

Professor
Dept. of Oral &
Maxillofacial Surgery
K.L.E.'s Institute of Dental
Sciences & Hospital, Belgaum

Dr. Rajeev Singh

Professor
Dept. of Prosthodontia

Dr. G. Mandlik

Sr. Lecturer
Dept. of Oral &
Maxillofacial Surgery

Dr. Ekta Keswani

Sr. Lecturer
Dept. of Oral &
Maxillofacial Surgery

Dr. Vraturaj Shevale

Sr. Lecturer
Dept. of Oral &
Maxillofacial Surgery

Dr. D Y Patil Dental College & Hospital, Sector 7, Nerul, Navi Mumbai 400706

Abstract

A clinical study was undertaken to evaluate the efficacy of midline submental intubation in patients with multiple maxillofacial trauma so as to avoid tracheostomy in patients in whom orotracheal and nasotracheal intubation are not indicated. 34 patients admitted to K.L.E.'s Institute of Dental Sciences, Belgaum and Pad. Dr. D.Y. Patil Dental College, Navi Mumbai for pan facial trauma were operated under general anaesthesia using midline submental intubation. All the patients were extubated at the end of the procedure. No major complications were encountered. Submental intubation is a simple, safe and effective technique in pan facial trauma. It avoids the complications associated with tracheostomy and allows intraoperative intermaxillary fixation while providing a better field of work for the oral and maxillofacial surgeon.

Key Words: Intubation, submental intubation, panfacial trauma, midline.

Introduction

In maxillofacial surgery, general anaesthesia is usually administered via the nasal or oral route. In patients with multiple maxillofacial fractures, both oral and nasal routes of intubation become difficult, while, the nasal route may even give rise to a number of complications such as cranial intubation, trauma to the pharynx, sinusitis, etc.^{9,21,23.}

Orotracheal intubation significantly impedes manoeuvres for reduction and stabilisation of jaws, which often require intraoperative intermaxillary fixation. As a result, some specialists consider tracheostomy as a preferred route of airway management.^{4,10,11,12} Tracheostomy is accompanied by severe morbidity such as subcutaneous emphysema, pneumothorax, tracheal stenosis, etc.^{6,10,11,24} The laterosubmental approach for endotracheal intubation, first described by Altemir in 1986, offered a safe alternative to tracheostomy. MacInnis E. et al (1999)¹⁶ modified this technique to utilize a strict midline approach. We evaluated the use of midline submental intubation for treatment of multiple facial fractures including nasoethmoidal complex fractures where nasal intubation has considerable morbidity^{10,11,21,23,26} and oral intubation makes management difficult.

Clinical Materials and Methods

Nineteen cases reporting to the department of Oral and Maxillofacial

Surgery, K.L.E.'s Institute of Dental Sciences and Hospital, Belgaum, and fifteen cases reporting to Pad. Dr. D.Y. Patil Dental College and Hospital, Navi Mumbai with multiple facial traumas were selected for this study.

Criteria for Selection were:

1. Patients with minimal neurological deficit.
2. Multiple craniomaxillofacial fractures
3. Patients requiring short-term intraoperative intermaxillary fixation.

Patients requiring long term airway support and maintenance and known keloid formers were excluded from our study.

The following variables were evaluated:

1. Time required for intubation.
2. Intra and post operative complications.
3. Submental and intraoral wound healing one week and six months post-operatively.

The time required for intubation was calculated from completion of orotracheal intubation to fixation of submental tube.

Technique

Orotracheal intubation was accomplished using a reinforced tracheal tube. Surgical skin preparation of the submental and peri-oral region was performed.



Hemostat Exiting The Incisions Submentally As Well As Sublingually

The proposed line of incision in the submental crease was marked bisecting the midline of the face approximately 2cms in length or slightly greater than the diameter of the tube. Surgical site was infiltrated with 2% lignocaine with 1:200000 adrenalin. The skin and subcutaneous tissue were then incised with a no.15 blade. The mouth opening was maintained with a suitable prop. The tongue was elevated in a superoposterior direction with a tongue depressor, exposing the ventral surface of the tongue and floor of mouth. A 1cm midline incision was made posterior to the opening of the Warton's

duct. The incision was developed in an inferior direction between the geniohyoid, genioglossus and anterior bellies of the digastric muscles. Initial dissection is with blade and then blunt finger dissection is done until the mylohyoid muscle is encountered. Strict midline plane is maintained. A mosquito forcep is then passed through the submental incision. Using a palpating finger in the oral incision as guide, the mylohyoid muscle is bluntly breached. Spreading the haemostat enlarges the mylohyoid opening. The haemostat is then readily passed into the oral cavity.



Midline Submental Intubation

The armoured tube is disconnected from the circuit and the connector removed. The endotracheal tube was grasped by the haemostat and delivered through the submental incision. The anaesthetist reattaches the connector to the tube and reconnects the anaesthetic equipment. The tube is secured to the skin of the submental region with 1.0 black silk suture. Intraorally the tube lies in the right or left sublingual sulcus. The proposed surgical procedure is accomplished unhindered.

At the termination of the procedure the endotracheal tube is passed back through the intraoral incision into the mouth, reversing the original path. It is then exited through the mouth and secured. The oral incision is then secured with 3.0 vicryl sutures. Skin closure is performed using 4.0 ethylon. Extubation is done normally through oral route.

Results

Midline submental intubation was successfully accomplished in 34 patients. The mean time required for the procedure was between five to ten minutes. No major intraoperative complications were encountered. Intraoperative intermaxillary fixation was accomplished in all the cases. A good reduction and fixation was achieved in all the cases. One patient had infection of all the incision sites postoperatively while

another had a infected submental wound postoperatively.

Six months postoperatively the submental scar was imperceptible in all patients except upon close observation with neck hyperextended.

Discussion

The treatment of multiple maxillofacial injuries often imply difficulty in intraoperative airway management. When both nasotracheal and orotracheal intubation are unsuitable, tracheostomy is often the option of choice^{2,4,9,10,11,12,16,24}. Tracheostomy, however is associated with significant morbidity such as infection, hemorrhage, subcutaneous emphysema, pneumothorax, pneumomediastinum, recurrent laryngeal nerve damage, tracheal stenosis, etc.^{6,9,10,19}

There have been several attempts to achieve short term airway management including retromolar intubation,¹⁸ nasal tube switch^{2,5} and laterosubmental intubation.^{1,5,8,9,10,11,14,17,22} The laterosubmental intubation; first described by Altimer offered a safe alternative to tracheotomy.¹ MacInnis E. Et.al(1999),¹⁶ found this technique less than satisfactory due to bleeding, difficult tube passage and sublingual gland involvement. They modified this technique to utilize a strict midline approach. No major complication has ever been reported with this technique. In our experience, it has been a simple, fast and convenient procedure allowing the maxillofacial surgeon unhindered access to the operative field. A careful analysis of the anatomy of the anterior floor of the mouth indicates that if a strict midline approach is maintained, all major anatomical structures including the Wharton's duct, lingual nerves and sublingual glands can be avoided. Moreover there is minimal vascularise in the midline^{2,3}. This approach does not interfere with intraoperative maxilla-mandibular fixation. We treated 34 cases using this technique. All except 2 healed uneventfully. Infection of the submental wound was observed in two cases. One of these patients

was an uncontrolled diabetic and developed infection at all the surgical sites, possibly due to his diabetic status. The submental scar was imperceptible in all cases except on close observation, six months postoperatively. All patients were extubated immediately postoperatively. Hence the long term airway support was not judged.

We found the indications of this procedure to be

1. Patients with multiple maxillofacial fractures and minimal neurological deficit¹⁶
2. When short term intraoperative MMF is required and nasal intubation is contraindicated¹⁶

We conclude that midline submental intubation

1. Provides a better field of work for the oral and maxillofacial surgeon than the standard technique of intubation¹⁶
2. Avoided complications inherent with nasal intubation and tracheotomy^{1,3,4,5,8,9,10,11,12,14,15,17}
3. Allowed intraoperative maxilla-mandibular fixation in patients with nasoethmoidal complex fractures along with associated maxilla-mandibular fractures without having to resort to tracheotomy¹⁶.

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