



PROSPECTIVE EVALUATION OF SUBMENTAL INTUBATION EFFICACY IN COMPLEX MIDFACIAL TRAUMA

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KEYWORDS :

INTRODUCTION

Airway management in complex midfacial fracture is inevitable. In orotracheal intubation tube interfere with maxillomandibular fixation (MMF) which is mandatory in surgical repair of maxillofacial fracture. As well nasal intubation is contraindicated in nasal bone fractures, skull base fractures¹. Moreover, Le Fort fractures type II and III are frequently associated with skull base fractures involving the cribriform plate of the ethmoid, potentially creating a communication between the nasal cavity and the anterior cranial fossa with cerebrospinal fluid leakage.² tracheostomy may not be the ideal method for airway control in patients with isolated facial fractures who do not require requiring long-term ventilatory support³ and being a morbid procedure is not always a good alternative. In 1986, Hernandez Altemir described submental intubation as an alternative to the classic methods after which several authors have reported its utility with minimal complications this technique are offering an unobstructed surgical field and intra operative evaluation of dental occlusion for the surgeon, a secure airway for anesthetist, and minimal morbidity for the patient.⁴ In our study efficacy of submental intubation in complex midfacial fracture been evaluated.

MATERIAL AND METHOD

10 patients were selected irrespective of sex, caste, religion, and socioeconomic status with complex midface fracture that was treated in the department of oral and maxillofacial surgery Tamilnadu government dental college, Chennai were offered participation in this prospective study. They were informed of the merit and demerits of the procedure regarding the study. The patients had given informed consent or refusal regarding participation in the study.

Inclusion criterias were patients in whom nasal and oral intubation is contraindicated in presence of CSF rhinorrhea, epistaxis & fractured nasal bone and where intra operative control of dental occlusion is required and Patients undergoing elective Lefort osteotomies. Patients who require long term airway support and maintenance, tendency for keloid formation, severe neurological complications, multisystem trauma, Infection at site of incision, multiple wounds involving floor of mouth were excluded in this study.

Surgical Procedure for submental approach

Using flexometallic endotracheal tube, orotracheal intubation is performed initially. A 1.5 - 2 cm skin crease incision is then made in the submental paramedian region medial to the inferior border of the mandible, 1/3rd of the distance from the symphysis to the angle of mandible. The side used for the incision being dictated by site of

mandible fracture, by placing the incision on contralateral side to fracture involvement thereby avoiding interference from the tube. A closed curved artery forceps is then introduced through the submental incision and with blunt dissection in subcutaneous tissue (with platysma) and mylohyoid muscle is dissected using curved hemostatic forceps by keeping it in over the lingual cortex of mandible, a tunnel is created just medial to lingual surface of the mandible thereby avoiding injury to the submandibular duct and the lingual nerve, which are located medial to the incision. After detachment of the endotracheal tube from the breathing circuit and removal of connector, the pilot balloon is pulled out gently with an artery forceps. After stabilizing the tracheal tube, the proximal end of the tube is pulled out gently through the tunnel created. The connector then replaced and the endotracheal tube is connected back to breathing circuit. After ensuring bilateral equal air entry, the endotracheal tube is fixed to skin using 3-0 silk suture.

Extubation, when indicated, is done in reverse order, that is after cutting the skin sutures and the deflated pilot tube is passed intraorally followed by endotracheal tube. If maxillomandibular fixation is to be maintained, then the tube is pulled through the submental incision after deflation of the pneumatic cuff. The submental incision is then closed with three to four interrupted sutures. The intraoral incision is left to heal secondarily.

Inclusion criteria and clinical parameter

The parameters taken into consideration are, time required for intubation (starting from the completion of the orotracheal intubation to the fixation of the submental tube to extra oral skin), surgeon's satisfaction (No interference with checking of dental occlusion and clear surgical access), anaesthetist's satisfaction (No dislodgement of tube, ease of procedure, stability of vital signs during conversion of the orotracheal intubation to submental intubation and immediate extubation), and complications associated with submental intubation techniques.

RESULT

Out of 10 patients submental intubation was completed successfully in 9 men and 1 female ranging in age from 18 to 34 years. Time of the procedure (mean=8 minutes, SD =0.5 minutes, Range=7-9 minute), Surgeon's satisfaction and Anaesthetist's satisfaction were 100%. No accidental extubation, tube injuries or leaking cuff occurred. There was no significant oxygen desaturation in any patient during the procedure. No major complications such as hemorrhage, injury to the sublingual glands, Wharton's duct injury, lingual nerve paresis or orocutaneous fistula were observed. No motor or sensory nerve disturbance was recorded. Postoperative scarring of the submental wound was detectable only on close

inspection with the neck hyperextended. None of the cases showed keloid or hypertrophic scars. However, we experienced three cases of superficial infection of the submental wound, which was resolved after meticulous debridement and wound care.

DISCUSSION

Maxillofacial injury has been described in the medical literature as early as 2500 B.C¹ and become increasingly common due to high speed road traffic accidents. Securing an airway in maxillofacial injuries with an endotracheal tube remain a challenge. In presence of Lefort fractures and naso-orbitoethmoid complex fractures, nasotracheal intubation⁵ is contraindicated in such cases, and also in isolated nasal bone fracture, as it may result in displacement of fracture fragments, accidental passage of tube into the cranium resulting in meningitis. Even such complications not circumvented totally by fiber-optic bronchoscope. Awake oral intubation⁶ is difficult in cases of minimal mouth opening conditions and cervical spine injury. tracheostomy is a traditional method favored by some surgeons and anesthesiologists. However, this procedure is associated with many complications.⁷

Hernandez Altemir in 1986 first described and introduced submental intubation as an option in the management of difficult airway in oral and maxillofacial surgery.⁸ Submental intubation has been heralded as a simple, secure and effective procedure for operative airway control in major maxillofacial traumas and it allows practitioners to avoid the risk of epistaxis, iatrogenic meningitis or trauma of the anterior skull base which may follow nasotracheal intubation.⁹ In retromolar intubation, a semilunar osteotomy is usually required in this area of the mandible to gain the necessary space for the tube. However, it takes a mean duration of 25 minutes to perform this procedure, and bony anatomy is not preserved. Paradoxically, this method seems to add further morbidity to a technique designed to avoid it¹⁰ Schutz and Hamed, in their comparative study of submental intubation and tracheostomy, concluded that submental intubation is associated with low morbidity and may replace tracheostomy in selected cases of maxillofacial trauma.¹¹

Other indications for submental intubation are simultaneous orthognathic surgery with rhinoplasty¹². The submental intubation technique is contraindicated in patients who require a prolonged period of assisted ventilation¹³. Altemir's original technique, which has been modified, may be divided into anatomical and anesthetic modifications. Anatomical modification includes variation in the exit path of the ETT. Stoll et al¹⁴ in 1994 advocated the submandibular approach over the laterosubmental approach. MacInnis and Baig¹⁵ in 1999 found the laterosubmental approach less satisfactory because of difficulty of tube passage, bleeding, and sublingual gland injury; they preferred the submental incision in the midline. However, the midline approach may traumatize the Wharton's ducts and interfere with attachment of the genioglossus and geniohyoid muscles. Extraperiosteal dissection in close contact with the lingual periosteum of the mandible instead of subperiosteal dissection was the main modification suggested by Tagliatalata et al¹⁶ in 2006.

Submental intubation complications include detachment of the pilot balloon or its damage during exteriorization, damage to the ETT cuff, abscess formation in the floor of the mouth, infection of the submental wound, salivary fistula, development of mucocele, and facial scarring.¹⁷

CONCLUSION

Submental intubation is an effective airway management in complex maxillofacial fractures with low complication rates, who do not require prolonged post-surgical ventilatory support.



Figure.1 Armamentarium for submental intubation



Figure.2 After skin incision, blunt dissection of platysma and mylohyoid using curved forceps to reach floor of the mandible



Figure.3 Submental tube secured with extraoral sutures



Figure.4 Post operative minimal scar visible only at neck extension.

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