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Original Research Paper

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PER OPERATIVE TRACHEOTOMY OR SUBMANDIBULAR INTUBATION ANESTHESIA IN MAXILLOFACIAL TRAUMA, ANALYTIC PERSPECTIVE VIEWPOINT.

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ABSTRACT

Purpose: To assess effectiveness of newly devised submandibular intubation technique in maxillofacial trauma patients presenting with airway problems. **Design:** 10 trauma patients with maxillofacial injuries were operated under general anesthesia by submandibular intubation and 10 patients by per operative tracheotomy. The two techniques were assessed for conduct of operative procedures intra and postoperatively and complications if any during and after surgery. **Observations:** 7 patients in Submandibular intubation group were extubated after successful conduct of anesthesia and surgery while 2 patients were ventilated in postoperative period and all three were extubated in 24 hours postoperative while 4 patients in tracheotomy group required ventilator support in postoperative period for about 48 hours. **Conclusion:** Submandibular is an effective means of intubation to avoid tracheostomy for operative procedures. It is easy, safe and effective technique with minimal morbidity and tracheotomy for operative procedure can be avoided. However difficult airway patients who may require postop ventilator are better managed with tracheotomy.

KEYWORDS : Maxillofacial, submandibular, tracheotomy

INTRODUCTION:

Face trauma involving maxilla, mandible, temporomandibular joints either or both, nasal septum, tongue, cheeks, gums, teeth and other soft tissues and bony structures present a challenge to attending anesthesiologists whose innovative professional skills are put to test. Face oedema and joints immobility because of joints dislocations and or fractures put these patients in the difficult intubation category Mallampati III and above. The anesthetist has to decide the route of general anesthesia as oral and nasal channels may not be available for passage of endotracheal tube due to trauma. Anatomical disruptions due to trauma and having to share the work field for proposed surgical procedures add to the challenge. To combat these instances where the usual route of intubation is not accessible to anesthesiologists, alternative techniques of intubation have been devised and practiced. The standard solution in these situations is to perform an elective peroperative short-term tracheotomy[1] before the operation. Alternative approaches to endotracheal intubation are retro molar and sub mental/submandibular to accomplish holistic correction of face trauma[2]. Submandibular intubation technique which started as sub mental intubation and its modifications thereafter using single or two tubes (Rail Road Technique) have been performed after inducing general anesthesia to secure airway with an oral endotracheal tube and then transpositioning the tube in the submandibular segment. Submandibular intubation is a modification of sub mental intubation first introduced by Spanish maxillofacial surgeon Altemir[3,4] which was devised to overcome problems of sub mental intubation[5]. On the other hand anesthesia by tracheotomy tube preoperative is a conventional route all anesthesiologists are familiar with. It is easy, secure, safe, and dependable, away from surgical field and provides efficient ventilation and drainage of lungs if required. Moreover change in surgical peroperative and postoperative plan is easily and effectively manageable. Also unforeseen events and complications requiring postoperative ventilation and suctioning of lung secretions are readily managed. However the potential problems inherent to the submandibular technique are difficulty in removing the endotracheal tube (ETT) connecter, damage to the pilot balloon, malpositioning of the tube leading to endobronchial intubation and accidental extubation while negotiating the tube through the incision[1, 2]. Tracheotomy intubation even for short time is not without morbidity. We decided to evaluate the two techniques of intubation in faciomaxillary trauma cases admitted in the institute SBIMS, MOWA Raipur from April 2022 to December 2023.

Design and observations:

The study was designed to compare two techniques namely submandibular intubation and per operative tracheotomy for general anesthesia in patients of faciomaxillary trauma involving nasal septum also and thus both oral or nasal intubation routes being not available because of surgical work area. Patients were randomly deputed to submandibular group or tracheotomy group. Submandibular intubation was planned with two tubes technique. Trauma patients with history of any associated head injury were not included. General anesthesia with submandibular intubation in ten (10) randomly chosen trauma cases was planned. After intravenous line Inj. Glycopyrrolate 0.2 mg and Inj. Fentanyl 1.5-2 g/kg was given followed by preoxygenation and induction with Inj. Propofol 2-2.5 mg/kg and Inj. suxamethonium 1-1.5 mg/kg, trachea was intubated with cuffed polyvinyl chloride tube size 8 mm ID instead of flexometallic tube.

A transverse skin incision of 1.5cm was made in the right submandibular area one inch below and half inch anterior to the angle of mandible to avoid injury to mandibular branch of facial nerve. Subsequent tissue layers were dissected viz. fat, platysma, investing layer of deep cervical fascia, mylohoid till the mucous membrane of oral cavity was reached. Incision on the mucous membrane allowed tip of artery forceps to be introduced into oral cavity. A new Flexometallic tube of size 8 was negotiated over a bougie through the incision and bougie was withdrawn.

The patient was given 3 vital capacity breaths with 100% oxygen. A Gum elastic bougie was then passed through the PVC ETT, its cuff deflated and the tube was withdrawn over the bougie leaving it in place. The outer end of the bougie was introduced into the patient end of flexomatellic tube while the flexometallic tube was guided over the bougie into the trachea (Figure1). Adequate ventilation was confirmed. The tube was then secured in place with sutures. Total intravenous anesthesia (TIVA) technique was used in all patients using propofol, fentanyl and paracetamol in appropriate titrated doses. No problems were encountered during the surgery in terms of airway manipulations. 8 patients were fully awake after reversal of anesthesia and were found fit to maintain airway and 2 patients were put on ventilator as their breathing effort was found not adequate. These patients were extubated via the submandibular route within 24 hours. The wound was closed by tightening the stay sutures already placed. The patient were followed in the postoperative period, no complications were encountered.

Fig 1
Bougie threaded in the submandibular tube
oral endotracheal tube & bougie
Submandibular intubation

Ten (10) trauma patients randomly selected for tracheotomy with minimally invasive procedure for general anesthesia. A horizontal skin incision measuring 20-25 mm about the approximate width of trachea was given midway between the cricoid and the suprasternal notch dissecting to superficial cervical fascia. Strap muscles were retracted and thyroid isthmus also. Thyroid isthmus was dissected away from trachea and retracted superiorly with cricoid hook. Tracheotomy was completed with a horizontal inter cartilaginous incision placed between 2nd and 4th tracheal rings. 8.0 mm ID flexometallic tube was used and fixed with skin sutures. General anesthesia was induced using the mentioned drugs as in case of submandibular group. Patients' breathing effort was assessed and if found adequate were decannulated post surgery. Tube was removed and after securing haemostasis wound was stitched in layers. However 4 patients required postop ventilator support and were weaned off ventilator within 24 hours. No post tracheotomy complications were encountered and patients were shifted from surgery care unit. Figure 2

Fig 2: Tracheotomy with horizontal tracheal stoma

DISCUSSION:

Managing airway in panfacial reconstructive surgery in major maxillofacial trauma was difficult and tedious because oral and nasal, both natural channels of passage of endotracheal tube, are not available to anesthetist because of surgical intervention until 1986 when Sir Hernández Altemir first described submental repositioning of endotracheal tube after oral intubation[4]. This provided an effective alternative to short-term tracheotomy, the only option available for general anesthesia. Stoll[6] later described a technique similar to submental intubation but where the incision is placed further posterior in submandibular region [6]. This is an easy and convenient modification avoiding potential complications of submental technique like damage to the sublingual gland and duct, sub maxillary duct, and lingual nerve. Repositioning of intubated oral endotracheal tube was found cumbersome and instances of damage to tube adaptor, tube margins were reported. There were multiple instances of displacement of endotracheal tube also. This lead to another modification advocating use of two endotracheal tubes[2,7,8], one anterograde and another retrograde. This is claimed to be superior because there is less chance of hypoxia in paralyzed patient if there is difficulty and delay in retrieval and second there is no need of detaching the connector. However these procedures are not devoid of complications and inadvertent soiling of ETT with blood and secretions during manipulation may not be avoided. With further modifications of techniques certainly the results improved, mentioned problems were corrected and complications minimized improving patient care and satisfaction. Complications associated with submandibular intubation include local infection, scarring, postoperative salivary fistula, mucocele at floor of mouth and paraesthesia of lingual nerve. However there are very few reports of these complications available. Per operative tracheotomy in such patients has its own advantage. It is conventional, easy, more and better known and manageable and is choice for all airway issues. To top it drainage of secretions is easy and effective thereby enhancing recovery. Toledo[9] et all published 6 months of postoperative follow up from 17 patients of maxillofacial trauma who underwent submental endotracheal intubation (SEI) and demonstated a low rate of complications. To conclude submandibular intubation technique is an at par novel alternative with few complications to tracheotomy for short term airway management in maxillofacial trauma and corrective surgery. However if airway and breathing inadequacy is anticipated for longer time and associated head injury pre or per operative tracheotomy is safe and more effective technique of imparting general anesthesia and airway management after surgery. Following dictum if intubation is possible tracheotomy should be avoided it is easy to conclude that modified submandibular intubation is easy, safe and novel alternative method for tracheal intubation in patients with craniomaxillofacial trauma posted for corrective surgery with low morbidity.

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