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Submental Intubation: Brief Literature Review and Case Report

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Abstract: ***Facial fractures are often associated with the nasoorbitoetmoidal complex (NOE) and maxillary bones (maxilla and/or mandible), making it difficult to choose intubation for airway maintenance. The submental intubation technique has emerged as an alternative for selected cases, being easy to perform and with a low complication rate. The aim of the present study is to realize a literature review and report the case of an 18-year-old male, with a motorcycle accident evolving with traumatic brain injury (TBI) and multiple facial fractures. Submental intubation was performed due to a cranial base fracture and also the need of the use of the oclusion as a guide for fracture reduction and fixation. The procedure evolved uneventfully, being the patient in postoperative follow-up and without any signs of complications. Submental intubation offers a viable, easy-to-perform, and safer alternative to other techniques.***

Keywords: submental intubation, airway, facial trauma

1. Introduction

In patients with multiple facial fractures (affecting the nasal cavity and dental occlusion), the correct use of the airway and, at the same time, a surgical field that allows an approach to reduce fractures is required[1]. In patients, the main goals of treatment should be projection and nasal patency, soft tissue support and adequate dental occlusion[2,3].

In cases of nasoorbitoetmoidal fractures (NOE), Le Fort II and III, where skull base fractures often involve the cribiform lamina of the ethmoid bone with potential cerebrospinal fluid leakage, attempting nasotracheal intubation may result in a major complication such as the passage of the tube inside the skull[4,5]. Other complications involve meningitis, sepsis, sinusitis and epistaxis[6].

In maxillofacial surgery, nasotracheal intubation has always been the preferred intubation method because of the possibility of obtaining a transoperative occlusion to guide the reduction and fixation of fractures. Tracheostomy is the most cited method for approaching patients with complex facial fractures[7]. However, due to some restrictions of these methods, Altemir[8] in 1986 introduced a technique called submental intubation in order to avoid the complications of other alternatives.

After conventional orotracheal intubation, the procedure recommended by Altemir is performed through a 2cm skin incision in the paramedial submental region, adjacent to the lower border of the mandible. Disclosure is performed with curved hemostatic forceps, always in contact with the lingual face of the mandible, until reaching the buccal floor. After incising the tip of the hemostatic forceps, the passage of the cuff towards the skin begins. The same maneuver is done with the tube (after disconnecting it). After reconnecting the tube, the tube is fixed to the skin by suturing with 2-0 nylon. To reverse for conventional orotracheal intubation, the order is changed with the passage of the tube and, later, the cuff. The skin incision is sutured closed and the intraoral is not, healing by second intention.

The aim of this pape ris to carry out a brief review of literature about the technique and report a case well conducted.

2. Case Report

Male patient, 18 years old, motorcycle accident victim with head injury and multiple fractures of the face. It was transferred from another service after primary care.

On physical and imaging examination, it was possible to observe Le Fort II fracture, left temporal temporal bone fracture, anterior and posterior frontal sinus wall fracture (with cerebrospinal fluid leakage, rhinorrhea and pneumoencephalon) and skull base fracture (with bilateral periorbital ecchymosis - raccoon sign).

The patient followed in the intensive care unit (ICU) and followed up with the neurosurgery team until clinical improvement and pneumocephalus regression. After discharge from neurosurgery, ophthalmology, orthopedics and general surgery, the surgical procedure was carried out.

Due to the need for intraoperative intermaxillary fixation for adequate reduction and fixation of the fractures and also due to the existence of skull base fracture with cerebrospinal fluid leakage, it was decided to perform conventional orotracheal intubation followed by the submentual intubation technique.

After orotracheal intubation, submentual intubation was performed as recommended by Altemir. A 2cm paramedial incision was made in the submental region with dissemination in contact with the lingual face of the mandible and toward the anterior region of the buccal floor (Fig. 1). Once the tunneling was done, the cuff was deflated first and passed through a curved hemostatic forceps (Fig. 2). The cuff was inflated again and then the tube was briefly disconnected and the tube was passed through the same technique. After reconnecting the tube, it was fixed to the skin through 2-0 nylon thread (Fig. 3).

After the reduction and fixation of all fractures were completed, intubation was reversed. This time, the tube was first passed, followed by the cuff. Skin was sutured with 5-0 nylon and the hole in the buccal floor was not sutured (Fig. 4). We decided to perform extubation of the patient still in the operating room due to the length of surgery and also due to the absence of fractures in the mandible, and the risk of

airway obstruction in the immediate postoperative period was ruled out.

3. Discussion

Patients with multiple facial fractures or even panfacial fractures often have difficulties in obtaining a safe airway that does not hinder the surgical procedure. Nasotracheal intubation, widespread in oral maxillofacial surgery in general, is contraindicated in cases of nasal and/or skull base fractures. On the other hand, tracheostomy is an alternative subject to numerous complications, such as aesthetically unfavorable scarring, pneumothorax, pneumonia, tracheal stenosis and tracheomalacia[9]. In addition to being a more complex surgical procedure, it has a mortality rate of about 2% of cases[10]. However, it has specific indications, as in cases requiring long-term ventilatory support to avoid damage to the vocal cords and those with obstruction. acute airway disease[11].

Given the lack of consensus, Altemir8 proposed a new method for treating patients with a history of multiple face fractures, involving the maxilla and / or mandible concomitantly with the nasal bones or skull base. It is a fast, simple, low cost technique and low learning curve for the maintenance of airway during the transoperative period of these patients. Currently it has great support in the literature when well indicated[1,8,11].

When compared to tracheostomy, it has the advantages of a much less visible scar (detected only with the hyperextended head)[12], low complication rate[13], shorter hospital stay, lower cost, lower mortality rate[10] and shorter execution time[1,8].

Over time, the submental intubation technique received new indications. It has been reported in orthognathic surgery due to the fact that it does not make it difficult to visualize the middle third and provide minimal transoperative distortion of the nasolabial soft tissue[14,15]. Another indication would be the concomitant nasal surgery, avoiding the change from nasotracheal to orotracheal intubation in the intraoperative or vice versa, reducing the risks of such procedure[16].

As for the technique, the paramedial incision was followed by blunt dissection through the myohyoid muscle proposed by Altemir. The midline incision proposed by MacInnis and Baig[17] is in disuse due to its interference in the insertion of the genioglossus and geniohyoid muscles[13]. The difference between our technique and that of Altemir is due to the nonperformance of subperiosteal dissection on the lingual aspect of the mandible[18]. It is believed that with a supraperiosteal dissection it is possible to obtain a lower rate of complications.

To perform this technique, the presence of a wire endotracheal tube is required. An important preoperative step is to check the tube to see if the connector is easily removed. Suture fixation of the tube to the skin prevents its displacement with consequent extubation or selective intubation. Another risk that could be caused by the technique would be cuff rupture. Patkar et al. reported a case where they insulated the cuff and occluded it with hemostatic forceps[19].

Submental intubation also has contraindications. These include the need for long-term mechanical ventilation, lacerations in the anterior region of the oral cavity, multiple mandibular fractures requiring extraoral access, severe neurological damage, and a history of keloid development[20,21].

Regarding the decision to extubate the patient or not, this will depend on the consensus between the surgeon and the anesthetist regarding the patient's clinical condition at the end of the procedure. In cases of very long procedures and bilateral mandible fractures, edema caused by surgical manipulation can cause lingual ptosis with an airway obstruction[12]. As it is a relatively quick procedure and without involvement of mandibular fracture, we decided to perform extubation still in the operating room, with no complications. Regarding complications, the most important are submental wound infection, abscess formation on the floor of the mouth, submandibular salivary ducts or sublingual glands injury, mucocele formation, marginal nerve branch injury and hypertrophic scarring in the submental region[1]. In our case, no complications were observed among those mentioned above, and the patient was followed up with a healing process within the normal range.

4. Conclusion

Submental intubation offers a viable, easy-to-perform, minimally invasive and safe alternative for patients with contraindications to nasotracheal intubation due to multiple face fractures and requiring occlusion as a guide for fracture treatment. This approach is less complicated and more practical when compared to tracheostomy for specific cases.

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Figure 1: Curved hemostatic forceps demonstrating the tunneling technique through the incision in the skin and oral floor.

Figure 2: Cuff inflation after its passage with a curved hemostatic forceps.

Figure 3: Complete submental intubation with the tube reconnected and fixed to the skin through 2-0 nylon suture

Figure 4: reversal for conventional orotracheal intubation and 5-0 nylon suture and curative.