

Submental Intubation: A Valide Alternative

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Abstract

The treatment of complex maxillofacial trauma presents itself as a challenge to the surgeon and the anesthesiologist. In most cases, the trans-surgical maxillomandibular block becomes essential for the correct reduction and fixation of the fractures. The intercuspation of the teeth should be performed with the greatest possible fidelity without any device that can disrupt the occlusion. Thus, in cases of maxillary fracture, it is recommended the use of nasotracheal intubation. However, this route becomes unavailable if there is involvement of the skull base and injuries of the nasal structures. For these cases, can be used tracheostomy, submental intubation or oral intubation with retromolar path for airway maintenance. Because of the complications inherent in tracheostomy, it is no longer the preferred option. The objective of this paper is to demonstrate, through the case report, the technique of submental derivation, which can be used effectively and safely in patients with severe facial trauma.

Keywords: Maxillofacial trauma; Intubation; General anesthesia; Submental intubation.

Introduction

The technique of submental intubation (SMI) was primarily conceived and described by Altemir in 1986 as an alternative to avoid tracheostomy in patients with facial trauma¹. The SMI consists of passing the endotracheal tube through the floor of the mouth allowing intercuspation of the teeth during surgery, concurrent to the access to the nasal structure without endangering patients diagnosed with skull base trauma. Thus, tracheotomy is avoided, significantly reducing additional risk of iatrogenic surgical complications.

The method remained unchanged for around ten years. After this time, numerous articles have been produced with minor modifications²⁻⁴. Despite this steady increase in scientific literature, the relative scarcity of this issue in certain surgical specialties where tracheostomy and facial trauma are common, such as otolaryngology, suggests a lack of awareness and possible underutilization of the procedure⁵.

The SMI can be indicated for jaw fractures, orthognathic surgery and head and neck tumors. It is contraindicated especially in cases where there is need for intubation extended over 72 hours due to the increased

risk of laryngeal damage and pneumonia^{5,6}.

The objective of this paper is to present a case report where the submental intubation for maintenance of mechanical ventilation was used, during general anesthesia in a patient with facial trauma and thus, discuss specific technical criteria.

Case report

An 50-year-old male was admitted in the Service of Oral and Maxillofacial Surgery of Clinics Hospital of the Federal University of Goiás, with a history of car accident culminating in facial trauma. On admission, the patient presented level of consciousness within the normal range with a Glasgow coma score of 15 and no major systemic change. Physical examination showed facial swelling, maxillary mobility, diplopia, periorbital ecchymosis and right eye subconjutival hematoma associated with crackling and deviation of the nasal bones. The imaging examination confirmed Le Fort I maxillary fracture, right orbital zygomatic complex fracture and nasal bones fracture.

After preparation, the patient was referred to Surgical Center for reduction and fixation of fractures un-

der general anesthesia. The chosen method of intubation was submental shunt.

Submental intubation technique

Patient in the supine position was subjected to conventional tracheal intubation. After the procedure, antisepsis of intraoral and neck was held, with aqueous chlorhexidine solution of 2% and Alcohol Chlorhexidine 0.5% respectively. Temporary fields were positioned and anesthetic solution containing vasoconstrictor was infiltrated in the submental region (Figure 1).

Subsequently the anesthesia, a 2cm incision in the skin at the submental region lateral to the midline, as seen in Figure 2. Then, the division of the muscle layers (platysma and mylohyoid) must follow the lingual cortex of the mandible, with the aim of avoiding noble structures adjacent to the path (lingual nerve, submental artery, submental vein, duct of submandibular gland, sublingual gland).

The proximity of the instrument to the cortical ensures a path free of major complication, however, it is recommended to insert the index finger into the oral cavity and determine if the blunt tip emerges anterior to the caruncle of the submandibular gland (Figure 3).

After divulsion, the capturing process of pneumatic Cuff and endotracheal tube began. For this, a hemostat is inserted through the hole created (which must allow the passage of the tube without any interference) and gently pulled to the extra-oral environment (Figure 4). Soon, the tube is disconnected from the ventilator, grasped and transferred to submental region (Figure 5).

Performed the transfer, the tube is reconnected, thus ensuring the re-establishment of mechanical ventilation. The patient is currently submitted to pulmonary auscultation with the objective of verifying the correct placement of the system and airway maintenance (Figure 6).

The position was maintained by suture done with needled 2-0 cotton thread. (Figure 7). After surgery, the tube is repositioned in the oral cavity and the submental intubation is reversed. Thus, the patient is extubated in conventional manner.

The suture of muscular plans was performed using 4-0 vicryl, while the skin received 5-0 nylon. The intra-oral incision does not require suturing and the wound is left to heal by secondary intention⁷.



Figure 1 - Infiltrative anesthesia: 2ml of Bupivacaine Hydrochloride with epinephrine 1:200,000.



Figure 2 - incision .



Figure 3 - (A) Divulsion of platysma; (B) Divulsion of the mylohyoid; (C) Index finger checking intraoral position; (D) Full Divulsion, anterior to the submandibular caruncle.

Discussion

The technique of submental intubation was developed with the aim of reducing the complications inherent to tracheostomy in patients with complex facial trauma. Since the publication of Altemir¹, the need of obtaining transoperative occlusal parameter associated to nasal pyramid fracture and/or skull base fracture, is no longer pure indication for tracheostomy. Thus, this procedure has increased morbidity and many associated complications, such as tracheal stenosis, recurrent laryngeal nerve injury, hemorrhage, among others, is restricted to seriously injured polytrauma patients requiring prolonged assistance with mechanical ventilation⁸.

The ISM is also indicated for orthognathic surgery procedures^{2,4-5,9}. However, the authors of this article believe that the scar from the submental intubation - even if slight - precludes its routine use in orthognathic, which are all elective surgeries. The use of this technique, by our clinical experience, should be reserved for specific cases

and not be presented as an everyday option.

Although the original technique predicts a 2cm incision in submental region laterally to the midline, some studies modified the access to the median region of the mandible^{2,10} and more lateral-posterior region¹¹. The justification was to prevent bleeding and damage to noble structures. The authors of this article do not corroborate this variation and justification, since the divulsion in the midline necessarily would have to be trough the genius-hyoid muscles, genioglossus and anterior belly of the digastric muscle, which could cause more tissue damage. It is important that the divulsion as close as possible to the mandibular lingual cortical decreases damage to noble structures. Moreover, in a literature review carried out in 2012⁵, of 842 patients, only 60 had minor complications, and among these, only two cases were venous bleeding, and one case of transient paresthesia of the lingual nerve.

Perhaps one of the most critical aspects in the procedure is to disconnect the tube and its derivation for the submental region. There-

fore, the large divulsion of the wound is recommended, allowing the tube transition without interference. Some authors propose the use of devices to facilitate the course, such as a nasal speculum¹, sterile glove¹², nylon guide tube⁴. These technique refinements as well as expedite the procedure, avoid the presence of blood in the tube (as shown in figure 5) which can cause an infection of the upper airway tract. After the literature review for the publication of this article, our service uses a sterile glove n.8 according to Lima et al¹².

Complications are minimal and include local infection, damage to the endotracheal tube, fistula, hypertrophic scar, venous bleeding, transient hypoesthesia of the lingual nerve, mucocele formation, however, the index is low and of trivial treatment⁵. Therefore, we agree with the authors when they state that the technique is easy to perform, quick, free of major complications and has a small learning curve^{4-5,7,11-14}. However, despite the benefits presented in relation to tracheostomy, there is a shortage in some literatures which generates

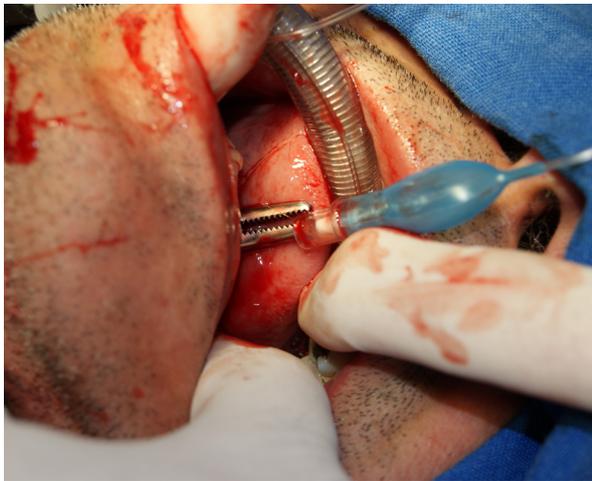


Figure 4 - Seizure of pneumatic cuff by hemostat. The maneuver should be performed gently to avoid damaging the structure of the cuff.



Figure 5 - Transfer of the endotracheal tube from intra oral environment to submental region.



Figure 6 - System reconnected.



Figure 7 - Maintenance suture of endotracheal tube.

Conclusion

The technique of submental intubation is a viable option for cases of maxillofacial fractures. It presents minimal complications when compared to tracheostomy. It is underused in some head and neck surgical specialties and because of this, and its intrinsic benefits, must be disclosed.

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Intubação submental: uma alternativa válida**Resumo**

O tratamento do trauma maxilofacial complexo apresenta-se como um desafio para o cirurgião e o anestesiológico. Na maioria dos casos, o bloqueio maxilomandibular trans-cirúrgico torna-se essencial para a correta redução e fixação das fraturas. A intercuspidação dos dentes deve ser realizada com a maior fidelidade possível, sem qualquer dispositivo que possa interromper a oclusão. Assim, nos casos de fratura maxilar, recomenda-se o uso de intubação nasotraqueal. No entanto, esta via torna-se indisponível se houver envolvimento da base do crânio e lesões das estruturas nasais. Para esses casos, pode ser utilizada traqueostomia, intubação submental ou intubação oral com trajeto retromolar para manutenção da via aérea. Devido às complicações inerentes à traqueostomia, não é mais a opção preferida. O objetivo deste trabalho é demonstrar, através do relato de caso, a técnica de derivação submental, que pode ser utilizada efetiva e seguramente em pacientes com trauma facial grave.

Palavras-chave: Traumatismo maxilo-facial; Intubação; Anestesia geral; Intubação submental.
