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Case Report

Submental intubation

Sonia Jindal[1], Kamlesh Kothari[2], Amit Kumar Singh[2]

[1]Department of Oral Surgery, Dr. D Y Patil's Dental College and Hospital, Pune, [2]Apollo Gleneagles Hospital, Kolkata, India

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Address for correspondence:
Dr. Sonia Jindal,
62/64, Third Floor, Vrindavan Building, Dady Seth Agiary Lane, Marine Lines, Mumbai - 400 002, India.
E-mail: visagepune@gmail.com

ABSTRACT

MacInnis and Baig modified Altemirs' original technique for sub-mental intubation. Instead of a lateral entry, they described a central entry just anterior to the sub-mental crease that does not carry the risk of damage to the lingual nerves, submandibular ducts and sublingual glands. We describe here our experience with this modified sub-mental intubation that also allows the operating surgeon to provide for a correct midline and optimal esthetics in case of panfacial trauma.

Key Words: MacInnis and Baig, midline intubation, panfacial trauma, sub-mental intubation

INTRODUCTION

Hernandez Altemir, a Maxillofacial surgeon, first described an alternative for tracheostomy in 1986.[1] The sub-mental route for endotracheal intubation consists of pulling the free end of an endotracheal tube (universal connector removed) through a sub-mental incision, after the usual orotracheal intubation has been performed. This technique provides a secure airway, optimal field, allows maxillo-mandibular fixation while avoiding the drawbacks and complications of nasotracheal intubation and tracheostomy. Nasotracheal intubation is not possible in the presence of fractures of nasal bones, skull base fractures, and cerebrospinal fluid rhinorrhea. Any attempt towards nasotracheal intubation can lead to passage of tube into the cranium, exposing the patient to risk of meningitis, sepsis, sinusitis, epistaxis and dislodgement of bony fragments by the tube. Various modifications of Altemirs' original technique have since been described.[2-10]

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MacInnis and Baig.[2] had reported that, their experience with standard technique as described by Altemir was less than satisfactory because of bleeding, difficult tube passage and sublingual gland involvement. Instead of slight lateral exit wound sub-mentally, i.e., parallel to the submandibular ducts taking care to avoid the lingual nerve by keeping the incision anterior to the first mandibular molar, they modified the technique to strict midline approach in 15 patients with satisfactory results. We also followed the midline approach without any complication. Potential complications with the sub-mental route are superficial infection of the sub-mental wound, trauma to submandibular and sublingual glands or ducts, damage to lingual nerve, orocutaneous fistula and hypertrophic scar.

CASE REPORT

A 38-year-old male patient with panfacial trauma was planned for open reduction and internal fixation under General Anesthesia. Nasotracheal intubation was ruled out due to the presence of nasal fractures. Oral intubation was also ruled out due to the need to establish occlusion by intermaxillary fixation (IMF). Initially, a tracheostomy was planned, but in the operation theatre itself it was decided to intubate this patient through the sub-mental route as described by Mac Innis and Baig. After normal oral intubation using a tube (such as a mallinkrodt tube, US), which allows the connector to be removed, an incision

measuring 2 cm was marked in the midline of the chin just anterior to the sub-mental crease close to the lower border of the mandible by the maxillofacial surgeon. Local anesthetic was infiltrated, and a 20 mm incision was made, enough to admit a size 8 tube. Blunt dissection was carried out as close as possible to the lingual aspect of the mandible into the floor of the mouth. A longitudinal incision was then made in the floor of the mouth, in the midline between the submandibular ducts at the base of the tongue, just enough to allow the passage of the tube so as to protect the facial nerve, lingual nerve and submandibular duct [Figure 1]. Artery forceps were passed from the extraoral to the intraoral incision and the existing flexometallic orotracheal tube drawn through the incision after grasping with the artery forceps [Figure 2]. This maneuver took approximately, 6 min for the maxillofacial surgeon to do. Correct tube position was confirmed with capnography and lung auscultation by the anesthetist. The cuff of the tube was inflated and the throat packed by the anesthetist. Temporary black silk sutures were placed to secure the tube extraorally, one on either side of the tube and around it by the surgical team.

The patient was painted and draped as usual, with full access to the facial bones and occlusion. Upon open reduction and internal fixation, which was now conveniently done in a single stage surgery, when the patient was ready to be extubated, the anchoring sutures were cut. The tube was removed extraorally and an oropharyngeal airway placed. 3-4 black silk sutures were placed in the skin extraorally. There was no need for intraoral sutures. If required, the tube can be kept *in situ* for a day or two. However, in this case the IMF was removed first, and then the throat-pack. The throat was suctioned thoroughly, and the tube was removed in the operation theatre through the sub-mental incision. The wound was closed with three interrupted sutures of 3-0 ethilon.

DISCUSSION

Options for intubation have traditionally been oral intubation, nasal intubation or tracheostomy. Anterior and middle cranial fossa skull base fractures are generally a contraindication to the use of a nasal tube because of the significant risk of intracranial penetration. This usually occurs in the region of the thin cribriform plate but, more posterior areas are also vulnerable. A nasal tube could also cause mucosal trauma and promote epistaxis. The presence of a nasal tube interferes with access to the surgical site particularly when trying to repair fractures of the nasoethmoid complex, intranasal mucosal lacerations and procedures using a coronal flap when the nasal skeleton must be fully exposed. Oral intubation interferes with the establishment of a functional occlusion, which is a vital step in the treatment of facial fractures. However, when the nose/cranial base are involved along with the facial bones, in case the orotracheal route is selected, the tube must be changed midway through the procedure and fibreoptic guidance is a must to avoid nasal injury. This involves the risks of prolonged theatre time, and inadvertent injury to the recently fixated bones. Patients who receive a tracheostomy are left with a scar in an obvious location, which may be depressed, hypertrophic or suboptimal. The potential complications associated with a tracheostomy include blockage of airway, hemorrhage, surgical

Figure 1: Photo of the patient with orotracheal intubation and the submental incision

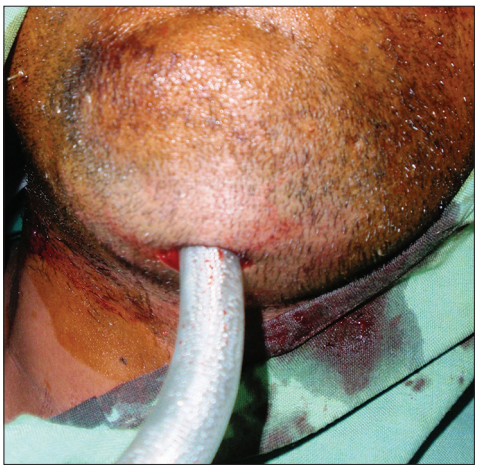

Figure 2: Photo of patient with the submental tube in place

emphysema, pneumomediastinum, pneumothorax and recurrent laryngeal nerve damage. Later complications include tracheal stenosis, infections, and tracheoesophageal fistula. Sub-mental intubation avoids the peri-operative and late complications associated with tracheostomy.[11] It permits downward traction of the maxilla after Le Fort I sectioning and in cranial base surgery. It also does not interfere with maxillomandibular fixation at the end of the surgery.

Loss of airway and hemorrhage are still potential risks with sub-mental intubation as they are with tracheostomy and although the risk of hemorrhage causing loss of airway is much lesser. The potential indications for sub-mental intubation extend beyond craniomaxillofacial trauma to include orthognathic surgery and elective craniomaxillofacial procedures in which reference to the dental occlusion is required. An example would be sub-cranial Le Fort III mid-facial advancement in which the tube is often changed in the middle of the procedure, wasting precious time and exposing the patient to risk. There are several descriptions of more lateral placement of the sub-mental incision.

Again the midline approach seems preferable, as there is less risk of damage to the submandibular ducts, sublingual glands and lingual nerves. The scar is in a more favorable position, and the midline is usually relatively avascular. This procedure has been modified so that the retrograde intubation using a pharyngeal loop can be done in a patient with limited mouth opening. The only indication for a tracheostomy in this scenario would be the need for prolonged intubation, beyond a day or two, which the sub-mental tube is not able to accomplish.

CONCLUSION

Sub-mental intubation is the procedure of choice for panfacial fractures involving the nasal region, or cranial base. Complex facial osteotomies and cranial base surgery with transfacial approach for oncosurgery are other indications. It avoids risk to the patient and loss of sterility caused by change of the tube from oral to nasal; avoids the risk of meningitis and sepsis as with nasotracheal intubation in naso-ethmoid fractures and avoids the complications of tracheostomy. Advantages of sub-mental intubation include good surgical access without oronasal distortion; intraoperative checking of occlusion, no significant nerve damage provided the lingual nerve is cared for, no need for post-operative care, less hospital stay, cost effectiveness and inconspicuous scar. The contraindications to sub-mental intubation are in the patient who needs prolonged intubation, patients' refusal, bleeding diathesis, laryngotracheal injury, sub-mental infection, gunshot injuries, tumor ablation, and history of keloids. Desaturation, accidental extubation, endobronchial intubation and local infection are rare complications

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