

Submento-Submandibular Intubation-an Adjunct in Orthognathic Surgery?

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Received date: Nov 27, 2014; Accepted date: Dec 23, 2014; Published date: Dec 29, 2014

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Abstract

The submento-submandibular intubation technique has been used in facial trauma cases where there is a requirement of addressing the facial fracture requiring intraoperative verification of occlusal relationship and also addressing the nasal fractures. However the utility of this technique in orthognathic surgery cases has not been reported as much. The case report presents and discusses the effective use of this technique in the surgical management of a case of bimaxillary protrusion with lip deficiency.

Keywords Orthognathic surgery; Submento-submental intubation; Maxillofacial surgery; Anterior segmental osteotomies

Introduction

Contemporary Oral and Maxillofacial Surgery (OMFS) is aggressive and exacting. As the specialty expands its focus and looks more closely at orthognathic surgery, cleft lip and palate surgery etc, adjunctive procedures become increasingly important in the quest to achieve superlative goals. One of the areas critical to OMFS is the route of administration of General Anesthesia. Conventionally OMFS has relied on oral and nasal routes for endotracheal intubation [1]. The nasal route being the more preferred route as it spares the occlusion and permits intraoperative verification of occlusal relationship [2]. However nasal intubation is definitely not the straight jacketed solution to all operative challenges in OMFS [3]. The patients with midface trauma present a unique requirement of addressing the nasal fractures along with other concomitant fractures involving the dentoalveolar segments/occlusion. The tube changing technique is an alternative to the more aggressive tracheostomy in the management of such cases, not to mention the frequently under addressed nasal fractures consequent to use of nasal technique alone [4]. Also there are situations where the nasal route per se is contraindicated e.g. in fractures involving the cranial base [5]. The submento-submandibular intubation has proved effective in such situations in comparison to the more morbid and manpower intense tracheostomy [6]. Though on the face of it, it appears to be complex, the submento-submandibular intubation technique is quite simple, easy to learn and produces wonderful results in good hands. The literature is replete and primarily projects the use of submento-submandibular intubation technique in the management of complex facial trauma cases [7]. However the utility of this technique in orthognathic surgery cases has been cited much less.

Case Report

We present a case report of the use of submento-submandibular intubation in the surgical management of bimaxillary protrusion using anterior maxillary osteotomy and mandibular subapical osteotomy and set back. A 16 year old male patient reported to our hospital with a

complaint of forwardly placed front teeth with inability to close the lips. Clinically and radiologically (cephalometrically) he was diagnosed as a case of bimaxillary protrusion with lip deficiency. The treatment plan comprised of standard three stages. The first stage (Orthodontic) comprised of presurgical orthodontics followed by the second stage (Surgical) comprising of extraction of premolar teeth in all four quadrants followed by anterior maxillary osteotomy, with mandibular subapical osteotomy and setback of the osteotomized segment using a prefabricated occlusal splint. The third stage (Orthodontic) comprised of final orthodontic finishing. Since the patient had an upturned nose with small nares and a sharp antero-posterior decline of the anterior nasal floor (Figure 1) close to the osteotomy site coupled with a prominent anterior nasal spine, decision was taken to use the submento-submandibular route for placement of the endotracheal tube for administration of general anesthesia. The intubation was done using the double tube technique as advocated by Green and Moore [8].



Figure 1: Anterior nasal floor.

Materials and Method

That evening, she had another acute episode of tachycardia and hypertension followed by hypotension and PEA arrest. The patient

underwent CPR and she received two iv boluses of epinephrine 1 mg and was placed on epinephrine and dopamine infusions. An IABP was placed. There was clinical suspicion for a pheochromocytoma but an abdominal/pelvic CT was negative. Over the next 24 hours, the epinephrine and dopamine were weaned off, the patient was again extubated, and the IABP was removed. Repeat TTE four days following the initial arrest showed LVEF 55% and no regional wall motion abnormalities (Figure 2).



Figure 2: Positioning the balloon end in the oral cavity.

The endotracheal tube initially placed orally through which anesthesia was being administered was then withdrawn and the second endotracheal tube passed through the submento-submandibular route was placed in the airway to continue with the general anesthesia (Figure 3).

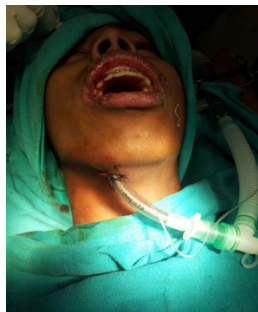


Figure 3: Submento-submandibular route placed in the airway.

After verifying the position of the second tube a throat pack was placed and the endotracheal tube was secured by a purse string suture using 1-0 silk in the submandibular region. The planned osteotomies were carried out and surgical goals accomplished using the Cupar's technique. Hemostasis was verified and mucosal incisions were closed. The total time taken to create an access from submento-submandibular region into the oral cavity and pass the endotracheal tube through it was less than five minutes. The total duration of surgery was approximately three hours during which the air pressure in the balloon was constantly monitored and adjusted to avoid pressure on the vocal cords and the surrounding structures. The second (submento-submandibular) endotracheal tube being used to administer anesthesia till this stage was then withdrawn and replaced with a standard oral endotracheal tube. The floor of the mouth mucosa and submento-submandibular cutaneous incisions used to pass the endotracheal tube were then closed using 3-0 vicryl and silk respectively. Subsequently the general anesthesia was terminated and

patient extubated conventionally. Pressure dressings were placed on the upper and lower lip and at the submento-submandibular incision site. Postoperative period was uneventful and the patient was discharged on the third postoperative day with diminishing edema, stable occlusion, improving mouth opening and no neurological deficit in the operated site. There was no complaint of sore throat/throat discomfort in the postoperative phase and the submandibular and floor of the mouth incisions healed uneventfully.

Discussion

Aggression and exactness in any surgical discipline are not an outcome of foolhardy bravados but a consequence of carefully calculated risks taken in order of further the cause. Submento-submandibular intubation technique, though an invasive procedure with a list of potential complications proved to be of significant utility in our case.

Submento-submandibular intubation in craniofacial injuries was first proposed by Francisco Hernandez Altemir, a Spanish Oral & Maxillofacial Surgeon in 1986 [9]. He proposed it as an alternative to short-term elective tracheostomy, where both oral and nasal route for endotracheal intubation were not feasible. This technique is applicable where anatomy is likely to become normal after the surgery and long-term postoperative ventilation or protection of airway is not anticipated. Many modifications have been proposed to the technique since then [10-16]. Historically this technique has been resorted to in cases of facial trauma cases where there was a requirement to operate both on the nose and other facial bones and the necessity to verify occlusal relation intraoperatively [17]. Also in cases with concomitant anterior skull base fractures along with facial fractures, to avoid the entry of the endotracheal tube in the cranium leading to meningitis, CSF leakage etc in an attempt to intubate through the nasal route [18]. In orthognathic surgery cases the use of the submento-submandibular technique has probably not gained momentum because the additional invasive procedure does not seem to be a very welcome option. The one piece Lefort 1 osteotomy as contemporarily practiced has off late become the work horse in most maxillary orthognathic surgical procedures. Since the osteotomy is large and the full length of the nasal septum is disjuncted and nasal floor raised completely, the nasal intubation does not seem to hinder the procedure; however the possibility still remains that the submento-submandibular technique may add to operator accessibility and ease further. In cases where surgery is opted for in the anterior maxilla where the technique is access sensitive and there is little scope for compromising the blood supply to the osteotomized segment the submento-submandibular intubation may be a useful adjunct which not only provides a more unhindered access to the anterior nasal floor but also prevent injury to the nasal and palatal mucosa which are crucial to maintaining a viable blood supply to the osteotomized segment.

Conclusion

The submento-submandibular intubation technique has a proven utility in the management of maxillofacial trauma cases; however in elective orthognathic surgery cases the efficacy remains unexplored. Our case had a favourable outcome in terms of operator ease and lack of untoward intraoperative events, however long term studies with standardized samples are required to ascertain its worthiness to be incorporated in the protocol of management of such cases.

References

1. Lindsay Arrandale, Viki Mitchell (2008) Anaesthesia for maxillofacial surgery. *Anaesthesia & Intensive Care Medicine* 9: 351-354.
2. Hall CE, Shutt LE (2003) Nasotracheal intubation for head and neck surgery. *Anaesthesia* 58: 249-256.
3. Arrowsmith JE, Robertshaw HJ, Boyd JD (1998) Nasotracheal intubation in the presence of frontobasal skull fracture. *Can J Anaesth* 45: 71-75.
4. Mittal G, Mittal RK, Katyal S, Uppal S, Mittal V (2014) Airway management in maxillofacial trauma: do we really need tracheostomy/submental intubation. *J Clin Diagn Res* 8: 77-79.
5. Seebacher J, Nozik D, Mathieu A (1975) Inadvertent intracranial introduction of a nasogastric tube, a complication of severe maxillofacial trauma. *Anesthesiology* 42: 100-102.
6. Hönig JF, Braun U (1993) Laterosubmental tracheal intubation. An alternative method to nasal-oral intubation or tracheostomy in single-step treatment of panfacial multiple fractures or osteotomies. *Anaesthesist* 42: 256-258.
7. Katsnelson T, Farcon E, Adamo AR (1994) More on submandibular endotracheal intubation for panfacial fractures. *J Clin Anesth* 6: 527-528.
8. Green JD, Moore UJ (1996) A modification of sub-mental intubation. *Br J Anaesth* 77: 789-791.
9. Hernández Altemir F (1986) The submental route for endotracheal intubation. A new technique. *J Maxillofac Surg* 14: 64-65.
10. Gadre KS, Wanknis PP (2010) Transmylohyoid/Submental intubation: review, analysis, and refinements. *J Craniofac Surg* 21: 516-519.
11. Tagliatalata Scafati C, Maio G, Aliberti F, Tagliatalata Scafati S, Grimaldi PL (2006) Submento-submandibular intubation: is the subperiosteal passage essential? Experience in 107 consecutive cases. *Br J Oral Maxillofac Surg* 44: 12-14.
12. MacInnis E, Baig M (1999) A modified submental approach for oral endotracheal intubation. *Int J Oral Maxillofac Surg* 28: 344-346.
13. Hanamoto H, Morimoto Y, Niwa H, Iida S, Aikawa T (2011) A new modification for safer submental orotracheal intubation. *J Anesth* 25: 781-783.
14. Drolet P, Girard M, Poirier J, Grenier Y (2000) Facilitating submental endotracheal intubation with an endotracheal tube exchanger. *Anesth Analg* 90: 222-223.
15. Nyárády Z, Sári F, Olasz L, Nyárády J (2006) Submental endotracheal intubation in concurrent orthognathic surgery: a technical note. *J Craniomaxillofac Surg* 34: 362-365.
16. Biswas BK, Joshi S, Bhattacharyya P, Gupta PK, Baniwal S (2006) Percutaneous dilational tracheostomy kit: an aid to submental intubation. *Anesth Analg* 103: 1055.
17. Das S, Das TP, Ghosh PS (2012) Submental intubation: A journey over the last 25 years. *J Anaesthesiol Clin Pharmacol* 28: 291-303.
18. Muzzi DA, Losasso TJ, Cucchiara RF (1991) Complication from a nasopharyngeal airway in a patient with a basilar skull fracture. *Anesthesiology* 74: 366-368.