Submental Orotracheal Intubation in Maxillofacial Fracture Surgery: Report of Two Cases

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Two patients, aged 18 and 28 years, with maxillofacial trauma due to motor vehicle accident, were operated upon by a team of plastic surgeons. In this report we aimed to present our experience with submental intubation procedure in these cases, in which orotracheal or nasotracheal intubation was impossible due to panfacial fracture.

Key Words: Maxillofacial trauma, submental intubation, panfacial fracture

Introduction

Maxillofacial trauma is a serious injury, which affect upper respiratory tract and cause structural defects. The resultant situation disturbs the ease of surgical and anaesthetic procedures and jeopardizes airway patency. During such interventions, the use of orotracheal intubation impedes the ability to achieve intermaxillary fixation (1). Multiple midfacial fractures and naso-orbito-ethmoid fractures also create an obstacle to nasotracheal tube placement (2). Submental orotracheal intubation (SOI) technique can be used in endotracheal tube placement in situations where it cannot be introduced using the nasal route, such as the presence of a multiple facial trauma or a hypoplastic nose (1).

In this paper, we present our experience with submental intubation in two patients; with the patients' written consents. We aimed both to emphasize the technical details of the procedure and to present wound healing at the incision site during long term follow-up.

Case Reports

Case 1

An 18-year-old patient presented with a maxillofacial fracture, which occurred in an in-vehicle accident, was operated under elective conditions. After standard monitoring of vital parameters and preoxygenation, anaesthesia was induced with 2 mg kg⁻¹ of propofol, 0.5 mg kg⁻¹ of rocuronium and 2 µg kg⁻¹ of fentanyl. Orotracheal intubation was performed using a 7.5 F spiral endotracheal tube. The balloon of the intubation tube was inflated, tube location verified and it was connected to the anaesthesia device. Maintenance of anaesthesia was performed with 2 L min⁻¹ fresh gas flow in 50% oxygen and 50% nitrous oxide mixture and isoflurane 1%.

Case 2

A 28-year-old patient presented with panfacial maxillofacial fracture, which occurred in an in-vehicle accident was operated under elective conditions. Standard monitoring and pre-oxygenation was performed as were done in Case 1. As the Mallampati score was 3 and mouth opening angle was 40°, after arrangements for urgent airway management was made, anaesthesia was induced with 2 mg kg⁻¹ of propofol, 1.0 mg kg⁻¹ of succinylcholine and 2 µg kg⁻¹ of fentanyl. Orotracheal intubation using 8.0 F spiral endotracheal tube was performed uneventfully. After maintenance of anaesthesia was performed in a standardized fashion, preparations for submental intubation were made.

Patients' consents were obtained before the operation. Surgical antisepsis was provided using 2% povidone-iodine. Thereafter, a 10-12 mm incision was made over the submental paramedian region by the plastic surgery team (Figure 1A). Using blunt dissection, the base of the mouth and the mucosa was reached through a skin incision and an intraoral incision (Figure 1B). The submandibular duct and the lingual nerve were preserved during the procedure. Then, the intubation tube and its connector were disconnected from the anaesthesia circuit. The tip of the tube was grasped with a clamp that was passed through the tunnel created between the submental region and the oral cavity and the tube was pulled (Figure 1C). The patients were reconnected to the anaesthesia circuit (Figure 1D). These procedures took 2 and 3 minutes, respectively. The patients remained in apnoea for about 30 seconds and no decrease in oxygen saturation was observed. The position of the tube was verified by auscultation of both lungs. Its position was secured with sutures. At the end of the surgical procedure,

the tube and its connector were disconnected from the circuit and tube was pulled back to the oral cavity. Both the skin incision and the intraoral incision were sutured. After spontaneous breathing resumed, the patients were extubated and were taken to the recovery room. The submental incision scars of the patients were assessed 6 months after the operation (Figure 2).

Discussion

Maxillofacial traumas, frequently encountered nowadays are commonly managed by open surgical reduction and internal fixation. The most important facts that should be considered during the operation by both the anaesthesiologist and the surgeons include providing proper occlusion and securing the airway. During surgical management of maxillofacial fractures, nasotracheal intubation makes the surgical repair of naso-orbito-ethmoid fractures impossible and orotracheal intubation precludes the assessment of dental occlusion (3). In both of our cases with nasal, mandibular and midfacial fractures that required reduction and fixation, we were not able to use nasotracheal or orotracheal intubation, as it would have been impossible to provide dental occlusion. There is no consensus on the best approach that should be taken for airway management in patients whom orotracheal and nasotracheal intubation are both contraindicated (4). Tracheostomy may be an alternative option (5). However, it may cause iatrogenic complications such as tracheal stenosis, internal emphysema, injury to the laryngeal nerve, tracheoesophageal fistula and scarring (6). Submental intubation may be an alternative option to tracheostomy for tracheal intubation (6). Since its first description by Hernandez Altemir et al. (7) in 1986, submental intubation has undergone several modifications by means of the technique and the site of incision (8). Hernandez Altemir et al. (7) had intended to avoid injury to the lingual nerve by making the submental incision lateral to the midline. Using a single intubation tube, they had performed orotracheal intubation first, and then had pulled the tube to the submental region. However, MacInnis et al. (9) recommended the incision to be made in the midline in their revised technique. They suggested that, using this technique, the risk of bleeding was lower, submandibular gland could be retracted and the tube could be introduced more easily. However, risks of sublingual hematoma and oedema were emphasized as the potential disadvantages of the technique. We used the technique described by Hernandez Altemir et al. (7) in both of our patients. By a meticulous approach, using a blunt dissection and incision, we reached the base of the mouth and replaced the tube to the submental area without any complication. Green and Moore modified this technique in 1995 to allow the use of endotracheal tube with detachable universal connectors and used two different intubation tubes in this technique. They used the first tube for orotracheal intubation and after a second tube was placed submentally, removed the first tube. Using a similar method, Hanamoto et al. (1) using a second tube, performed submental intubation in the shortest apnoea duration. MacInnis et al. (9) modified the technique in 1999 by performing the incision 2 cm lateral from the midline and through the anterior bellies of the digastric, geniohyoid, and genioglossus muscles.

Several complications of using submental intubation were described in the literature (7). These complications include those that can occur as a result of damage to the pilot balloon during the procedure, submental wound infection, abscess formation at the base of the mouth and fistula formation. In a review of 842 patients, success rate was reported to be 100% and the minor complications were observed in 60 patients including superficial skin infections, damage to the tube, fistula formation, right mainstem bronchus intubation, hypertrophic scarring, accidental extubation during the procedure,

Figure 1. A) Submental paramedian incision and dissection. B) Reaching to the base of the mouth by a blunt dissection. C) Pulling of the tube by the help of a clamp. D) Re-connection of the patient to the circuit.

Figure 2. Incision scars 6 months after the procedure.

transient lingual nerve paraesthesia and venous bleeding. No serious complication was reported in the literature (8). We think that the choice of the intubation tube is the most important issue, which should be kept in mind to avoid major complications. We propose the use of spiral embedded tubes for the ease of the procedure and to prevent the tube being kinked during both the manoeuvres that is performed inside the mouth and the surgical interferences that is performed throughout the procedure. We accomplished the procedures uneventfully and did not observe any complications by use of spiral embedded tubes in both patients.

Conclusion

Submental intubation is a preferable technique in patients who present with panfacial fracture and scheduled to undergo maxillofacial surgery. It is also a safe and comfortable technique by means of allowing the surgeons to perform reduction and maxillo-mandibular fixation simultaneously while taking the intubation tube away from the surgical field.

Conflict of Interest

No conflict of interest was declared by the authors.

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Informed Consent: Written informed consent was obtained from patients who participated in this case.

Author Contributions

Concept - Ü.Y.T.; Design - Ü.Y.T., F.E.K.; Supervision - A.D., A.A.; Funding - H.B., H.K.; Materials - H.B.; Data Collection and/or Processing - Ü.Y.T.; Analysis and/or Interpretation - Ü.Y.T., H.K., A.A.; Literature Review - Ü.Y.T., F.E.K., A.D.; Writer - Ü.Y.T., F.E.K.; Critical Review - Ü.Y.T., F.E.K., H.K., A.A.; Other - H.B., F.E.K.

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