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Submental intubation in panfacial injuries: our experience

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Abstract – Panfacial fractures present a unique set of problems to the anaesthesiologist and surgeon. Airway management in panfacial fractures is still a challenge to the anaesthesiologist as all modalities available such as orotracheal intubation, nasotracheal intubation, tracheostomy, etc., have their own advantages and disadvantages. When all the conventional modalities to secure airway seem unsuitable then submental route offers an excellent alternative to manage airway in such patients. Here we describe our experience with submental intubation technique in 10 patients with panfacial injuries over a period of two years.

Securing an airway in patients with panfacial injuries remain a challenge to an anaesthesiologist. No consensus exists till date as to which is the best way of securing an airway when orotracheal and nasotracheal intubation are contraindicated (1). Tracheostomy remains an excellent technique to secure an airway in panfacial fractures but it is not free of its inherent complications. Submental intubation has been described as an alternative technique, as it offers a secure airway to the anaesthesiologist, an optimum operating field and an opportunity for surgeon to check dental occlusion per operatively with limited morbidity for the patients. We here describe our experience with this technique.

Materials and methods

From November 2006 to November 2008 ten patients of panfacial injuries were intubated using submental intubation. There were six male and four female patients with mean age of 30 years (20–40 years). Most of facial injuries were a combination of fractures affecting dental occlusion (Maxillary fractures of Le fort Type 1, Mandibular fractures or alveolar fractures) and associated with another fracture dislocating either the anterior skull base (Le fort Type II or III fractures) or nasal pyramid (Naso Orbito Ethmoidal fractures).

All patients underwent pre anaesthetic checkup and were of ASA grade 1 & 2. Informed consent was taken and all patients were kept fasting for 8 h. We followed standard anaesthesia technique in all patients. In operation theatre IV line was secured with 18G IV cannula and routine monitoring was done. Patients were premedicated with Inj Glycopyrollate 0.2 mg, Inj midazolam 0.05 mg kg^{-1}, Inj Fentanyl 2 μg kg^{-1}, Inj Ranitidine 50 mg and Inj Metoclopramide 10 mg IV. Patients were pre-oxygenated for 3 min and were induced with Inj Propofol 2 mg kg^{-1} IV and after proper mask ventilation Inj succinylcholine 2 mg kg^{-1} IV was administered. Initially oral endotracheal intubation was performed with a 32G flexometallic endotracheal tube (Willy Rusch AG, Kernen, Germany). After proper packing of throat, ETT connector was removed from the tube with the help of mosquito forceps so that it can be easily removed and reattached in the next step. After sterile painting and draping of chin and mouth, 2 ml of lignocaine with adrenaline (2%) was injected at the incision site (Fig. 1). A 1.5 cm transverse skin incision was made in the median region of submental area, directly adjacent to lower border of mandible (Fig. 2). The site used for incision was selected by presence of concurrent mandible fracture, main aim being to stay as far as possible from the fracture site in order to reduce interference from the tube. Mouth opening was maintained using mouth gag. Floor of the mouth was exposed by retracting the tongue. A closed artery forceps was introduced through submental incision and blunt dissection was performed between anterior bellies of digastrics, mylohyoid, geniohyoid and genioglossus muscles (Fig. 3). Intraorally a longitudinal incision was made in midline between submandibular ducts close to the base of the tongue. A tunnel is made wide enough to accommodate ETT. The ETT was then disconnected from breathing circuit and connector removed. Pilot balloon followed by ETT was gently pulled out through the incision (Fig. 4). The tube connector was reattached and ETT was reconnected to circuit (Fig. 5). Bilateral air entry was checked and

Fig. 1. Local infiltration at incision site.

Fig. 2. Incision for submental intubation.

Fig. 3. Blunt dissection of floor of mouth.

tube was fixed with 3-0 silk sutures. Mean duration for surgery was 3 h (2–4 h). At the end of surgery submental intubation was converted to oral intubation. First pilot

Fig. 4. Pulling of flexometallic tube along with pilot balloon through incision.

Fig. 5. Secured flexometallic tube through submental approach.

balloon and then ETT were pulled intraorally. Submental incision was closed with two loose skin sutures to allow certain degree of drainage. 4-0 vycril was used to suture intraoral layer. After removal of pack reversal of neuromuscular blockade was done with neostigmine and Glycopyrollate. Out of 10 patients, eight were extubated after return of reflexes and two of patients were shifted to ICU for elective ventilatory support.

Results

In all patients submental intubation permitted simultaneous reduction and fixation of all fractures and intraoperative control of dental occlusion without any interference during the operation.

In all patients intraoperative and postoperative period was uneventful. There were no episodes of arterial desaturation while converting oral intubation to submental intubation and vice versa. Care was taken not to damage pilot balloon and ETT connector could be easily removed and reattached firmly. During the procedure no difficulty was encountered in passing the tube through

the floor of mouth. Total procedure time from incision making to passing ETT submentally till reconnection of circuit was less than 8 min. Disconnection time from circuit was approximately 1 min.

There were some minor complications encountered in two patients. In one of the patients there was accidental disconnection of tube from the circuit per-operatively which was recognized immediately and taken care of. In another patient, there was a slight wound infection at incision site postoperatively which was cured with regular dressing and antibiotics.

In all patients, after two months submental incision scar was almost invisible.

Discussion

Airway management of patients who suffer from panfacial fractures is a complicated task. Due to the teeth embedded in facial bones, the treatment of facial fractures requires not only the alignment of fractures fragments but also proper occlusion of teeth.

Nasotracheal intubation is usually contraindicated in maxillofacial fractures since there are many complications like inadvertent introduction of tube into the cranium, haemorrhage, obstruction of tube by distorted airway architecture, distal dislodgement of bony fragments by tube, meningitis, sepsis, sinusitis, etc. (2–12).

Orotracheal tube compromises with the reduction and maintenance of pan facial fractures (13). Further, it is difficult to check dental occlusion intra-operatively when orotracheal tube is in place.

Tracheostomy, an alternate favourite method, has its own complications like haemorrhage, recurrent laryngeal nerve damage, subcutaneous emphysema, tracheal stenosis, trachea-oesophageal fistula and scarring (6, 14–18).

Martinez Lage et al described an alternative technique called retromolar intubation for panfacial fractures in which a semilunar osteotomy is made in retromolar space (19). Orotracheal tube is then placed in the retromolar area lying below occlusion plane, giving an unobstructed intraoral surgical field with secure airway management moreover intermaxillary fixation can be done without any obstruction from tube. However the main disadvantages of this technique are that it takes a mean duration of 25 min to perform this procedure, bone anatomy is destroyed to make space for tube and evaluation of restoration of individual occlusion is partially impaired by presence of tube in oral vestibule (20, 21).

Altemir, a maxillofacial surgeon first described the technique of submental intubation in 1986 (22). Since the first application of this technique, many trials have shown the submental route to be a simple, quick and safe approach to the airway management. This technique provided a secure airway, an unobstructed intraoral surgical field and allowed maxillomandible fixation while avoiding the complications of nasotracheal and orotracheal intubation and tracheostomy.

Since its first description submental intubation has undergone various modifications and found new indications (13, 23–29). It could be safely used in patients with midfacial or panfacial fractures with possible base of skull fractures as well as in patients undergoing elective Le Fort osteotimies or simultaneous elective mandibular orthognathic surgery and rhinoplasty procedure (2, 6, 21).

Infections at the site of incision, bleeding diasthesis, disrupted laryngotracheal anatomy, restricted retromolar space to allow suctioning, requirement of prolonged control of airway and permanent airway requirement are the few contraindications of this technique (2, 29).

Some authors have recommended lateral incision technique through the body of mandible (30, 31). However we opted for midline approach as described by MacInnis (24) for two reasons: first, only few anatomic structures are present and there is minimum risk of neurovascular damage. Secondly, the midline incision heals almost imperceptibly and therefore is cosmetically superior.

Conclusion

Submental intubation is a useful alternative technique of airway management in patients with panfacial fractures. It provides a safe and reliable route for endotracheal intubation and also allows checking of dental occlusion peropertively without causing significant morbidity to the patient. This procedure is simple, safe and quick to execute. Finally, it has low incidence of operative and postoperative complication, eliminates drawbacks of tracheostomy and allows both surgeon and anaesthetist to give better quality of patient care.

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