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RESEARCH ARTICLE

OROTRACHEAL INTUBATION USING RETROMOLAR SPACE:A RELIABLE ALTERNATIVE INTUBATION APPROACH TO PREVENT DENTAL INJURY–TECHNICAL NOTE

Dr. Amod Patankar, Dr. Reshmi Sharma, Trainee, Dr. Sudhir Pawar, Dr. Swapna Patankar, Dr. Krishnanunni Nair, Trainee and Dr. Richa Sharma Trainee

[1,2,4,5]Department of Oral and Maxillofacial Surgery, Bharati Vidyapeeth Dental College and Hospital, Pune
[3,6]Department of Oral and Maxillofacial Pathology and Oral Microbiology, Bharati Vidyapeeth Dental College and Hospital, Pune

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Corresponding author:

ABSTRACT

There have been many recent advances in airway management but still dental injuries remains one of the most common anesthesia related adverse events and cause for malpractice litigations against anesthesia providers. The precautions required for prevention of dental injuries are not always effective because these techniques involve contact and pressure exerted against maxillary anterior teeth. We describe a case of intubation using retromolar space in a case of panfacial fracture.

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INTRODUCTION

Perianesthetic dental injuries account for the largest number of anesthesia-related adverse events and the major cause for negligence process against anesthesia providers according to closed claims data bases (Caron, 2000). Recent prevention advances in intubation devices and prevention plans using protective dental guards, video laryngoscopes, and flexible fiberoptic bronchoscopes with intubating airways have not been effective in decreasing the incidence of dental injuries. As an effective means to prevent dental injury, we propose using the retromolar space to insert a flexible fiberoptic bronchoscope to minimize contact with the vulnerable teeth during intubation.

Case description: A 63-year-old female with pan facial fracture of the face presented for ORIF with plating under general anesthesia. Patient was hypertensive since last 10 years and diabetic since 7 years, for which she was on medication. Preoperative airway assessment showed satisfactory mouth opening and normal neck range of motion. Dentition was in poor condition. After examination, her oral cavity showed poor oral hygiene, severe periodontal disease, restorations in central incisor, and several broken lower teeth. Using the Miller tooth mobility classification, upper anterior were classified as class I (greater mobility than normal physiologic) Nasal bone was fractured so nasal intubation was uncertain. Since patient had mandibular fracture also which required maxillomandibular fixation, oral intubation was also not opted. Patient had partially impacted lower third molar on left side, which was planned to be removed with upper third molar under GA. In the operation theatre, standard monitors were applied and the patient was preoxygenated with 100% oxygen. Intravenous Propofol 60 mg and Fentanyl 200 mcg were administered. Following adequate bag and mask ventilation with 100% oxygen, intravenous Rocuronium 50 mg was given. A well-lubricated 36 French nasopharyngeal airway was inserted into the oral cavity with adequate lubrication. A 3.5 mm flexible fiberoptic bronchoscope armed with a 6.5 mm wired reinforced tracheal tube was inserted into the mouth. Once the scope was in the trachea, the tube was then advanced over the scope for tracheal intubation (Figure 1). After the intubation, extraction of upper and lower third molar was carried out. After the extraction, adequate space was available in left side of the retro molar region where the tube was shifted, after achieving haemostsis. During this procedure, there was direct contact only to the posterolateral surfaces of the last molars by the fiberscope and the tracheal tube. After intubation, all teeth were examined and were found to be intact and in occlusion in view of maxillomandibular fixation, with the tube in retromolar space.

Fig: RETROMOLAR INTUBATION

DISCUSSION

Orotracheal intubation is commonly performed to secure and protect the airway in patients requiring general anesthesia for surgical procedures. Even in experienced hands, intraoral manipulation may cause injuries to the teeth, especially maxillary anteriors with considerable functional, cosmetic, psychological, and financial consequences. The overall incidence of anesthesia-related dental injuries is estimated to be between 0.06% and 12% (Lokesh, 2013). Similar to other iatrogenic adverse events, perioperative dental injuries are subject to forensic liability. In fact, dental injuries are the most frequent cause for malpractice litigation against anesthesia providers (Caron, 2000). The risk factors for dental injuries include poor dentition and difficult intubation due to prominent upper incisors, decreased mouth opening, and short bulky neck. The severity of injury ranges from minimal enamel damage to crown or root fracture and complete tooth avulsion. An unrecognized dislodged tooth may be inhaled into the lung, causing pneumonia, abscess, and bronchiectasis requiring invasive procedures to retrieve it.

The maxillary incisors are most commonly injured by a laryngoscope blade, especially when used as a fulcrum to expose the epiglottis. Considering the magnitude of the problem, various strategies for prevention of dental injury have been recommended. Preoperative assessment of the airway and preexisting dental abnormalities and factors which may increase dental fragility should be carefully documented. Tooth guards or occlusal gutters may be valuable in protecting teeth with veneers and porcelain restorations during intubation. Unfortunately, in cases of already loose teeth, their insertion and removal may in fact directly cause teeth avulsion. Thus, current strategies for prevention of dental injuries have not been effective or reliable. Furthermore, the level of training of the operator does not influence the occurrence of dental injuries related to oral intubations (Martinez-Lage, 1998). Flexible fiberoptic nasal intubation is effective in preventing dental injury. However, the nasal route is contraindicated in patients with intranasal pathology, bleeding diathesis, and basal skull fractures. It is not an intubation route appropriate for surgery involving the nose, paranasal sinuses, nasolacrimal ducts, or transphenoidal hypophysectomy. Furthermore, nasotracheal intubation may cause serious complications including trauma to nasal structures and epistaxis (Lee, 2009). In this case, nasotracheal intubation was not performed due to the existence of bilateral nasal bone fracture. Therefore, an alternative approach is needed. In contrast to the previously mentioned techniques which apply direct forces on the vulnerable teeth, flexible fiberoptic intubation through the retromolar space is a much more effective and reliable technique to prevent dental injuries because it involves minimal contact with the teeth. Bounded anteriorly by the last erupted molar, posteriorly by the ramus of the mandible, superiorly by the maxillary tuberosity, and inferiorly by the retromolar trigone, the retromolar space has been used for flexible fiberoptic oral intubation in patients with severe trismus in whom the reduced interincisor distance does not allow for placement of a rigid laryngoscope or a tracheal tube between the teeth (6 and 9). Retromolar space dimensions using dental pantomograms have reported a mean height of 17.9 mm for the right space and 18.1 mm for the left space. The reported mean width was 17.5 mm for the right space and 16.51 mm for the left space (7 and 8).

These measurements show that the retromolar space is large enough to readily fit an 8.0 mm tracheal tube, which has an outer diameter of 10.8 mm. Because of the existence of two retromolar spaces, right and left, even in the presence of loose teeth or a retromolar trigone lesion on one side, the uninvolved contralateral side can be safely used for tube placement. The skills required to perform retromolar flexible fiberoptic intubation are essentially the same needed for conventional fiberoptic oral or nasal intubations. An operator with expertise in fiberoptic bronchoscopy techniques can master this new approach without difficulty. The main advantage of this approach is that, by advancing the fiberoptic scope into the retromolar space into the pharyngeal cavity, the intraoral structures, including the tongue and intraoral secretions, are bypassed. Based on teaching residents and fellows, this technique is surprisingly easy to learn. Competence can be reasonably achieved after 20–30 successful retromolar intubations (Gaiser, 1998).

Competing Interests: The authors declare that they have no competing interests.

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