

What went wrong? Case report and protocol for management of dislodged tooth during intubation

K.V Ramana Reddy¹, Priyanka Nath*², Sadam Srinivasa Rao³

¹ Professor & H.O.D Department of Oral & Maxillofacial Surgery, Army College of Dental Sciences, Hyderabad, Telangana, India

² Assistant Professor, Department of Oral & Maxillofacial Surgery, Army College of Dental Sciences, Hyderabad, Telangana, India

³ Professor, Department of Oral & Maxillofacial Surgery, Army College of Dental Sciences, Hyderabad, Telangana, India

ABSTRACT

Dental injury during general anesthesia while intubation is a frequent cause of morbidity for patients and a source of litigation against anesthetists. Most injuries occur as a result of laryngoscopy. Dental injury may range from a simple enamel fracture to avulsion and pulmonary aspiration. We report a case of dislodged tooth during intubation being done for a 25-year old male patient with maxillofacial trauma. We propose a protocol for management of dislodged tooth during intubation.

Keywords: Dental injury, Dislodge tooth, Laryngoscopy, Bronchoscopy

Introduction

Dental trauma during anesthesia is the most frequent cause of anesthesia related medico legal claims. Recent large retrospective studies have estimated that between 1 in 2805 (0.04%) and 1 in 2073 (0.05%) individuals undergoing a general anesthetic risk dental damage.[1] Dental injuries can range from simple enamel fractures to loosening to avulsion and pulmonary aspiration.[2] Due to the position of the laryngoscope in the mouth during intubation injury to the maxillary anterior teeth particularly the left maxillary central incisor is more frequent.[2] Most often than not dental injury is identified by the anesthetist. At the time of intubation however some cases can be missed. In a retrospective study of 161,687 anesthetic cases, 14% of dental damage was identified first by the patient or a member of the recovery staff.[3][4] In addition to dental damage, trauma to the lips and gingival have also been frequently reported.[6] The incidence of these conditions is hard to quantify, but probably occur with much greater frequency than damage to the dentition.[2][5][7]

*Correspondence

Dr. Priyanka Nath

Assistant Professor, Department of Oral & Maxillofacial Surgery, Army College of Dental Sciences, Hyderabad, Telangana, India

E Mail: mdabid2412@gmail.com

Case report

A 25-year old male motorist presented to our hospital after a road traffic accident. He was primarily stabilized and shifted to the maxillofacial unit where he was diagnosed with bilateral zygomatic complex fractures, nasal bone fracture and maxillary anterior dentoalveolar fracture. [Fig 1] He had numerous facial abrasions and loose right and left upper incisors. Neurologic examination did not reveal any focal deficits and physical examination was non-contributory. Laboratory findings were within normal limits. The patient was posted for open reduction with internal fixation under general anesthesia the following day. The patient was classified as Mallampati (ii), No predictive signs of difficult intubation were reported during the pre-anesthetic check up. Laryngoscopic inspection and glottis view were not as easy as expected; as a consequence, tracheal intubation was not immediate. Two attempts to intubate failed. Trachea was successfully intubated in the third attempt. Leveraging the laryngoscope against the upper maxillary anteriors during laryngoscopy resulted in the loss of both upper central incisors. The right central incisor was accounted for by the anesthetists. The fact that the left central incisor was missing and unaccounted for was discovered during surgery.

Immediately surgery was stopped and the visible parts of the oral cavity were inspected. Digital exploration and laryngoscopy which followed was also fruitless. A joint decision was made by the anesthetists and the operating surgeons to proceed with the surgery. After the surgery, to exclude the possibility that the tooth had slipped into the tracheobronchial tree, a trancheobronchoscopy was performed but nothing was found in the main airway. The airway was also visualized with the help of a C-Arm, finding no

evidence of tooth in the airway it was assumed that the tooth had passed beyond the esophagus and would pass uneventfully through intestinal tract. The patient was extubated and monitored in the ICU. On the first post operative day a chest x-ray [Fig 2] and abdominal x-ray was obtained. [Fig 3] The central incisor could be localized in the upper digestive tract. On follow –up ten days later a second abdominal x-ray was obtained which showed no evidence of the tooth.[Fig 4]



Fig 1: Bilateral zygomatic fracture; nasal bone fracture & maxillary dentoalveolar fracture



Fig 2: Normal chest X-RAY taken on first day post operative day



Fig 3: Tooth located in upper GIT X -RAY abdomen



Fig 4: Ten days post operative X-RAY abdomen

Discussion –what went wrong?

A wide variety of factors are responsible for dental trauma during orotracheal intubation like in the case reported. At preoperative evaluation the loose teeth were not extracted. The AO foundation recommends thorough preoperative evaluation of the oral cavity, removal of all foreign bodies and extraction of loose teeth. [7] Apart from direct dentoalveolar trauma, patients with poor oral hygiene, periodontally compromised dentition and presence of prosthesis makes them more susceptible to avulsion during intubation.[8] Newland *et al.*[3] found that patients with poor dentition or reconstructive work were 3-4 times more likely to have dental injuries related to anesthesia. But in our case study there was no such findings related to dentition. Warner ME *et al* [2], Givol N *et al* [7] in a retrospective analysis of incident report of dental injury for elective intubations, 72% of the incidence occurred in patients aged 50-70 yr, likely due to the higher incidence of periodontal disease in that group. In our study the patient was young (25

years old). Burton and Baker.[8] in their observation found that the majority of anesthesiologists did not use a protective guard routinely, and 45% had never used one. The use of mouth guards has no significant effect on the incidence of dental injury. The main disadvantage of these tooth protectors is that their thickness decreases the amount of space within the oral cavity, leading to poor visibility and increased difficulty in guiding the endotracheal tube into the larynx.[8][9] No particular precautions like bite block or mouth guards were applied in our case. Using the bridge as a fulcrum for the laryngoscope blade was enough to displace the tooth. The upward and forward mobilization of the mandible and base of the tongue routinely performed by simple extension of the neck, decreases the intensity of the forces exerted during laryngoscopy probably due to the reduction of the tongue volume for its mobilization during laryngoscopy.[9][10] Lee *et al* reported that using a Macintosh blade with a low-height flange

(i.e., callender modification) reduced the frequency of direct contact between the blade and the maxillary teeth by more than 80%.[10] Submental intubation should have been the choice of intubation since there was a nasal bone fracture which resulted in two failed attempts to intubate. Bronchoscopy was immediately done without a chest x-ray, which could have been taken during the maxillofacial procedure.[10] Complications of bronchoscopy include severe laryngeal edema or bronchospasm requiring tracheotomy or reintubation, pneumothorax, pneumomediastinum, cardiac arrest, tracheal or bronchial laceration, and hypoxic brain damage. In addition recent reports of atypical mycobacterium causing contamination of bronchoscopes leading to pseudo infections and toxicity from glutaraldehyde is also a concern.[10][11] Most of the complications that occur are slight and transitory, and their frequency has been reported to be 2.9% to 3.1% of the procedures carried out.[13] However, some centers report a higher complication rate of over 10%, 28%, and as high as 48% have been published. [14] This when compared

to the complication rates of endoscopy which are 12.6% mainly constituting of retropharyngeal abscess due to delay in presentation, it is safe to state that endoscopy is relatively safer procedure with less morbidity, moreover foreign bodies less than 2.5cm in diameter and/or <5 cm in length which have gone beyond the esophagus will pass uneventfully through intestinal tract in 70-80% cases requiring no intervention as in our case.[13-15] Keeping the above in view, we suggest a protocol for the management of a dislodged tooth during intubation.

Preoperative assessment

Identify loose teeth and other risk factors like periodontal or gum disease, large anterior restorations, veneers, crowns, bridgework and implants, protruding upper incisors, extensive tooth surface loss, endodontically or root canal treated teeth, Mallampati classification III etc. Preoperative discussion with patient and attenders. Documentation of findings.

Recommendations for prevention of perioperative dental damage

1. A 3-0 silk suture without the needle can be wrapped several times around the gingival margins if the mobile tooth and adjacent teeth for stability. The suture can be secured with adhesive tape to the ipsi lateral cheek.
2. During laryngoscopy excessive stress may be placed upon the mandibular anterior or maxillary right posterior teeth subjecting only posterior teeth to minimal oblique and vertical forces.
3. Using a Macintosh blade with a low height reduced the frequency of direct contact between the blade and the maxillary teeth.
4. The cap of a 20ml syringe or a pediatric laryngoscope blade can be placed across the palate between the two premolars. This will avoid contact of the laryngoscope blade with the maxillary anterior teeth preventing trauma.



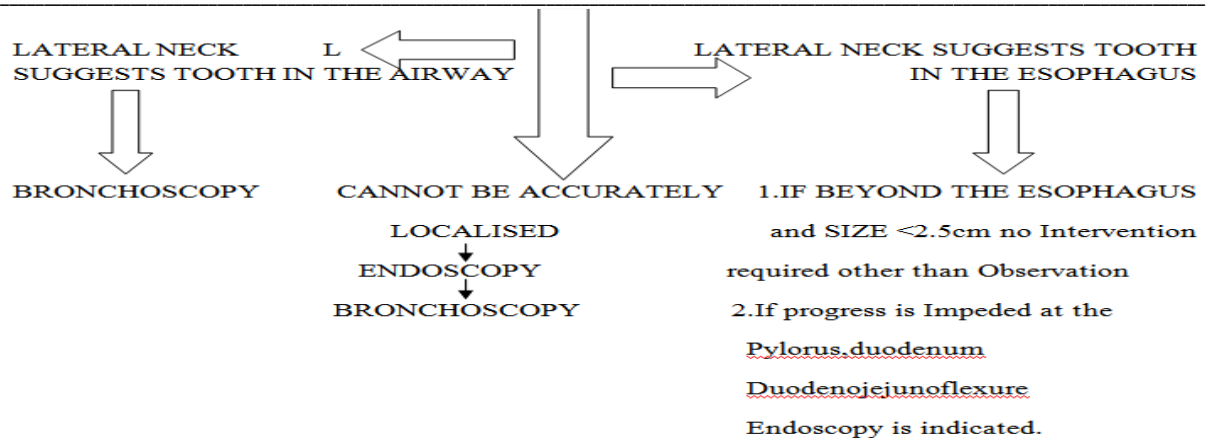
Examine the oral cavity for any missing tooth that is unaccounted for prior to starting the procedure.



unaccounted for

LARYNGOSCOPY and finger sweep in the oral cavity.

NECK RADIOGRAPHS: - Tracheal objects tend to align in the sagittal plane, where as esophageal objects tend to align in the anterior plane. An object that overlaps the boundaries of the airway on an anterior-posterior view is unlikely to be inside the airway.



Conclusion

Dental trauma continues to be the most common cause of malpractice against anesthesiologist. It is imperative to understand that the anesthetist solely cannot be blamed for such mishaps. The maxillofacial surgeon must document loose teeth and other risk factors that could lead to dislodgement and inform the anesthetist prior to intubation. All preventive measures should be taken to prevent trauma to teeth and adjacent tissues during laryngoscopy. However if such a mishap occurs following a definite protocol can help prevent further complications

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Source of Support: Nil

Conflict of Interest: None