

Assessment of awareness among anesthetists regarding emergency management of tooth avulsed during tracheal intubation

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ABSTRACT

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Anesthesiologist always works around the oral and peri oral soft and hard tissue. Oral/nasal intubation might injure hard tissue or “knock out” the tooth. The present study was conducted among anesthetic specialist to assess the measures that they would take to manage an avulsed tooth that might occur during intubation & laryngoscopy. The present study involved 40 anesthetists working in private hospitals. They were asked to answer a questionnaire designed to evaluate the line of action that an anesthetist would follow in case of an iatrogenic tooth avulsion. Anesthesiologists were aware that trauma to oro-facial region might occur during intra oral manipulation. However few knew the correct protocol to be followed in handling the avulsed tooth. There is a need to make anesthetist aware that immediate reimplantation and stabilization of a permanent avulsed tooth should be done.

INTRODUCTION

Trauma to the dentition can occur during endotracheal intubation using classic laryngoscopy. The overall incidence of dental injury is estimated to be between 0.06% and 12%¹. Risk factor for dental injury during tracheal intubation is periodontal involvement of tooth and/or

difficult laryngoscopy as in case of decreased mouth opening, macroglossia, retruded mandible, forwardly placed maxillary incisors, shortened thyromental distance and when extension of neck is limited².

Different dental injuries reported during anesthetic procedure are subluxation, crown fracture, and tooth avulsion. Warner et al analyzed dental injuries in 598,904 consecutive cases and

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found that the upper incisors were the most commonly involved teeth³. Anaesthetists mostly use the maxillary incisors as a fulcrum and exert great forces on them which probably lead to their injury⁴. Blade-tooth contact is extremely frequent in patients with reduced mouth opening or with Mallampati higher than II. Oropharyngeal airways, such as Laryngeal masks, should also be used with caution in individuals with vulnerable anterior teeth or prostheses^{2,5}.

In a study by Hoffman et al. 20.8% of all dental traumas was avulsion. This is such a relevant problem that the Medical Defence Union has already named it the most frequent cause of compensation during general anaesthesia⁶.

The present study was carried out among anaesthetists regarding their knowledge and attitude towards management of avulsed teeth.

MATERIAL AND METHODS

The present study involved forty anaesthetists working in private hospitals or nursing homes in Raipur, Bilai, and Durg city of Chhattisgarh state in India. All the participants were anaesthetic specialists.

A questionnaire was prepared which had nine questions about tooth avulsion (Table 1). For each question, multiple options to answer were provided. The questions were prepared to explore their knowledge and to know the line of

action that an anaesthetist would follow in case of an iatrogenic tooth avulsion. Written consent was taken from them for participation. The questionnaires were given to anaesthetists and were asked to answer.

RESULTS

Majority of anaesthetists (95%) felt that they have sufficient knowledge pertaining to management of avulsed tooth (Table 1). They had gained knowledge mostly through CDE programs, scientific articles on dental trauma emergency care and during tenure of medical course (Table 1). Most of the anaesthetist knew the proper way of holding an avulsed tooth (70%) however many felt (40 %) that avulsed tooth should be reimplanted in recovery area. Moreover around 60% of anaesthetists were not willing to reimplant as they felt it was not their specialty (45%). A large number of the anaesthetists (70 %) answered that dentist should be called 6 hours post operatively. If we have a look at the percentage of anaesthetists who marked the correct option (Table 2), most of the anaesthetists knew that one should hold the avulsed tooth by its crown (70%). Around one third (30%) rightly marked that an avulsed tooth should be reimplanted immediately. Less than half (45%) of the anaesthetists knew that avulsed primary tooth should not be reimplanted.

Table 1. Questionnaire along with response for assessment of awareness among anesthetists regarding emergency management of avulsed tooth.

| | Question | Number | Percentage |
|----|---|---------------|-------------------|
| 1. | Do you have any knowledge pertaining to management of avulsed tooth? | | |
| | Yes | 38 | 95 |
| | No | 02 | 05 |
| 2. | If yes, what is your source of information? | | |
| | CDE program | 26 | 65 |
| | During tenure of medical course | 04 | 10 |
| | Health talks on TV/Radio | 02 | 05 |
| | Scientific articles on dental trauma emergency care | 08 | 20 |
| 3. | How to hold avulsed tooth? | | |
| | Crown | 28 | 70 |
| | Root | 08 | 20 |
| | Anywhere on tooth | 02 | 05 |
| | Don't know | 02 | 05 |
| 4. | When to reimplant tooth? | | |
| | Immediately | 12 | 30 |
| | During anesthesia | 08 | 20 |
| | Recovery area | 16 | 40 |
| | No time constraints | 04 | 10 |
| 5. | Are you willing to reimplant tooth? | | |
| | Yes | 16 | 40 |
| | No | 24 | 60 |
| 6. | Reason for unwillingness? | | |
| | Lack of adequate knowledge | 12 | 30 |
| | Legal | 08 | 20 |
| | Not his specialty | 18 | 45 |
| | Others | 02 | 05 |
| 7. | Where to keep tooth before reimplantation? | | |
| | Dried & wrapped up in gauze | 16 | 40 |
| | Normal saline | 12 | 30 |
| | Child's saliva | 02 | 05 |
| | Antiseptic solution | 08 | 20 |
| | Hanks solution | 02 | 05 |
| 8. | When to reach dentist after avulsion? | | |
| | Within 30 minutes | 02 | 05 |
| | Within 01 hour | 04 | 10 |
| | 6 hours post operatively | 28 | 70 |
| | After discharging the patient | 02 | 05 |
| | Don't know | 04 | 10 |
| 9. | Should we reimplant primary tooth? | | |
| | Yes | 18 | 45 |
| | NO | 22 | 65 |

Table 2. Percentage of anesthetists who marked the correct option.

| | Question | Number | Correct Percentage |
|----|---|--------|--------------------|
| 1. | How to hold avulsed tooth? | 28 | 70 |
| | Crown | | |
| 2. | When to reimplant tooth? | 12 | 30 |
| | Immediately | | |
| 3. | When to reach dentist after avulsion? | 02 | 05 |
| | Within 30 minutes | | |
| 4. | Where to keep tooth before reimplantation? | | 40 |
| | Normal saline* | 12 | |
| | Child's saliva* | 02 | |
| | Hanks solution* | 02 | |
| 5. | Should we reimplant primary tooth? | | 45 |
| | NO | 18 | |

*All the options mentioned are correct.

DISCUSSION

Injuries to the teeth have been associated commonly with general anesthesia especially during endotracheal intubation. Trauma to the teeth has been suggested to occur during laryngoscopy or from use of airways, mouth openers, props or gags. Tooth injuries are said to range from micro-fractures of the natural tooth substance, Subluxation injury, and pulp necrosis to actual avulsion⁷.

The primary objective in management of avulsed tooth is to reimplant the tooth in its anatomical correct position with minimum possible delay thereby making an attempt to maintain the viability of periodontal cells and reestablish neuro-vascular supply to tooth⁶. Unfortunately only 30% of the anesthetist in the present study marked that the tooth should be implanted immediately. Moreover around 10 % felt that there are no time constraints linked to it. Nearly half

(40%) were not willing to reimplant themselves as they felt it wasn't their specialty or they did not have adequate knowledge.

One should always hold the tooth by its crown whenever we try to place the avulsed tooth back into the socket. Holding the tooth from its root end can damage the periodontal ligament fibres which aid in anchoring the tooth within the alveolar socket⁸. In the present study majority (70%) were aware of this fact however in another study by Mourao J et al, only 41.5 % of the anesthetists knew the correct way of holding the tooth.

Avulsed tooth should be placed in a storage medium if there is a delay in reimplantation to prevent drying of tooth. Drying leads to loss of normal physiologic metabolism of periodontal cells and make them non viable⁸. Nearly half (40 %) of the anesthetist in the present study

felt that the tooth should be dried up and kept in gauze. The ideal medium for storing an avulsed tooth is Hank's solution. In the present study, only 5 % marked that option for storing the avulsed tooth.

If a primary tooth is avulsed, one should not attempt to reimplant it as this may damage the permanent tooth or primary tooth might ankylose with the bone. Ankylosis of primary tooth will prevent its physiologic shedding and obstruct the way for eruption of permanent tooth⁹. In the present study around 45% of the anesthetists felt that even milk tooth should be reimplanted. Thus we find, though some anesthetists were aware of the protocol for management of avulsed tooth, still there is a lacunae in their awareness of the protocol for avulsed tooth management.

Proper preclinical assesment is the key to minimize dental injuries. The anesthesist should look for the risk factors that can lead to dental insult mainly the poor dental status and history of difficult intubation.^[1] Any patient who is awaiting an elective surgical procedure requiring a general anaesthesia should be advised to attend their dentist first. Preoperative dental treatment can address some dental risk factors. This might include the restoration of carious lesions, replacement of any lost or loose anterior restorations, splinting or extraction of any mobile teeth and the provision of a guard for use during surgery¹⁰.

Direct laryngoscopy using the paraglossal straight blade technique avoids dental damage in patients with mobile upper incisors and no right maxillary molars. It is a practical alternative method that differs from the traditional Macintosh laryngoscope in patients with a high risk of dental injury during the procedure³.

Different devices have been proposed to protect the teeth during direct laryngoscopy. Improved laryngoscope designs, e.g., the "Dental Protector Blade", the "Improved Laryngoscope Blade", or the "Callander Laryngoscope Blade" were proposed to reduce dental lesions. These laryngoscope designs have become widely accepted into clinical practice. Two types of dental shields have also been developed. One of these consists of individually adaptable shields using thermoplastic material, cellulose-acetate foil, or ethylene vinyl-acetate. The other group is preformed dental shields¹¹.

CONCLUSION

Dental injuries are common during intubation worst being tooth avulsion. Knowledge of risk factors that put patient at risk to dental injury and proper pre-clinical assessment can reduce the incidence and severity of injury. Should tooth avulsion happen, locate the tooth intraorally, hold it by its crown, immediately try to reimplant the tooth in its anatomical location and call maxillo-facial surgeon to stabilize the tooth. Symposium and guest lectures by a dental specialist can help in educating/refreshing

knowledge/creating awareness among the anesthetic specialists towards emergency management of avulsed tooth.

REFERENCES

1. Sousa JM, Mourão JI. Tooth injury in anaesthesiology. *Braz J Anesthesiol.* 2015;65(6):511-8.
2. Feltracco P, Barbieri S, Salvaterra F, et al. Unusual Displacement of a Mobilised Dental Bridge during Orotracheal Intubation. *Case Rep Anesthesiol* 2011;2011:781957.
3. Huang YF, Ting CK, Chang WK, et al. Prevention of Dental Damage and Improvement of Difficult Intubation Using a Paraglossal Technique With a Straight Miller Blade. *J Chin Med Assoc.* 2010; 73(10):553-6.
4. Mourão J, Neto J, Luís C, et al. Dental injury after conventional direct laryngoscopy: a prospective observational study. *Anaesthesia.* 2013; 68(10):1059-65.
5. Yasny JS. Perioperative dental considerations for the anesthesiologist. *Anesth Analg.* 2009; 108(5):1564-73.
6. Mourão JB, Magalhães D, Rocha GNP. Accidental Dental Avulsion Caused by Direct Laryngoscopy. *J Anesth Clin Res.* 2014; 5(4):400.
7. Tiku AM, Hegde RJ, Swain LA, et al. To assess and create awareness among anesthesiologists regarding prevention and management of injuries to the teeth and their associated structures during general anesthesia. *J Indian Soc Pedod Prev Dent.* 2014; 32(1):58-62.
8. Andersson L, Andreasen JO, Day P et al. International Association of dental traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol.* 2012; 28(2):88-96.
9. American Academy on Pediatric Dentistry Council on Clinical Affairs. Guideline on management of acute dental trauma. *Pediatr Dent.* 2008-2009; 30(7 Suppl):175-83.
10. Windsor J, Lockie J. Anaesthesia and dental trauma. *Anaesthesia and Intensive Care Medicine.* 2008; 9(8): 355-357.
11. Monaca E, Fock N, Doehm, et al. The effectiveness of preformed tooth protectors during endotracheal intubation: an upper jaw model. *Anesth Analg.* 2007; 105(5):1326-32.

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