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Dentoalveolar trauma induced by intubation in urgent maxillofacial surgery: case report

Trauma dentoalveolar induzido por intubação em cirurgia bucomaxilofacial de urgência: relato de caso

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ABSTRACT

Dental trauma is a common complication in general anesthesia, especially when using nasotracheal intubation during the classic laryngoscopy. Risk factors range from difficult intubation through difficult airways to occlusal changes in the patient, with incisors being widely affected by dental elements. Tooth avulsion is the most frequent type of trauma, followed by lateral dislocation and root fracture. Male patient, 39 years old, presented at the Emergency and Trauma Hospital in Caruaru/PE, a motorcycle accident victim with a bilateral jaw fracture. Given the need to fix fractures, the patient underwent a surgical procedure under general anesthesia. During laryngoscopy, heavy bleeding was observed in the oral cavity. After inspection, root fracture of lateral incisor and avulsion of right central incisor were noted. The avulsionated tooth was not found. An orthopedic image intensifier was used to locate the dental element in the thoracic region. However, it was not possible to determine its location. Therefore, an upper gastrointestinal (UGI) endoscopy was requested, and the dental element was in the digestive tract at the esophagus level. The tooth was removed, and the surgical procedure for osteosynthesis of bilateral mandible fracture was carried on. Dentoalveolar traumas induced by general anesthesia are frequent and require preventive measures since they can directly affect the patient's physical, economic, and medical conditions, along with anesthesiologists and maxillofacial surgeon's risk of receiving a civil lawsuit.

Indexing terms: General anesthesia. Surgery oral. Tooth avulsion.

RESUMO

O trauma dental é classificado como uma complicação comum em anestesia geral, em especial quando utilizada a intubação nasotraqueal durante o uso do laringoscópio clássico. Os fatores de risco envolvem desde dificuldade de intubação por via aérea difícil até alterações oclusais do paciente, sendo os incisivos, elementos dentários amplamente acometidos. A avulsão é o tipo de trauma mais frequente, seguido de luxação lateral e fratura radicular. Paciente do gênero masculino, melanoderma, 39 anos, apresentou-se no

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Hospital de Emergência e Trauma em Caruaru/PE vítima de acidente motociclístico, apresentando fratura bilateral de mandíbula. Visto a necessidade de fixação das fraturas, o paciente foi submetido a procedimento cirúrgico sob anestesia geral. Durante a laringoscopia, observou-se sangramento intenso na cavidade oral. Após inspeção, constatou-se fratura radicular do incisivo lateral esquerdo, e avulsão do incisivo central direito, sendo este último não encontrado. Com o intuito de preservar a via área, utilizou-se intensificador de imagem ortopédico, onde foi observado que o elemento dentário estava na região torácica, porém não foi possível apontar sua localização. Sendo assim, solicitou-se vídeo endoscopia, onde o elemento dentário se encontrava na via digestiva, na altura do esôfago. O mesmo foi removido e deu-se sequência ao procedimento cirúrgico de osteossíntese de fratura bilateral de mandíbula. Conclui-se que os traumas dentoalveolares induzidos por anestesia geral são frequentes e requerem condutas com finalidade preventivas, já que podem repercutir diretamente nas condições físicas, econômicas e médico-legais do paciente, bem como, processo cível dos profissionais envolvidos.

Termo de indexação: *Anestesia geral. Cirurgia bucal. Avulsão dentária.*

INTRODUCTION

Dentoalveolar trauma has a multifactorial etiology, among which it is worth mentioning motorcycle accidents, falling from the level itself, airway manipulation procedure, among others. This type of trauma can affect the posterior and anterior dental elements, the latter being the most affected [1].

Anesthesia is a medical specialty that operates oral or nasal cavity to access the lower airways. Therefore, tracheal intubation has a potential risk of injury to the tissues of the larynx, pharynx, esophagus, oral mucosa, labial, and teeth [2].

Although the researches point to a considerable under-reporting of traumas during intubation, the literature shows that the incidence of dental injuries in intubation maneuvers is estimated at up to 12%, being avulsion the most frequent trauma [3].

Intraoral manipulation is inevitable during direct laryngoscopy. Therefore, it is necessary to inspect the oral cavity before the surgical procedure since factors such as occlusal changes of the patient, tooth mobility, and difficult airway may predispose to lesions in the oral cavity during intubation [1,2].

In facial traumas involving mandibular fractures, especially in the condylar region, limitation of mouth opening is commonly associated since the condylar structure maintains the vertical dimension and, when fractured, reduces its length. Therefore, orotracheal and nasotracheal lumens are also reduced, making direct visualization of upper airways harder [4].

The oral cavity is a component of the air and digestive tracts. Therefore, fractured dental elements can be displaced to the respiratory or digestive tract during the insertion of the tracheal tube. When directed to the lower airways, some immediate procedures should be taken, such as an x-ray with an intensifier to locate teeth fragments. The presence of a foreign body on the respiratory tract can make extubating difficult, exposing the patient to the risk of his physical integrity [5].

The alveolar trauma can affect the patient's social, functional, and organic environment since each dental element has essential aesthetic-functional functions. To professionals is the main cause of legal proceedings [1,3].

This article aims to report a clinical case of a dentoalveolar trauma during nasotracheal intubation, pointing out the conducts taken and considering what is currently described in the literature.

CASE REPORT

A male patient, 39 years old, was admitted to the Emergency and Trauma Hospital in Caruaru/PE with polytrauma after a motorcycle accident. The patient was oriented, denied morbidities or chronic use of medications. On physical examination, moderate trismus with limited mouth opening, loss of vertical dimension, and anterior open bite were observed. A bilateral mandibular fracture (parasymphysis and bilateral condyle) was confirmed as the final diagnosis (figure 1).

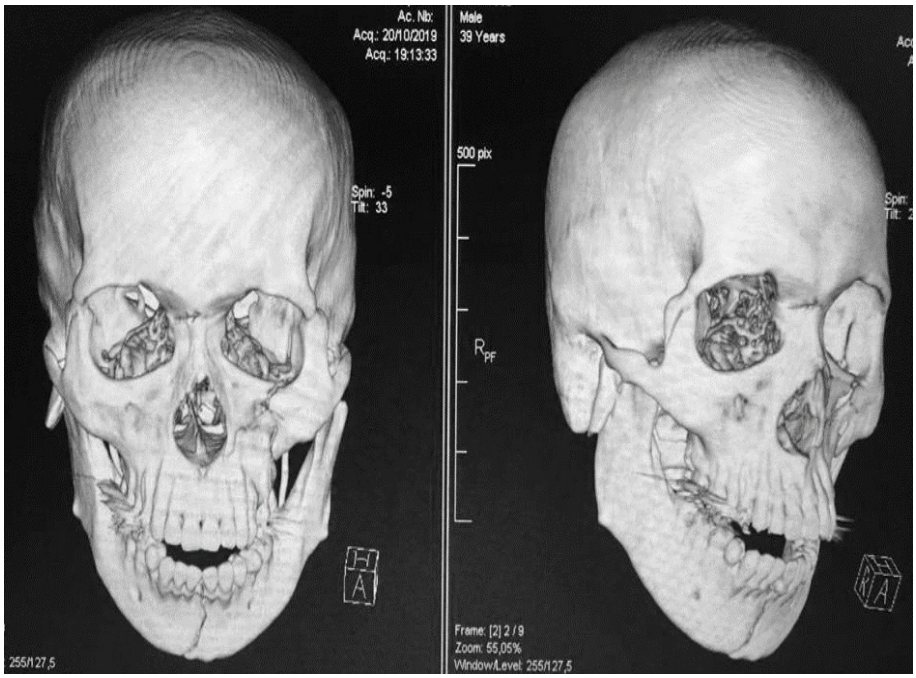

Figure 1 – Facial tomography showing mandibular fractures involved.

Because of the need to fix fractures, the patient underwent a surgical procedure under general anesthesia with nasotracheal intubation. During the anesthetic evaluation, the patient was classified as Mallampati III. Classical laryngoscopy was performed with limitations, in which intense bleeding was observed in the oral cavity coming from the maxilla's anterior region. After inspection, root fracture of lateral incisor and avulsion of right central incisor were noted. The avulsionated tooth was not found (figure 2), and an orthopedic image intensifier was used to locate it, showing a radiopaque image in the thoracic region, presumably the dental element (figure 3).

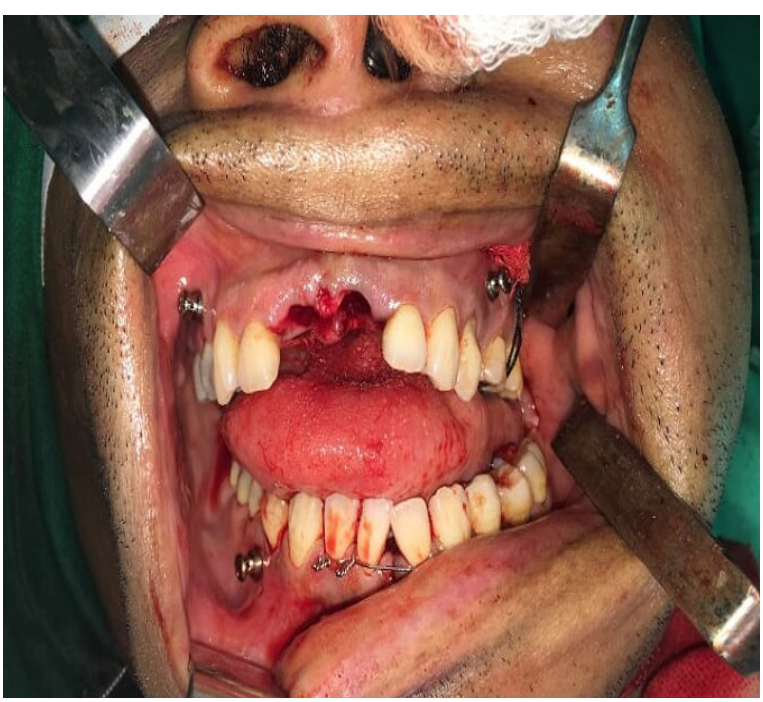

Figure 2 – Intraoral clinical aspect after complex bilateral mandible fracture's osteosynthesis.

Figure 3 – Fluoroscopic image of the chest region showing dental element.

The upper gastrointestinal (UGI) endoscopy was requested to determine the dental element's exact location, right at the digestive tract in the esophagus level (figure 4). The tooth was removed via endoscopy, and the surgical procedure

Figure 4 – Alvusionated tooth in the esophageal region captured by UGI.

for osteosynthesis of bilateral mandible fracture proceeded (figure 5). At the end of the procedure, the patient's extubation was carried out uneventfully with airway preservation.

Figure 5 – Dental elements (11 and 21) with root fracture and avulsion, respectively.

DISCUSSION

Surgical procedures in maxillofacial traumatology require specific care, such as preserving airways, according to trauma intensity and anatomical structures involved. Maneuvers such as general anesthesia are essential to treat trauma patients [6]. The specific case refers to a patient with a mandible fracture who required osteosynthesis under general anesthesia.

General anesthesia is a procedure that provides loss of consciousness and neuromuscular block, preserving the patient's airway through tracheal intubation [3]. Intubations can be nasotracheal or orotracheal, so named according to the tube passage, nose, or mouth, respectively [6,7]. The most commonly used route for intubation in maxillofacial surgeries is the nasal one, due to the mandibular and maxillary bones' involvement and the need for free access to the oral cavity for manipulation of the dental arches. Therefore, the preferential intubations are nasotracheal as in the reported clinical case.

There are proposed classifications to guide professionals regarding the difficulty in visualizing the airways during intubation. A classic example described in the literature is the Mallampati classification, which assigns a score from I to IV. Type I have less and type IV has greater difficulty in intubation based on the visualization of anatomical structures [8]. The patient had Mallampati III.

Classical laryngoscopy comprises the insertion of a laryngoscope from the oral cavity to the epiglottic vallecula. This anesthetic procedure is the most favorable one to cause traumatic injuries. The anterior dental elements have the highest trauma rate, reaching 12% of the total dentoalveolar traumas. In the case presented, the teeth involved in the trauma were the upper central incisors [7,8].

Factors such as limited mouth opening can make laryngoscopy risky, and it is common in patients with middle and lower facial thirds fractures. In the present case, the patient had a 3-point jaw fracture in the symphysis and the bilateral condyle regions. The last one makes up the temporomandibular joint [4].

Class II malocclusion, previous periodontal disease, mouth breathing patients, extensive restorations, tooth mobility, and tongue disorders are other factors of greater susceptibility to cause trauma. It correlates directly to the presenting case, showing a class II patient with a projection of the upper dental arch without dental pathologies [3].

Laryngoscopy with optical fiber comprises a video-guided maneuver that allows visualization of airway structures without requiring the patient's mouth opening. This method is used to intubate difficult airways on a large scale, especially in patients with facial and cervical trauma, when manipulating the oral cavity is not possible [7].

According to studies, dental trauma is often associated with single teeth, rarely occurring in adjacent teeth. Avulsion has the highest incidence, followed by fracture and dental dislocation. In contrast to the number of teeth involved, the reported case shows two dental elements involved in tooth avulsion and fracture [9,10].

Both in cases of blunt dental trauma involving the supporting tissues and fractures, there may be displacement of the dental elements. If the displacement occurs to the digestive tract, there will be no risk for the patient. However, presuming it affects the respiratory tract, complications such as glottis edema, infection, or death from asphyxiation require complementary exams to locate the missing dental element [5,10].

Bearing in mind that the reported case occurred in a hospital environment, we opted for an initial image exam with an orthopedic image intensifier. This test, called fluoroscopy, converts X-rays into visible light, which allows the visualization of internal structures in motion, captured on TV in real-time. The major disadvantage of fluoroscopy is two-dimensional images, which made it difficult to visualize the dental element.

Since there was no success with fluoroscopy, an upper gastrointestinal (UGI) endoscopy was requested. UGI is a video-guided examination to inspect and remove abnormalities in the gastrointestinal system, thus being characterized as a diagnostic and treatment test when necessary, widely used to remove foreign bodies in emergency hospitals and emergencies [5]. During endoscopy, the dental element was observed in the esophageal region.

After avulsion, dental elements can be reimplanted with splinting, as long as the tooth has a good condition. Criteria such as time and type of storage are indispensable for the success of dental reimplantation. A period of fewer than two hours and adequate storage, such as milk, are presented as important allies for the proper execution of the technique. The dental reimplant was not performed in the present case since there was no storage at the hospital unit or semi-rigid containment supplies such as composite resin [9,10].

Anatomical particularities of traumatized patients must be acknowledged so that it is possible to elaborate alternative methods to ensure maxillofacial management goes without complications. There are crucial points to consider in this prevention, such as preoperative evaluation, knowledge of dental anatomy, and oral cavity assessment [6,11].

CONCLUSION

Dentoalveolar traumas are inherent complications of tracheal intubation procedures. Anesthesiologists and maxillofacial surgeons must have adequate knowledge to choose the best approach and propose alternative methods when necessary.

Collaborators

TI ANDRADE, bibliographic research and article elaboration. KT PONTES, proofreading and text editing. FR ARAÚJO, selection and editing of images. JS ANDRADE, bibliographic research and article elaboration. JEP OLIVEIRA, final guidelines and corrections of the article.

REFERENCES

1. Stein KM, Aker J. A Review of dental anatomy and dental injury associated with anesthesia. AANA J. 2017;85(3):222-230.
2. Battistella CB, Machado FR, Juliano Y, Guimarães AS, Tanaka CE, Garbim CTS, et al. Intubação orotraqueal e disfunção

temporomandibular: estudo longitudinal controlado. Rev Bras Anestesiol. 2016;66(2):126-132. https://dx.doi.org/10.1016/j.bjan.2014.06.009

3. Gutiérrez JC, Merino S, de la Calle P, Perrino C, Represa M, Moral P. Correlation of preoperative findings in computed axial tomography with the presence of difficult airway in patients undergoing head and neck otorhinolaryngological surgery. Rev Esp Anestesiol Reanim (Engl Ed). 2018 May;65(5):252-257. http://dx.doi.org/10.1016/j.redar.2018.01.013
4. Barry RG, Wolbert TT, Gress TW, Ray PD, Mozaffari FB. Outcomes after open reduction with internal fixation of mandible fractures. J Craniofac Surg. 2018;29(5):1237-1240. http://dx.doi.org/10.1097/SCS.0000000000004551
5. Shiga T, Wajima Z, Inoue T, Sakamoto A. Predicting difficult intubation in apparently normal patients: a meta-analysis of bedside screening test performance. Anesthesiology. 2005;103(2):429-37. http://dx.doi.org/10.1097/00000542-200508000-00027
6. Bersot CDA, La Cava CFL, La Cava EN. Anestesia para cirurgia bucomaxilofacial e Odontologia: casos clínicos comentados. Rio de Janeiro: SAERJ; 2018.
7. Dagli R, Canturk M, Celik F, Erbesler ZA, Gurler M. O papel do video laringoscópio em programas de treinamento de intubação nasotraqueal. Rev Bras Anestesiol. 2018;68(5):447-454. https://dx.doi.org/10.1016/j.bjane.2018.02.004
8. Green SM, Roback MG. Is the mallampati score useful for emergency department airway management or procedural sedation? Ann Emerg Med. 2019;74(2):251-259. https://dx.doi.org/10.1016/j.annemergmed.2018.12.021
9. Nogueira EFC, Souza AL, Moraes BC, Vasconcellos RJH, Leite Segundo AV. Remoção de dente deslocado para o espaço submandibular: relato de caso. Rev Cir Traumatol Buco-Maxilo-Fac. 2019;19(3):35-38.
10. Sousa JMBR, Mourão JIB. Lesão dentária na anestesiologia. Rev Bras Anestesiol. 2015;65(6):511-518. https://dx.doi.org/10.1016/j.bjane.2013.04.011
11. Andrade RGAC, Lima BLS, Lopes DKOP, Filho ROC, Lima LC, Couceiro TCM. Dificuldade na laringoscopia e na intubação orotraqueal: estudo observacional. Rev Bras Anestesiol. 2018;68(2):168-173. http://dx.doi.org/10.1016/j.bjan.2017.10.009

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