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Transoral approach in facial penetrating trauma - importance of multidisciplinary management and nutritional support a case report

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ABSTRACT

The high incidence and prevalence of facial trauma makes it important to consider related injuries and possible complications that may arise as a result. Penetrating trauma to the face, although not common, requires a surgeon with knowledge of the anatomy and physiology of the injured area and injury patterns.

We present a case of penetrating trauma to the face that was caused by a blunt object (stake) resulting from the felling of a palm tree. We describe the transoral management that was performed and the multidisciplinary support that allowed optimal management of the injury without complications, including functional or aesthetic sequelae.

Experimental design, materials and methods

Introduction

Trauma is the leading cause of death for people under 40 years of age. Approximately 2 million facial traumas occur annually in the United States [1]; in addition, an increase in maxillofacial trauma has been seen, due to either traffic accidents or violence. [2]

The face fulfills several functions in humans such as breathing, feeding, vision, hearing and communication. The goal in facial trauma cases is to save the life of the patient, but the challenge is to restore most of these functions; therefore, a multidisciplinary team is required.

It is important to note that the initial management of these cases must be structured according to the ABCDE guidelines of the Committee on Trauma of the American College of Surgeons using the algorithm of Advanced Trauma Life Support (ATLS) that has already been instituted.

Compromised airways, acute bleeding, vision problems, and neurological injuries are the main problems that need to be ruled out during the primary review. [3]

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Case presentation

A 66-year-old male patient was transferred to the emergency room of our hospital 12 h after experiencing facial trauma while cutting down a Chonta palm tree (*Bactris gasipaes* Kunth). He presented with a penetrating injury to the face that was caused by a wooden projectile created when the tree fell. The palm tree is characterized by its strength, which is why it was used for spears or bows by Shuar tribes (Fig. 1A).

He was evaluated by the head and neck surgery physician in conjunction with general surgery. In the physical examination, we found the patient awake with spontaneous breathing, a blood pressure of 120/70, a heart rate of 85 beats per minute, no evidence of active bleeding or vomiting, and the patient did not lose consciousness. The initial management of the injury was performed according to the ATLS, which emphasizes airway, respiration, circulation, neurological status, and exposure. At the level of the left nasal wing, we saw a penetrating injury caused by a wood splinter that penetrated the oropharyngeal region through the hard palate and was directed laterally to the right side. (Fig. 2A–B). Once the patient was stabilized, a secondary review was carried out which did not find any associated lesions

A computerized axial tomography of the head with 3D reconstruction was performed, showing a foreign body measuring $13 \times 2 \times 1$ cm that entered the nasal wing on the left side and was directed caudally and laterally to the right, that resulted in a palate bone fracture and it penetrate the oropharynx and located to the right of the cervical spine at the level of C2-C3. (Figs. 3 and 4). As there was no evidence of vascular or brain injury, we decided to perform emergency surgery to remove the foreign body and performed surgical cleaning. A video laryngoscopy was performed in the operating room by the anesthesiologist, it showed edema of the uvula and pharynx that prevented visualization of the vocal cords. Therefore, a tracheostomy was performed while the patient was awake using local anesthesia. After the placement of the tracheostomy tube, anesthetic induction was started. (Fig. 5A).

The head and neck surgeon utilized a transoral approach to cut the foreign body in half with the aid of bone cutting forceps and then extracted both halves through the mouth. (Fig. 6A).

The foreign body was extracted with no evidence of vascular or nerve injury. (Fig. 7A) Transoral extraction of multiple perilesional wood fragments. We irrigated and washed the surgical area with 3000 ml saline solution, and we used a palatal mucosa suture with 3–0



Fig. 1. (A) Chonta palm (*Bactris gasipaes* Kunth).



Fig. 2. (A) Penetrating injury to the face (B) Foreign body passing through the hard palate into the oropharynx.

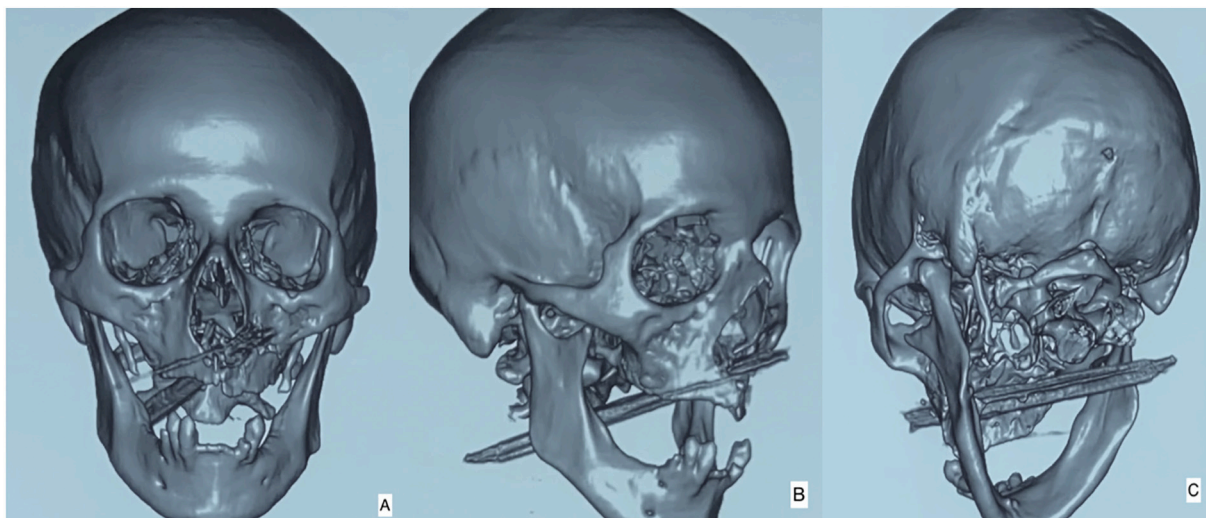


Fig. 3. (A) Computerized axial tomography with 3D reconstruction of the skull showing the trajectory of the contused object.

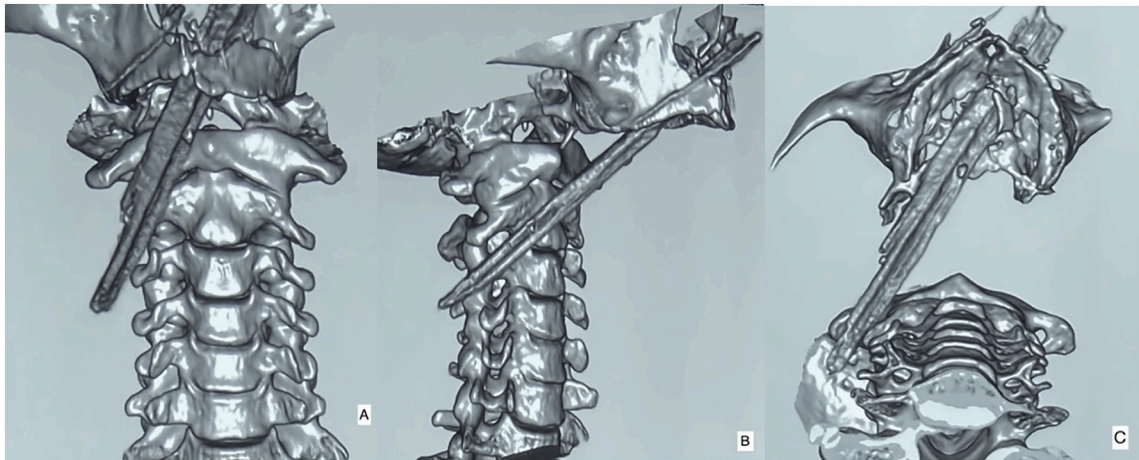


Fig. 4. (A) 3D reconstruction of cervical spine anterior view (B) right side view (C) bottom view.

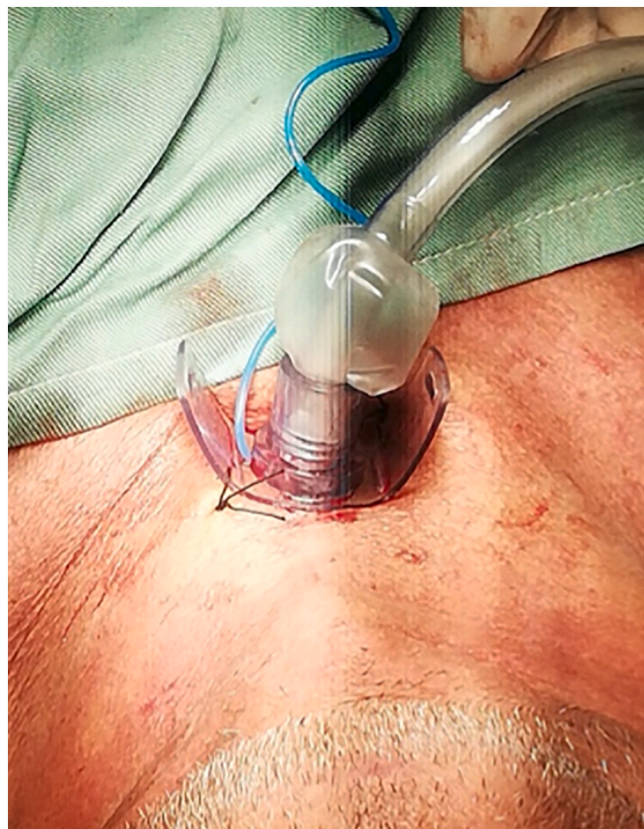


Fig. 5. (A) Performing tracheostomy.

polyglactin, a nasal mucosa suture with polyglactin 3–0 and a nasal wing reconstruction with 5–0 nylon. Due to the presence of a lesion involving the palate and an approximately 3 cm perforation of the pharynx, a jejunostomy tube was placed by the general surgeon to allow enteral feeding during hospitalization. During the postoperative period, we administered corticosteroids to reduce pharyngeal edema (Fig. 8A); in addition, we initiated antibiotic therapy for 7 days. During this time, enteral nutrition was administered by the jejunostomy tube.

The tracheostomy tube was removed on the fifth day. During his hospital stay, the patient was evaluated by psychology, maxillofacial surgery, otorhinolaryngology and respiratory physiotherapy and showed good progress.

Since good postoperative evolution and good tone of voice were observed and the laryngoscopy was normal, we decided to

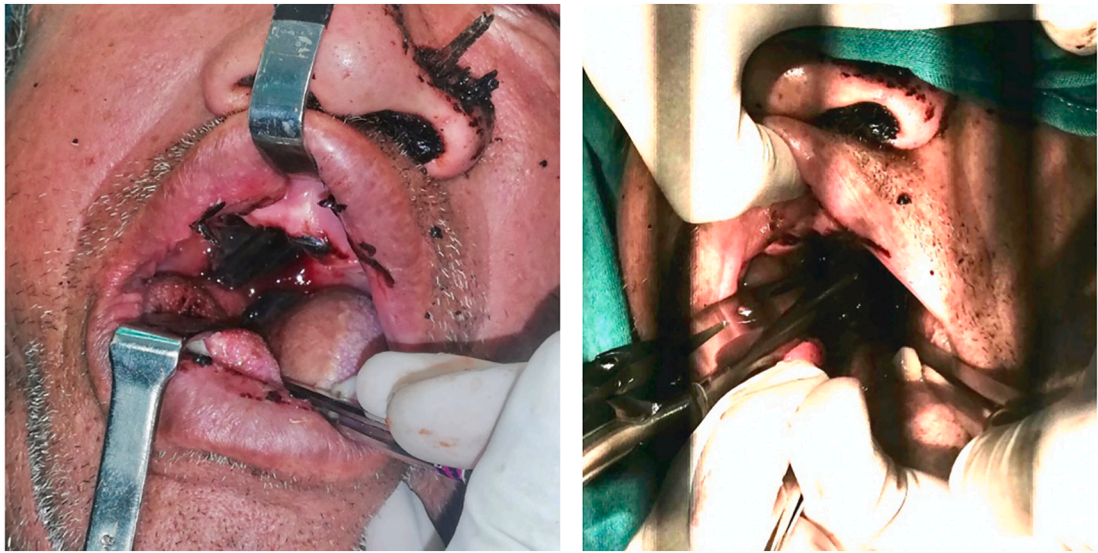


Fig. 6. (A) Foreign body section with Gouge.



Fig. 7. (A) Extracted foreign body.



Fig. 8. (A) Patient on the first postoperative day.

discharge the patient. After one month, the patient tolerated an oral diet, the jejunostomy tube was removed, and there were no postoperative complications.

Discussion

Trauma is the sixth leading cause of death worldwide, the leading cause of death in people over 45 years of age, and 25% of trauma injuries involve the face and are associated with low mortality rates. [4]

Facial injuries can be devastating functionally, aesthetically and psychologically, and cause great stress for the patients and their families. Management of these injuries should be multidisciplinary to make decisions and plan for surgery; it must always include a psychological evaluation that includes the family.

The initial management of facial trauma should be carried out in the prehospital setting, and it is essential to assess the need to secure the airway by tracheal intubation. [5,6] Bleeding can cause difficulty in the intubation process.

The injuries that can cause difficulty with intubation are 1) a maxillary fracture with posterior displacement, 2) loss of insertion of the tongue, 3) fragments that are the product of the trauma (teeth, soft tissue or bone) that obstruct the airway, 4) hemorrhage, 5) soft tissue edema and 6) trauma to the larynx or associated trachea [7]. In these cases, one of the most commonly used alternatives is a cricothyroidotomy that is later converted to a tracheostomy.

In the initial management of wounds with irrigation, there is no difference between saline solution or tap water [8].

Antibiotic prophylaxis has shown a decrease in the risk of infection in mandibular fractures, and studies are lacking to confirm other types of fractures [9].

Death due to hemorrhage is rare, and the main cause of death due to bleeding is obstruction of the airway. The use of angiography has been recommended for the diagnosis and treatment of bleeding vessels. CT angiography can be helpful in the diagnosis. [10]

It has been determined that patients with a mandibular fracture experience weight loss of 4–5% during their treatment; however, there is little literature about the management of nutritional status. The surgeon is responsible for preventing weight loss by deciding if it is necessary to place a jejunostomy tube or nasogastric tube for enteral nutrition depending on the type and length of injury recovery. [11]

The transoral approach is a procedure that is frequently used for the management of facial trauma because it allows access to the mandibular condyle, glands, tongue, approach to zygomatic fractures, and pharyngeal injuries, as in this case. There are multiple types of approaches to the face, which will depend on the affected area, fractured bones and affected sinuses. [12]

It is important that the multidisciplinary team considers that depending on the type and complexity of the trauma, that a

tracheostomy and an enteral nutrition route can be decisive in the initial and later management of face trauma.

Patients with facial trauma need continuous follow-up to assess complications and potential sequelae.

Ethics statement

Before writing this case report we explained the patient that we may publish some photos protecting patient's privacy, after patient allowed and signed an informed consent format, we proceed to take pictures.

CRediT authorship contribution statement

David A. Cardenas: Conceptualization, Writing - Original Draft **Cristian G. García:** Project administration **Alex P. Guachilema:** Writing - Review & Editing **José L. Moreno:** Investigation **Milton O. Sandoval:** Supervision **Dorian I. Villafuerte:** Writing - Review & Editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

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