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Case Report

Dentistry Section

An Interesting Case of Penetrating Craniofacial Trauma Involving a Wooden Stick

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ABSTRACT

Penetrating craniofacial trauma, although uncommon, has a high potential for death or catastrophic consequences from head injury or vital neurovascular injuries. The foreign body may cause significant challenge, especially when it is a large one. Airway obstruction, vascular injuries, intracranial communication, ocular injury and injuries to any other adjacent vital structures when involved may change the treatment objectives from simple foreign body retrieval to a comprehensive multidisciplinary approach to stabilize the patient. Retrieval of foreign bodies may be challenging because of many factors including the size of the object, its site, and the surrounding anatomical structures. Accurate localization of the foreign body before removal is essential in craniofacial region. We present a case of penetrating craniofacial trauma from a wooden stick, with an in situ foreign body, that was managed by emergency surgical exploration in general anaesthesia and retrieval of foreign body in Toto under antibiotic coverage and tetanus prophylaxis.

Keywords: Advanced trauma life support, Foreign body retrieval, Intracranial communication, Vital structures, Wooden stick

CASE REPORT

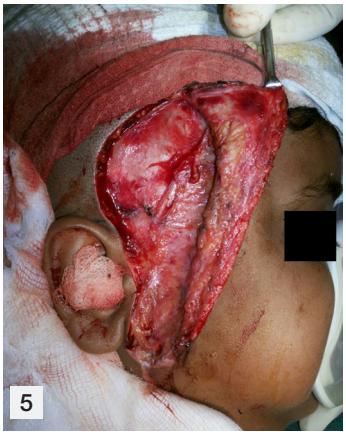
A 15-year-old boy reported to emergency department with history of fall from a tree onto a wooden fence and sustained a penetrating injury from a wooden piece [Table/Fig-1]. Patient was conscious and well oriented to time place and person. He reported after 30 minutes of the injury. He was given 1ml 0.5 mg tetanus vaccine. On presentation the patient was having pain over the injury site with foreign body in situ, his vitals were stable (pulse rate: 80/min, blood pressure: 120/80 mmHg). Thorough examination of the site of injury and facial nerve examination was done. There was no evidence of facial nerve injury. Computed tomography (CT) scan of neck and face was done to rule out injury to vascular structures and the extent of injury to Cranium in relation to foreign body. CT scan revealed that the foreign body was superficial to the investing layer of deep cervical fascia and all the major neurovascular structures were intact. The foreign body was visualized as linear hypo dense structure situated in the plane superficial to parotid fascia extending cranially superficial to temporal fascia [Table/Fig-2]. After identification of the retained foreign object [Table/Fig-3], surgical exploration and removal of the foreign body in Toto, precisely to prevent neurovascular damage under general anaesthesia was planned.

Preauricular incision was placed from the point of entry of the object, extending into temporal region, dissection was carried out in the subcutaneous plane just above superficial musculoaponeurotic system (SMAS). Flap was reflected in a uniform plane to completely expose the wooden piece [Table/Fig-4]. Foreign body was passively extracted and debridement was done to remove any debris [Table/Fig-5]. The local area was irrigated with antiseptic solution, and tissue approximation was completed in layers. The incision was closed with simple interrupted sutures [Table/Fig-6]. The retrieved foreign body was a bamboo stick which measured 11x2 cm [Table/Fig-7].

Patient with stood the procedure and there was no bleeding after the surgery. Patient was kept in intensive care unit (ICU) for monitoring vital signs and for haematoma. He had minimal haematoma at the site of injury on the first postoperative day, which was managed conservatively.

On the second postoperative day evaluation for facial nerve injury and parotid duct injury was done. Patient was discharged after one week of surgery. After two weeks patient was reviewed since he had a swelling in Preauricular region. There was minimal fluid collection which resolved in 2 days. Patient was under follow up for 6 months at regular intervals. Post recovery radiographs and CT scans were taken after one month to observe any signs of infections or undetected fractures. Wound healing was satisfactory and no signs of facial nerve paralysis and sialocele were found. In conclusion, this was a rare presentation of penetrating injury without injuring major neck vessels and facial nerve.

[Table/Fig-1]: Patient with penetrated Wooden Stick in the Emergency room. **[Table/Fig-2]:** Coronal CT section Showing the Foreign Body superficial to temporal bone and parotid fascia. **[Table/Fig-3]:** Cranial extension of the foreign body. **[Table/Fig-4]:** Flap raised for exploration of the site.



[Table/Fig-5]: Complete retrieval of the wooden stick in Toto.
[Table/Fig-6]: Wound closure and placement of glove drain.
[Table/Fig-7]: Retrieved foreign body measuring 11x 2 cm.

DISCUSSION

Penetrating trauma to the craniofacial region have been described as injuries caused by an object that penetrates hard or soft tissues and remain lodged within the body [1]. Penetrating craniofacial injuries can be high or low velocity injuries depending on the penetration speed of the foreign bodies [2]. Injuries resulting from wooden stick although uncommon can cause serious consequences like intracranial haematoma and are potentially fatal due to high risk of bacterial contamination [3,4]. Precise and timely exploration is required to avoid postoperative complications like facial nerve injury, sialocele formation, otitis media and meningitis [5]. Complete removal of foreign body is of utmost importance as retained wooden pieces can lead to life threatening disastrous outcomes [6-8].

Penetrating trauma is usually caused by long, thin and relatively hard objects. They more commonly occur in males compared to females and stick is found to be most common causative object in occurrence of penetrating injuries [9]. Evaluation of penetrating cervical and craniofacial trauma should follow protocols of advanced trauma life support (ATLS) with primary importance to assessment of airway, breathing and circulation [10]. These injuries may need immediate attention and timely surgical intervention to achieve good postoperative healing and prevention of infections, maintenance of intra cranial pressure and control bleeding from major blood vessels. The choice of therapeutic management in penetrating craniofacial trauma depends on whether it is emergency surgical intervention or non-surgical removal of the penetrating object, which requires recognition of the actual extent of the injury and anatomical relationship between the foreign body and the involved neurovascular structures. Wood is rarely detected on conventional radiography and is very difficult to detect on CT scans as it has a density very similar to that of intracranial and orbital soft tissue, especially after being present in an aqueous environment for 48 hours. Ultrasonography often may not detect wood in the orbital region, if it is dry and surrounded by air in the cavity. MRI scanning has been advocated when penetration by a wooden foreign body and its retention are suspected [11]. Although MRI scan suggested, due to patient's financial constraints it was not done. Consideration should be given to serial imaging in the event of a negative initial scan.

CT arteriogram is a very useful diagnostic tool in assessing vascular anatomy of the region, but in our case we didn't perform this investigation as we could feel pulsations of external carotid artery terminal branches distal to site of penetration and there was no history of bleeding externally and vitals were being monitored to assess the fall in blood pressure as in case of internal bleeding. With the conventional CT scan we could locate the plane of foreign body and it gave us picture of no collection in that particular plane. The economic condition of the patient was considered and it was decided to go for minimal investigation and close monitoring of vitals to identify any consequences of internal bleed. As the arteriogram is only an adjunctive tool, the patient was managed based on basic available investigations, clinical features and vitals. Maxillofacial surgeons attending to cases of penetrating craniofacial injuries in children sustained during playing should maintain a high index of suspicion for a retained wooden foreign body to prevent cutaneous draining fistula and life threatening complications. A retained wooden foreign body may remain asymptomatic for long, before presenting with a variety of complications.

In our case thorough debridement of the wound was done and was well irrigated to prevent retention of any foreign objects in the trauma site. In patients with penetrating wooden injuries immediate hospitalization, intensive parenteral antibiotics and tetanus prophylaxis is most important definitive therapy that include broad spectrum drugs since the risk of infection with gram-negative or resistant microorganisms is higher. A thorough history of trauma occurrence, meticulous examination, and frequent follow-up are also of utmost importance for uneventful healing of the injury.

CONCLUSION

A penetrating injury of the maxillofacial area can be quite challenging to asses and treat as the proximity of the structure to various vital structures like orbital contents, blood vessels, facial nerve, salivary glands, etc that can add to the difficulty in retrieval of the foreign body. Usually a team approach is required according to site and structure penetrated. A thorough pre-operative clinical and radiological assessment has to be done to avoid intraoperative complications. The treatment should aim in providing foreign body retrieval with minimal trauma to adjacent structures. Also, patient's postoperative evaluation of vision, hearing, facial nerve function, salivary duct patency etc., should be done according to the extent of penetration. A comprehensive care has to be provided so as to improve patients function and aesthetics.

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