Management of wooden foreign bodies in craniofacial region

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ABSTRACT

Even though variety of foreign bodies has been reported in a various locations in the craniofacial region, wooden foreign bodies are uncommon. Appropriate management of wooden foreign bodies is considered essential because of their infectious complications and difficulty in radiographic localization. Even though literature is replete with articles on management of foreign bodies in the craniofacial region, specific management of wooden foreign bodies are rarely reported. The purpose of this article is to report two cases of deeply placed wooden foreign body and a protocol for managing them in the maxillofacial region.

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Wooden foreign body (WFB) is uncommon, but it is imperative to manage them promptly. They occur due to road traffic accidents, explosions or bursts, gunshot injuries and therapeutic interventions in the craniofacial region. WFB removal is delayed in approximately one third of all cases because of the failure to localize them radiographically.¹ WFB is an excellent medium for microorganisms, and can lead to infectious complications if removal is not timely, because of its porous consistency and organic nature.²

This article reports two cases of deeply placed WFB and a protocol for managing them in the craniofacial region.

CASE REPORT 1

A 15-year-old boy presented with facial skin lacerations (1 cm × 1 cm) and a deeply penetrating injury in the left cheek. History revealed a fall from a tree over a pile of dry fire wood. The boy was taken immediately to the nearest hospital where a primary suturing was done with first aid and he was then referred to a tertiary care centre for further management. A CT was ordered in which a fire wood was evident and found to be lodged posterior to the maxillary tuberosity extending

superiorly to the pterygopalatine fossa (Figs. 1 and 2). The tip was found to rest in the body of the sphenoid bone (Fig. 1). Because of the proximity of the foreign body to vital neurological structures a complete neurological examination was performed however this showed no abnormal findings. Surgical access to the foreign body in the pterygopalatine fossa was achieved by a mandibular lateral swing osteotomy. On removal the wooden FB measured approximately 5 cm.

CASE REPORT 2

A 35-year-old male presented with facial abrasion and bleeding nose with a wooden object engaged in the left infraorbital region. He suffered an RTA where on impact with a wooden Christian cross hung around the rear view mirror of his car resulted in a portion of the object lodged deeply in bone. Primary care was provided and orbital and neurological examination revealed no abnormality. A CT was ordered to localize the FB. In axial sections the FB was seen to penetrate the antero-lateral wall of the maxilla extending into the maxillary sinus and proceeding to fracture the floor of the orbit (Fig. 3). The surgical

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Fig. 1 Coronal CT showing the extension of the material into the pterygopalatine fossa superiorly into the sphenoid sinus.

retrieval of the FB was performed through the laceration injury. The retrieved FB measured 6 cm $\times$ 1 cm (**Fig. 4**).

DISCUSSION

A wide variety of locations of wooden foreign bodies is reported depending on the type of trauma. Surgical removal of WFB is important because it may serve as unrecognized foci of infection. Wood, with its porous consistency and organic nature, is an excellent medium for microorganisms, and the retained wooden foreign matter may result in cellulitis, abscess, or fistula formation.³ Initial evaluation of patients with skin puncture wounds should be completed with a high suspicion for a foreign body. Patients also present for evaluation several months or even years after the initial injury, and consequently, clinical evaluation may fail to elicit a history of antecedent skin puncture.

The accurate localization is essential, in particular when the foreign body is in a critical location, it may be located in an air-filled cavity such as the maxillary sinus, in soft tissue such as the tongue or between bone and muscle.

Diagnosis and localization of the foreign body are based on the patient's history, clinical examination and imaging. Superficial foreign bodies are usually easy to remove if seen. However, penetrating foreign bodies are more difficult to remove.

Imaging for localization of foreign bodies can be performed using plain, computed tomography (CT), magnetic

Fig. 2 Surgical retrieval of the WFB from the pterygopalatine fossa after a mandibulotomy.

resonance imaging (MRI) and ultrasound based on the type of FB.

Aras et al in his study Comparing the sensitivity for detecting foreign bodies among conventional plain

Fig. 3 Axial CT showing a hypodense material in the maxillary sinus.

Fig. 4 Retrieved wooden FB.

radiography, computed tomography and ultrasonography reported that wood is completely invisible in plain radiography, CT is a valuable tool only when WFB is in air filled cavities like the paranasal sinuses or muscle and soft tissue.⁴

USG would prove useful in cases if WFB is superficial located in soft tissue and muscle and bony interfaces. It is however difficult to localize objects in air filled cavities or deeper tissue planes.^{4,5}

Although the usefulness of magnetic resonance imaging (MRI) to locate WFB in soft tissue has been reported in literature, MRI cannot be used as the first diagnostic tool because artefacts related to foreign body composition hinder the clear demonstration.¹

Other factors to consider would be the physical density and structure of wood. When wood is green and freshly cut, its density is relatively high because of its high water content. This presents with difficulty in distinguishing it from soft tissues on CT and MR images.

Extremely dry wood, especially soft varieties like balsa, is nearly all gas by volume and has CT attenuation close to that of air making localization difficult.⁴ However dry wood if retained for more than a period of 1 week will absorb sufficient moisture to appear radiodense.²

Dry wood has a low attenuation value in the acute state and may mimic air bubbles. However, in time the wood will absorb water from the surrounding with an obvious increase in radiodensity.²

Thus of all the imaging modalities in disposal to a craniofacial surgeon CT remains the less expensive and more readily available and faster to localize a WFB.⁴

Owing to the propensity of wooden FB to cause infections it is required to remove them early. Superficial located foreign body in the craniofacial region is amenable to removal under local anaesthesia. However deeper WFB is

preferentially removed under GA. Surgical access to the WFB can be achieved through the existing skin laceration (case-1) or in deeply placed inaccessible sites by access osteotomies (case-2). Mandibulotomy with a paramedian osteotomy between the canine and the first premolar provides access to the pterygopalatine and the parapharyngeal spaces subsequent to lateral swinging.

After retrieval of the foreign body the wound management would include control of bleeding and copious irrigation with saline solution and closure in different planes.⁶

Selection of the antibiotics as prophylaxis for the surgical retrieval will depend on its location and communications with oral cavity, nasal cavity and proximity to the meninges. Foreign bodies in orbit generally have higher morbidity than other sites, requiring more aggressive medical management.

In conclusion the management of WFB will have to consider factors like

1. Accurate localization
2. Type & duration of the retention of wood
3. Surgical access
4. Wound management.

CONFLICTS OF INTEREST

All authors have none to declare.

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