



Case Report

## A Rare Case of Retained Intracranial Foreign Body

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### ABSTRACT

#### Introduction

Low-velocity foreign bodies lodged intracranially pose several management dilemmas related to the nature, size, shape, chemical composition, and location of the object. Most of the information on retained intracranial foreign bodies is from reports of penetrating injuries from war wounds or civilian high-speed missiles. The management of penetrating head injury with retained intracranial wooden foreign body and its management are briefly reviewed in this report.

#### Presentation of Case

A 15 year old female presented with a discharging sinus over right cheek since three days and left sided hemiplegia and right ptosis following an alleged history of fall from tree three weeks back. Computerised Tomography (CT) scan head revealed a hypodensity extending below right zygomatic arch reaching up to middle cranial fossa with cortical break in temporal bone on right side suggestive of foreign body. Exploration of the wound converted into right temporal craniotomy was done and a wooden piece was removed. Postoperative period was uneventful and patient was discharged after ten days.

#### Conclusion

Penetrating head injuries in children constitute only a small part of the total number of traumatic head injuries and those with retained intracranial foreign body is even rare. Our case presented three weeks after the fall and reveals the diagnostic and therapeutic challenges and stresses the importance of high degree of suspicion to diagnose retained intracranial foreign bodies and the need for early surgical exploration, to avoid chronic and potentially life threatening neurological complications.

**Keywords:** Penetrating head injury, Retained intracranial foreign body, Paediatric head injury.

### INTRODUCTION

According to the World Health Organization, 5.8 million people died worldwide in 2000 due to injuries from accidents and traumatic brain injury is one of the most common causes of morbidity and mortality in developing countries. <sup>(1,2)</sup>

Penetrating head injuries in children constitute only a small part of the total number of traumatic head injuries seen in the casualty. Apart from gunshot and pellet injuries there are a number of other articles that have been described to cause penetrating injuries. Low-velocity foreign

bodies lodged intracranially pose several management dilemmas related to the nature, size, shape, chemical composition, and location of the object. Most of the information on retained intracranial foreign bodies is from reports of penetrating injuries from war wounds or civilian high-speed missiles. The management of penetrating head injury with retained intracranial wooden foreign body and its management are briefly reviewed in this report.

### CASE PRESENTATION

A 15 year old female presented with a discharging sinus over right cheek (Fig. 1) since three days and left sided hemiplegia and right ptosis (Fig.2) since two weeks. On detailed enquiry an alleged history of fall from tree with trauma to the cheek three weeks back was confirmed. Patient also gave history of loss of consciousness for about ten minutes with one episode of seizure after the fall. She was taken to a local doctor and was admitted. But as her condition did not improve she was referred to us for further management. On examination she was conscious and had moderate fever with tachycardia. She also had left sided hemiplegia with right sided ptosis, dilated non reacting right pupil and absent extraocular movements on right side. Seropurulent discharge was noted from the right cheek. CT scan of head (Fig. 3) revealed a hypodensity, extending below right zygomatic arch reaching up to middle cranial fossa with cortical break in temporal bone on right side most likely to be foreign body. Exploration of the wound converted into right temporal craniotomy was performed and a wooden piece of approximately 5 cm x 2 cm was found embedded in the temporal lobe (Fig.4) and touching the cavernous sinus. The wooden piece was cleared from the surrounding parenchyma, debridement was done followed by a thorough wash. Incision was

closed on a negative suction drain. Postoperative period was uneventful. Patient was discharged after ten days and followed up on outpatient basis.



Fig. 1: Discharging sinus over right cheek.



Fig. 2: Ptosis of right eye.

### DISCUSSION

The bony cranium protects the brain from injury caused by low-velocity domestic foreign bodies. Because their kinetic energy is low, such foreign bodies usually gain access to the cranial cavity through areas of naturally occurring communication such as the open cranial sutures of infants (4,5,8,9,16,18) or if the bony wall of the cranium is thin as in the temporal and occipital region. (13-15) The management of a low-velocity penetrating cranial injury by a wooden piece

and its retention in the parenchyma is

described in the above case.

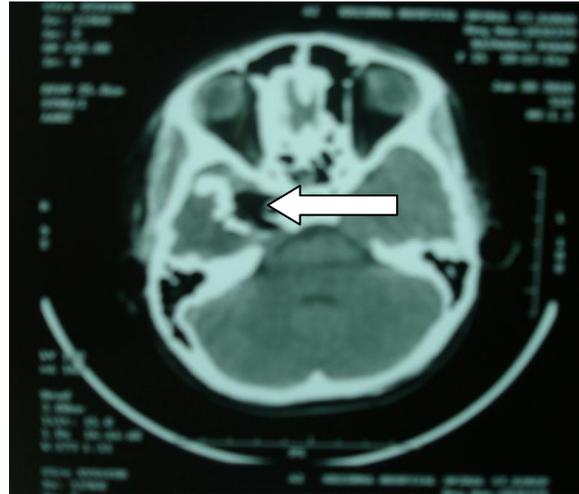


Fig. 3: CT scan image showing hypodensity, extending below right zygomatic arch reaching up to middle cranial fossa with cortical break in temporal bone on right side suggesting presence of foreign body (shown by the arrow mark).

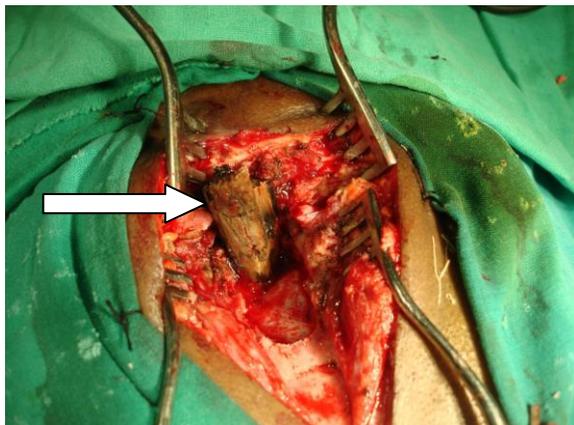


Fig.4: Intraoperative image showing the wooden foreign body (shown by the arrow mark) in the temporal region.



Fig.5: Image of excised wooden foreign body of approximately 5 cm x 2 cm.

The management of retained foreign bodies is controversial. Most of the information available on this subject comes from reports of penetrating injuries from war wounds or civilian high-velocity projectiles. (3,12) In studies of war injuries, Cushing cautioned against the potential danger of aggressively removing a foreign body in patients with penetrating injuries. (11) Cushing's conservative approach has been supported by studies from more recent armed conflicts on penetrating high-velocity missiles injuries. (10) On the basis of these studies, thorough debridement of the superficial wound tract without aggressive removal of a deeply located retained foreign body has been advocated.

The case described here posed a management dilemma because of its profound differences from penetrating wounds caused by high-speed velocity war or civilian missiles. The heat generated by a high-velocity bullet passing through tissues is thought to have a bactericidal effect that prevents or at least reduces the chances of contamination. In contrast, the foreign body that injured our patient was relatively low velocity and was contaminated by dirt.

These factors increased the risk of infection without proper cleansing. Other important considerations were the size of the foreign body involved, the seropurulent discharge through the right cheek and the neurological deficits the patient presented with. Consequently, the danger of developing meningitis or eventual death was present.

Chemical composition, shape, and location of the object are other factors worth considering when treating a patient with an intracranial foreign body retained from a domestic or work-related injury. Some metallic objects may dissolve over time and release potentially toxic substances. <sup>(17,19)</sup> The removal of a complex, irregularly shaped foreign body is challenging because the surface of the object must be dissected from the surrounding brain tissue with care to avoid further trauma during extrication. In some cases, the presence of surrounding hematoma facilitates extrication by providing a soft cushion between the foreign body and the surrounding brain. When a sharp foreign body causes a penetrating injury, cerebral angiography is necessary to rule out the possibility of vessel damage with pseudoaneurysm formation or the presence of an arteriovenous fistula. <sup>(6)</sup> Our patient had no such injuries.

Small and deep-seated foreign bodies can be difficult to localize. In the past, frame-based stereotactic localization <sup>(20)</sup> or even a magnet <sup>(7)</sup> had been used to localize objects. The availability of frameless image-based systems has facilitated these efforts. These systems are invaluable in the case of intraparenchymal foreign bodies that do not reach the surface of the brain.

In our patient, the wooden foreign body, which had entered the cranial cavity through the right temporal region, was traversing the basitemporal bone and temporal lobe, touching the right cavernous sinus. Thorough debridement was done and

closure was done over a negative suction drain after a thorough wash.

## CONCLUSION

Penetrating head injuries in children is a very serious injury that may lead to irreversible brain damage and death. Our case presented with a retained intracranial wooden foreign body three weeks after the injury which is a very rare presentation. This reveals the diagnostic and therapeutic challenges and stresses the importance of high degree of suspicion to diagnose retained intracranial foreign bodies and the need for early surgical exploration. This can help avoid chronic and potentially life threatening neurological complications.

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*Consent:* Written informed consent was obtained from the patient's parents for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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