



Exploring a Low Velocity Foreign Body in Brain---is CT Scan Always Necessary?

KEYWORDS

penetrating head injury, industrial accidents, low velocity injury. High velocity missile injury.

Dr Rohan P Patil

Senior resident, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr M N Ghatge

Professor, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr V V Gaikwad

Associate professor, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr. A S Joshi

Associate professor, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr A D Chougale

Professor, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr R M Kulkarni

Professor & HOD, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

Dr Sheetal Murchite

Associate professor, Department of Surgery, D Y Patil Hospital and Research center, D Y Patil University, Kolhapur.

ABSTRACT

Penetrating head injury is a life-threatening condition. Penetrating head injuries with impacted object are rare and in occipital region are rarer. The mechanism of low velocity injury is different from high velocity missile injury. Most cases result from industrial accidents, criminal assault & self-inflicted injury (1-4). It is difficult to investigate & manage patients with impacted insitu objects, and if the anticipated problems are not managed properly, they may give rise to serious complications. This case was diagnosed by simple investigation like X-RAY skull, prompt Neurological evaluation & immediate surgical exploration which resulted in complete recovery.

Introduction:

Brain can be perforated by almost every hard object (5). Incidence of low-velocity penetrating head injury cases in India and other under developing countries is common particularly in rural areas due to criminal assault, industrial assault & self inflicted wound (1-4). The patients with the impacted foreign bodies rarely reach for surgery. It is difficult to investigate & operate patients with impacted foreign body. If the impacted object is not removed carefully, it can cause further damage to the cerebral tissue or may lead to vascular injury. Injuries by low velocity objects are largely restricted to the wound tract unlike missile injury. MRI cannot be done in metal objects due to possible movement in response to magnetic torque(6). CT-scan also cannot be done because of star burst effect caused by metals(7). Early recognition, surgery, and judicious antibiotic with anticonvulsants give good results in the management of penetrating wounds of head.

Case report:

A 19 year old male manual worker with history of fall from 8 feet on occipital region came to the casualty with a nail in the occipital region. He had no neurodeficit, no signs of raised intracranial tension. An X-Ray was done which revealed nail penetrating the inner table of the vault. An occipital craniotomy was done and the nail was excised. Haemostasis was achieved with bipolar cautery and dura closed. The patient had no neurodeficit and recovered well. The patient came for follow-up after 7 days; he had no complaints after which the patient lost follow-up.



Fig 1: frontal view.



Fig 2: lateral view.



Fig 3 : Pre-operative photo of the impacted nail.



Fig 4 : Intra-operative photo after nail being excised.

Discussion:

Transcranial penetrating wounds are common at industrial

sites due to automatic machines used these days and criminal assaults with sharp objects and strict norms for firearms in India. The method of killing a person by driving nails into the brain can be found in the Holy Bible, where it is described in the Book of Judges(8). Pilcher observed that transcranial penetrating wounds have been caused by a variety of objects commonest being the knife blade(5). Others include ceramic stones(9), iron rod(10), nails(11), wood(12). Penetrating head injuries are uncommon in children but is potentially life threatening. They are usually seen in adults. The incidence of septic complication in children is significantly higher than that seen in adults(13). At low velocity (i.e., below 300 m/sec) injury results from direct disruption and laceration of tissues. Immediate radiological examination is mandatory because it suggests the depth & size of the penetrating foreign body and associated intracranial injury. Plain radiograph of the skull is useful to delineate the depth and direction of penetration(14). It quickly reveals the presence of slot fracture beneath a scalp laceration(8). It may be difficult to interpret CT scan due to the presence of metal artifact which causes star burst effect. If a patient has a relatively superficial impacted object *in situ* & is neurologically intact and without a demonstrable intracranial lesion on plain radiographs and , the risk of vascular injury is low(15). The object could be removed under general anesthesia in the operation theatre. The patient is then observed for neurological deterioration. We made a burr hole around the nail and then nibbled the bone towards the direction of the nail. The object should always be withdrawn in a direct reverse path of trajectory(16).

CONCLUSION:

Low-velocity penetrating head injury injuries in developing countries like India are not uncommon and are usually seen in rural setup and mainly because of industrial accidents, criminal assault or self inflicted injury. Minimally X-ray skull should be done as it is cost effective.

MRI can be dangerous in cases of retained ferromagnetic objects due to possible movement in response to the magnetic torque. The object should be always withdrawn in a reverse path of trajectory.

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