An Unusual Case of Transorbital Penetrating Brain Injury due to Fall on Branch of a Tree

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Abstract

Penetrating injury of the skull and brain are relatively uncommon wounds, representing about 0.4% of all head injuries. The orbit is an easy path for low velocity foreign bodies into the cranium. Severity of the injury may be masked by superficial wounds and lack of a primary neurological deficit. Here, we present an unusual and a dramatic case wherein a patient was brought to the hospital with a branch of a tree penetrating into the left orbit. We also highlight the usage of 3D reconstruction computed tomography for nonradiopaque objects such as, wooden stick, thus, obviating the need for routine magnetic resonance imaging in these cases. The patient was successfully operated on at the institute and the patient had postoperatively preserved vision and eye movements.

Keywords

- penetrating brain injury
- transorbital
- posttraumatic epilepsy

Introduction

Penetrating brain injury (PBI) are traumatic brain injuries which, though less prevalent than closed head trauma, PBI carries a worse prognosis.[1,2] Penetrating head injuries can be the result of numerous intentional or unintentional events, including missile wounds, stab wounds, and motor vehicle or occupational accidents (nails and screwdrivers).[3]

Craniocerebral injuries because of the objects penetrating the orbit are rare.[4] Here, we present an unusual case of transorbital intracranial penetrating head injury because of fall from height over a branch of a tree. The patient was successfully managed with the patient having postoperative preserved vision.

Case Report

A 20-year-old patient with a history of fall from the tree, presented to the emergency department in an unconscious state with a tree twig penetrating the eye (►**Figs. 1** and **2**).

An emergency computed tomography (CT) scan revealed the twig penetrating the orbit and entering the frontal lobe on left side. A 3D reconstruction (►**Figs. 3** and **4**) was performed which clearly demarcated the trajectory, obviating the need for a magnetic resonance imaging (MRI).

The patient was immediately shifted to the operating room (< 2 hours posttrauma). A fronto-orbital craniotomy was the performed, and the wooden stick delivered out under vision. Dural repair and plugging of the mucosal air sinus was done to avert any future cerebrospinal fluid (CSF) leak. The orbital muscles were repaired. Patient was electively ventilated for a day and was given prophylactic antiepileptic, antibiotic, and antifungal therapy.

Patient gradually improved and regained full consciousness without any visual defect. However, the patient had mild left-sided drooping of the eyelid seen on close inspection, but the patient could open and close the eyes.

Antiepileptic drugs were discontinued after 1 week, and the patient was discharged.

However, 3 months postoperatively, the patient had an episode of seizure necessitating the reinstitution of antiepileptic drugs.

The patient is now in his 10th month of follow-up without recurrence of seizures or other neurological deficits.

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Fig. 1 Clinical photograph showing the patient with a branch of tree penetrating the skull through the left eye.

Fig. 2 Clinical photograph after cutting the branches revealing the twig penetrating the eye.

Discussion

Penetrating injury of the skull and brain are relatively uncommon wounds, representing about 0.4% of all head injuries. [5] Penetrating head injuries caused by foreign bodies other than bullet and shrapnel are extremely unusual. The most common is because of knife injury, although bizarre craniocerebral perforating injuries have been reported, for example, those caused by nails, metal poles, ice picks, keys, pencils, chopsticks, and power drills.[6]

Low velocity injuries differ from gunshot and missile injuries in that they do not cause concentric zones of cavitations and necrosis. Instead, the damage is predominantly restricted to hemorrhagic infarction in the line of the wound track.[7] They are also very unlikely to have contrecoup injuries and diffuse axonal injury. Thus, in the absence of damage to vital centers and large vessels, the prognosis is usually favorable and this increases the importance of early treatment in these cases to avoid delayed vascular, infectious, and epileptic complications.[3]

The orbit forms an easy path for low-velocity foreign bodies into the intracranial space. Often the severity of the injury is masked by unobtrusive superficial wounds and lack of a primary neurological deficit.[8]

Early diagnosis with CT to assess the degree of transorbital and transcranial penetration is warranted. MRI is generally not recommended for use in the acute management of PBI, as it is time consuming and can be potentially dangerous when there are retained ferromagnetic objects because of possible movement of the object in response to the magnetic torque. However, MRI can be a useful neuroradiological modality, if the PBI is caused by a wooden object.[2] Plain CT scans may not pick up organic objects hence a CT reconstruction may often be helpful to locate the trajectory. As the complete trajectory of the wooden object was charted using 3D CT in our case, this obviated the need for an MRI.

Surgical treatment should be performed within 12 hours of the injury to decrease the risk of infectious complications.[9] Surgical incision should be done in such a fashion so as to incorporate (if possible) the area that needs debridement and vascular supply of the flap. When the trajectory of the missile violates an open air sinus, a watertight closure of the dura should be done as the literature suggests that it may decrease the risk of abscess formation and CSF fistulas.[1,2]

Our patient was treated postoperatively with prophylactic antibiotic and antifungal therapy in view of contaminated wooden object. Early surgery (within 3 hours), and postoperative antibiotics and antifungal treatment led to an uneventful recovery in our patient.

The risk of postoperative seizure is as high as 30 to 50%, of which 10% appear in first week of trauma.[10] The antiepileptic was discontinued after 1 week, but patient developed seizure 3 months postoperatively, emphasizing that many of these patients may develop delayed onset seizures requiring caution, close monitoring, and follow-up.

Fig. 3 Computed tomography with three-dimensional reconstruction showing the passage of the wooden twig.

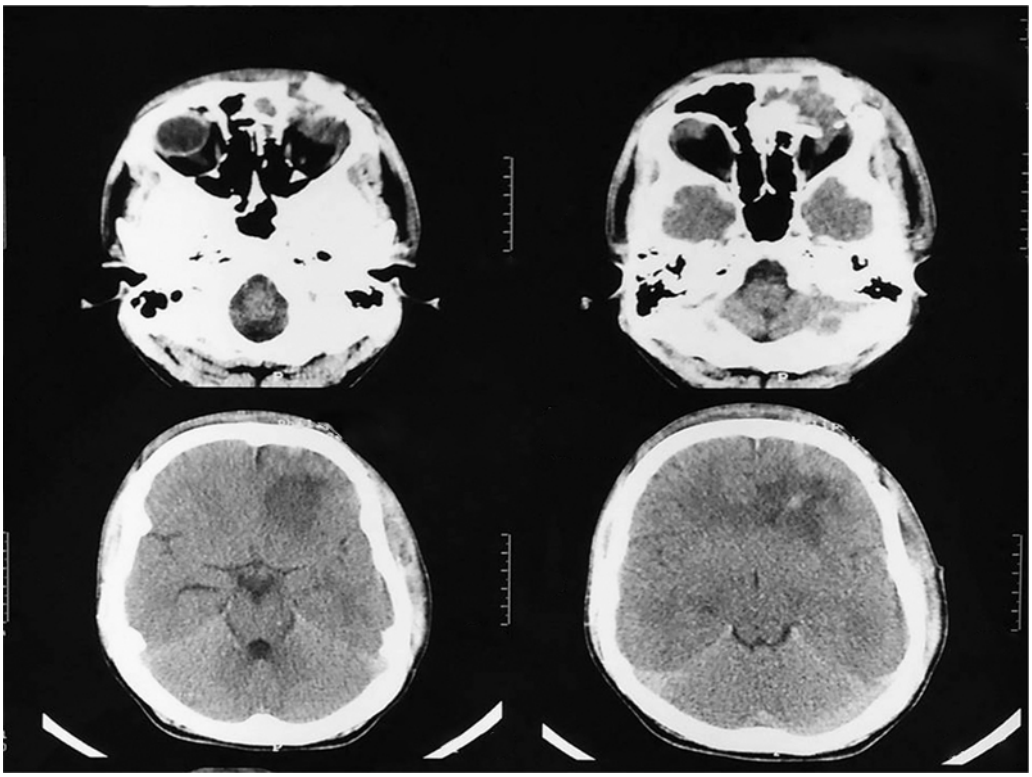

Fig. 4 Plain computed tomographic head demonstrating oedema around the penetrating object. Note, however, that the organic object trajectory cannot be well delineated.

Conclusion

Transorbital transcranial wooden penetrating injuries are rare. We present an unusual case where a wooden twig penetrated the brain through the transorbital route. This case emphasizes the role of early CT with 3D reconstruction, surgical treatment followed by antibiotics and antifungal therapy. This case also highlights the increased incidence of delayed posttraumatic epilepsy requiring long-term antiepileptic drug therapy.

Conflict of Interest
The authors have nothing to declare.

References

1 Esposito DP, Walker JP. Contemporary management of penetrating brain injury. Neurosurg Q 2009;19:249–254
2 Syed Faraz Kazim, Muhammad Shahzad Shamim, Muhammad Zubair Tahir, Syed Ather Enam, Shahan Waheed. Management of penetrating brain injury. J Emerg Trauma Shock 2011;4(3):395–402
3 Tanweer Karim, Margaret Topno. An unusual case of penetrating head injury in a child. J Emerg Trauma Shock 2010;3(2): 197–198
4 Di Roio C, Jourdan C, Mottolese C, Convert J, Artru F. Craniocerebral injury resulting from transorbital stick penetration in children. Child Nerv Syst 2000;16(8):503–506
5 Wellingson Silva Paiva, Monaco Bernardo, Prudente Marcelo, et al. Surgical treatment of a transorbital penetrating brain injury. Clin Ophthalmol 2010;4:1103–1105
6 Pascual JM, Navas M, Carrasco R. Penetrating ballistic- like frontal brain injury caused by a metallic rod. Acta Nurochirurgica 2009; 151:689–691
7 Domingo Z, Peter JC, de Villiers JC. Low-velocity penetrating craniocerebral injury in childhood. Pedia Neurosurg 1994; 21:45–49
8 Smely C, Orszagh M. Intracranial transorbital injury by a wooden foreign body: re-evaluation of CT and MRI findings. Br J Neurosurg 1999;13(2):206–211
9 Helling TS, McNabney WK, Whittaker CK, Schultz CC, Watkins M. The role of early surgical intervention in civilian gunshot wounds to the head. J Trauma 1992;32:398–400
10 Salazar AM, Jabbari B, Vance SC, Grafman J, Amin D, Dillon JD. Epilepsy after penetrating head injury, I. Clinical correlates: a report of the Vietnam Head Injury Study. Neurology 1985; 35:1406–1414