CASE REPORT

Scissor-Induced Penetrating Brain Injury in a Child: A Case Report

Surendran CM[a], Abu Hassan AF[a]

[a]Hospital Sultanah Bahiyah, KM 6, Jalan Langgar, Bandar Alor Setar, Kedah, Malaysia

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Corresponding Author
Dr Clara Meerashini A/P Surendran
Hospital Sultanah Bahiyah, KM 6, Jalan Langgar, Bandar Alor Setar, Kedah.
E-mail: clarameerashini@hotmail.com

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ABSTRACT

Penetrating brain injury (PBI) is a rare but severe form of traumatic brain injury, especially when caused by non-missile, low-velocity objects. We report a case involving a 12-year-old boy who sustained a penetrating frontal brain injury after falling with a scissor in hand during a school activity. The scissor penetrated the right orbital roof and entered the anterior cranial fossa, injuring the right frontal lobe and causing an intraparenchymal hematoma. Computed tomography (CT) confirmed the trajectory and extent of injury. The patient underwent emergency craniotomy and foreign body removal. Postoperatively, he recovered without neurological deficits, cerebrospinal fluid (CSF) leakage, or recurrent seizures. This case highlights the importance of timely imaging, careful surgical planning, and adherence to management principles to optimize outcomes in pediatric PBI.

INTRODUCTION

Penetrating brain injuries (PBIs) caused by foreign bodies are uncommon and carry a high risk of complications including vascular injury, seizures, intracranial infections, and CSF leakage. PBIs may be categorized as missile injuries (e.g., gunshot wounds) or non-missile injuries caused by sharp objects such as knives, scissors, or sticks. The removal of the penetrating object should only be performed under controlled surgical conditions. Preoperative planning, including the use of a similar object for trajectory estimation, may aid surgical precision. Stabilization of the object in situ is crucial to prevent further parenchymal damage during transport or imaging. Invasive injuries can result in hematomas, neurological deficits, or life-threatening infections if not promptly and appropriately managed.

CASE REPORT

History and Presentation

A 12-year-old boy with no prior medical history presented to the emergency department at Hospital Sultanah Bahiyah, Kedah, after a scissors-related injury during a school activity. While engaged in a craft task, he tripped and fell, causing the scissor to impale his right forehead just below the eyebrow. On initial evaluation, he was alert with a Glasgow Coma Scale (GCS) of 15/15. A 10 mm laceration was noted, with the scissor partially embedded. He exhibited no visual disturbances, had full extraocular movements, and both pupils were 3 mm and reactive. No other injuries were observed. While awaiting imaging, the patient experienced a generalized tonic-clonic seizure. He was treated with intravenous diazepam and subsequently intubated for airway protection.

Imaging and Diagnosis

A skull X-ray confirmed intracranial penetration. Non-contrast CT scan revealed a metallic foreign body traversing the right supraorbital bone into the anterior cranial fossa, with associated right frontal intraparenchymal hematoma (~2.0 × 1.0 cm). No midline shift or cerebral edema was noted. The patient was initiated on empirical intravenous antibiotics (ceftriaxone and metronidazole) for central nervous system (CNS) infection prophylaxis. Surgical intervention was planned.

Surgical Management

An urgent right craniotomy was performed under general anesthesia. The patient was positioned supine, and an extended hemicoronal incision was made posterior to the hairline for optimal exposure. A 1.0 cm craniotomy was created above the frontal sinus. The scissor, extending

into the frontal lobe, was gently removed in a controlled fashion to minimize parenchymal trauma. The wound and hematoma site were irrigated, debrided, and hemostasis achieved. Dural tears were repaired, and the scalp was closed in layers. The patient was transferred to the intensive care unit for postoperative care.

Postoperative Course

A repeat CT on postoperative Day 1 showed no new hemorrhage or midline shift. The patient was extubated uneventfully and remained neurologically intact. He was continued on antibiotics for six weeks and received intravenous phenytoin for seizure prophylaxis. The patient made a full recovery and was discharged after two weeks without neurological deficits or signs of infection.

DISCUSSION

Penetrating injuries to the brain are rare, particularly those involving low-velocity objects in pediatric populations. Compared to closed head injuries, PBIs are associated with increased morbidity and mortality. Despite general principles for PBI management, each case necessitates individualized surgical planning. CT scanning remains the cornerstone in evaluating the extent of bone and parenchymal injury. If vascular injury is suspected, CT angiography is warranted to assess traumatic aneurysms or vessel disruption. Immediate removal of the foreign object should be avoided unless absolutely necessary, as abrupt extraction may exacerbate brain injury or hemorrhage. Surgical goals include controlled extraction of the foreign body, removal of necrotic tissue and debris, evacuation of hematoma, achieving hemostasis, and ensuring watertight dural closure to prevent CSF leakage. Retained bone fragments and debris increase the risk of intracranial abscess, which typically manifests within a month. In our case, skull X-ray (Figure 1) and CT imaging (Figure 2) provided crucial details regarding the trajectory and extent of penetration. The CT scan clearly delineated the metallic foreign body passing through the right frontal bone into the anterior cranial fossa, with associated right frontal hematoma.

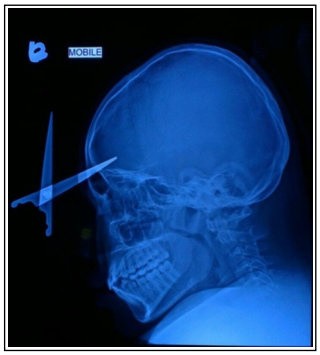

Figure 1: Lateral skull X-ray showing the scissor penetrating through the right orbital roof into the anterior cranial fossa

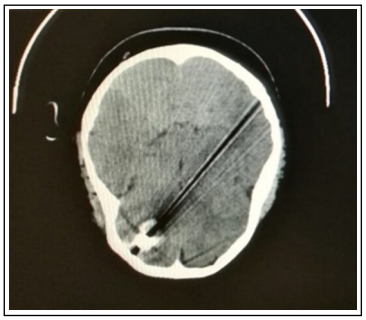

Figure 2: Axial non-contrast CT scan showing the metallic foreign body traversing the right frontal bone with associated intraparenchymal hematoma.

The surgical intervention was carefully planned, and an extended hemicoronal incision was used for optimal exposure (Figure 3). Early administration of prophylactic antibiotics is essential to reduce the risk of infection. Our patient was treated with six weeks of antibiotics due to the uncertain sterility of the scissor. Seizures are a common complication in PBIs, and the use of prophylactic antiepileptics is advisable even in patients without initial episodes. Serial imaging remains critical in detecting late complications such as hematoma expansion, cerebral edema, ventriculitis, or posttraumatic hydrocephalus.

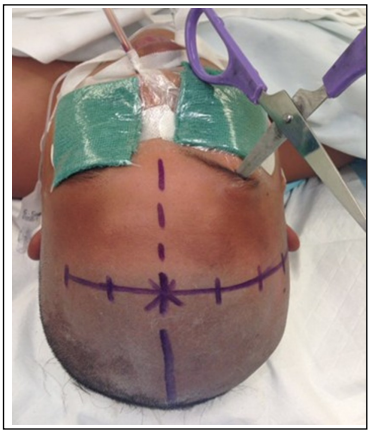

Figure 3: Intraoperative image showing incision planning with an extended right hemicoronal approach

CONCLUSION

This case highlights the importance of adhering to established principles in the management of penetrating brain injuries. Stabilization of the foreign body, timely imaging, appropriate antibiotic prophylaxis, and definitive surgical intervention contribute significantly to favorable outcomes. Each PBI case is unique, and a tailored approach is critical to achieving optimal recovery, especially in pediatric populations.

CONFLICT OF INTEREST

The authors declare no conflicts of interest and no external funding.

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