Transorbital intracranial penetrating injury by a metal rod extending to the temporal lobe

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DESCRIPTION

A man in his 40s was admitted to the emergency room of our level 1 trauma centre following a transorbital intracranial penetrating injury from a small-diameter metal rod projecting from the soil when in contact with a functioning machine on a farm. The patient had a Glasgow Coma Scale (GCS) of 14, laceration of the left medial canthus by the non-occult object, and periocular oedema that precluded eye examination (figure 1A). Prophylactic therapy with levotracetam, antitetanus vaccine and immunoglobulin, and cefuroxime was instituted. Head CT showed the tubular object entering the medial left orbital cavity, acquiring a curved shape (figure 2), and progressing between the internal and inferior recti, adjacent to the papyraceous lamina. It proceeded intracranially through the sphenoid wing (figure 1B) parallel to the floor of the middle fossa, penetrating the ipsilateral temporal pole (figure 1C), without apparently injuring the optic apparatus. No vascular injuries were identified on CT angiography.

The object was cautiously removed manually by neurosurgery in a sterile manner, with the patient lying on the CT scanner’s table under general anaesthesia. An ophthalmology attendant performed a subtenon injection of gentamicin and sutured the wound in the medial canthus. An immediate postprocedure CT showed blood in the trajectory of the removed rod, without significant mass effect (figure 3A). The patient was then admitted to the intensive care unit (ICU). A 3-hour postprocedure CT showed no relevant changes. Sedation was progressively discontinued after the 24-hour follow-up CT revealed no further complications other than a slight increase in oedema surrounding the haemorrhagic lesion (figure 3B). Paenibacillus amylolyticus was isolated from blood cultures.

After a 3-day ICU stay, the patient was transferred to a neurosurgery ward. At day 10 post-admission, with a GCS of 15, he was transferred to his local hospital, where he remained an additional 16 days under vigilance and antibiotic therapy. A brain contrast MRI, done due to transient fever, ruled out signs of infection or other complications. Binocular diplopia at infralevoversion and ocular discomfort was reported in the first 2 months, with progressive improvement. A 3-month follow-up CT revealed total resorption of the haematoma and oedema, with only a 2 mm hyperdense signal on the former location of the tip of the object (figure 3D). At

Figure 2 Three-dimensional CT reconstruction. The extracranial portion of the object has a vertical direction; however, upon contact with the orbit, the rod progresses laterally, horizontal to the axial plane.

Figure 3 (A) Immediate postprocedure head CT (axial, brain window), showing a haematoma along the object’s former path, without significant mass effect. (B) The 24-hour follow-up CT (axial, brain window) revealed a slight increase in the oedema surrounding the lesion. (C) The withdrawn metallic rod, shown to scale; note its angulation and corroded appearance. (D) The 3-month follow-up CT (axial, brain window), showing resorption of the haematoma and oedema; the small hyperdense signal on the former location of the rod’s tip possibly represents a small bone fragment from the sphenoid wing.
the 7-month follow-up, the patient had an Extended Glasgow Outcome Scale of 8, without signs of infection or cerebrospinal fluid leakage. A complete neuro-ophthalmological exam showed no abnormalities.

The ‘pull and see’ method of emergent removal of an externally accessible transorbital penetrating object has been previously described, with favourable outcomes.1–3 In our case, the metal rod entered through cutaneous Zone 3b (medial canthus), as defined by Turbin et al.4 Objects penetrating across it tend to exit the orbit primarily through the superior orbital fissure, followed by the sphenoid wing. This zone is mainly associated with cavernous sinus injury, followed by temporal lobe lesions, and brainstem damage.4 We hypothesise the object might have curved when in contact with the orbital wall, due to its heavily corroded state (figure 3C).

**Learning points**

► Transorbital intracranial penetrating injury is an unusual type of traumatic brain injury, with a high mortality rate.
► In selected cases, the ‘pull and see’ method of removal of non-occult foreign bodies may be safe.
► Preprocedure and immediate postprocedure imaging is essential for planning and exclusion of major complications.
► Head CT and CT angiography are the modalities of choice in the acute setting of injury by metallic foreign bodies.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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**REFERENCES**


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