Case Report

Penetrating Eye Injury

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Abstract A 38-year-old man presented to a regional Western Australian hospital after being stabbed in his left eye with a knife. Computerized Tomography (CT) revealed a 7 cm knife blade within the globe extending along the skull base. After transfer to a tertiary hospital, a cerebral angiogram was performed, excluding significant cerebral vascular involvement. Through a multidisciplinary approach with the otolaryngology and ophthalmology teams, the knife was removed without incident. The patient made a good post operative recovery and visual acuity continued to improve on follow-up appointments.

Keywords eye injuries, penetrating; eye foreign bodies; head injuries, penetrating

1 Introduction

Penetrating eye injuries are rare but potentially serious, with significant morbidity and mortality [5,6]. There have been few case reports and series relating to orbital injuries, and fewer still describe the surgical technique in removal of the foreign body. The following case illustrates a stab wound to the orbit which was successfully removed through the entrance wound with a good postoperative outcome.

2 Case report

A 38-year-old man presented at a regional Western Australian hospital after allegedly being stabbed in his left eye with a knife. There was no visible knife protruding from the orbit. The patient was intoxicated with alcohol on presentation, and was unable to open his left eye. Upon opening by the medical officer, there was evidence of proptosis, subconjunctival hemorrhage, photophobia, and reduced visual acuity. There was minimal pupillary reflex. His airway was intact. He was given intravenous antibiotics (gentamicin and ceftriaxone) and a tetanus booster. Non-contrast computerized tomography (CT) of the head revealed a 7 cm knife blade within the globe, extending along the skull base. He was transferred to Royal Perth Hospital by the Royal Flying Doctor Service for further management.

On arrival in Perth, he was reviewed by both the otolaryngology head and neck registrar and the ophthalmology registrar. On examination, the left eye was proptosed and tense with retrobulbar hemorrhage. The globe was intact. The pupil was non reactive. There were no long tract signs. The neck was soft and cranial nerves V, VII, VIII, and XII were intact. He was given further intravenous antibiotics, and had plain films (Figure 1) and a CT angiogram of the base of skull and face to determine relation to the carotid artery. The CT angiogram of the head revealed the blade entering the left orbit just lateral to the globe. There was disruption of the lateral rectus muscle but no significant intraorbital hematoma. The blade exited the left orbit through the lateral inferior wall just lateral to the apex of the orbit and entered the infratemporal fossa. The blade just touched the lateral wall of the left maxillary sinus with minor soft tissue swelling within the sinus. The blade transversed through the infratemporal fossa just underneath the skull base with the tip lying 1 mm medial to the internal carotid artery. No significant hematoma in the fossa was identified, and the knife blade was 7.5 cm long.

The patient was fasted and consented for a CT cerebral angiogram and surgery. In theatre, neuroradiology performed a cerebral angiogram under general anaesthesia to determine any cerebral vascular involvement (Figure 2). The left internal carotid, internal maxillary, and middle meningeal arteries were all normal and undamaged. The otolaryngology head & neck surgical team proceeded to removal of the foreign body. Through a left skin crease upper neck incision, the carotid bifurcation was isolated and controlled with vascular loops. A left lateral canthotomy was performed, the peristium was incised and elevated, and a dissection was made into the orbit. The end of the blade was found under the peristium which was incised, and the blade was removed without force. There was no bleeding and the 12th cranial nerve was preserved.

The ophthalmologists opened the conjunctival sac to expose the lateral surface. No penetrating eye injury was observed, and there was old blood only. The retinal folds did not have obvious rupture.

A neck drain was inserted and he remained on eye drops to reduce intraocular pressure & antibiotics. Postoperatively,
he made a good recovery without neurological or visual sequelae. He tolerated fluid and diet the day after surgery. The neck drain was removed two days after surgery. He unfortunately discharged against medical advice on the third day and was given oral antibiotics and eye drops, but on follow-up ophthalmology clinic visits continued to improve his visual acuity to 6/6 in the left eye three weeks after initial presentation.

This article received ethics approval from the Royal Perth Hospital Ethics Committee.

3 Discussion

Penetrating eye injuries are rare, but are associated with significant morbidity and mortality (up to 30%) [5,6]. Transorbital stab wounds have a higher incidence of both vascular (up to 50%) and infective complications, and injuries breaching the mucosal surface have higher rates of infection [6]. Orbital complications include globe rupture, retinal detachment, extraocular muscle injury, or optic nerve avulsion. Cranial penetration causes direct damage to vital structures and can be complicated by vascular trauma, hematoma formation, or infection [4,5].

The evaluation of a penetrating eye injury should be performed by a multidisciplinary team, as multiple regions of the head and neck are frequently involved [1,3]. Imaging with CT scans are vital in assessment of the injury to determine the path of the wound, and to identify vascular injury [1,3,4,7]. There have been several reports where there was successful removal of the foreign body via the entrance wound [1,2,7]. This was only performed after careful dissection and identification of important structures, and after confirming the absence of significant vascular injury [2,4,5].

In our case, the patient was extremely fortunate to avoid any serious or long lasting sequelae as a result of his injury. The only injury was disruption of the lateral rectus muscle as reported in the CT, and on follow up, his extraocular eye movements and visual acuity had returned to normal. As the knife entered the infratemporal fossa, which contains major vessels (internal carotid artery), and cranial nerves V, VII, and the initial portions of IX through to XII, he was fortunate not to have disturbed any of these structures.

Through a multidisciplinary approach, appropriate radiographic investigations, and careful operative management, the knife blade was successfully removed through the entrance wound without any significant complication.

References