## Management of an orbitocranial knife injury: a case report

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A 10-year-old girl suffering from a penetrating orbital stab wound with a knife on the inner canthus of her right eye is reported. Clinical examination of the patient displayed no signs of globe perforation or neurological deficits. The knife was removed slowly with careful and controlled motions. At the last visit three months after the surgery, visual acuity was 20/20, anterior and posterior segment findings were normal, and no binocular eye movement abnormalities were observed.

Key words: knife, orbital injury.

Orbitocranial penetrating injuries are usually associated with significant morbidity and mortality<sup>1</sup>. One of the most common orbital penetrating injuries in pediatric patients is caused by pencils<sup>2-6</sup>; wounds caused by knife are rare<sup>7</sup>. The anatomic proximity of the orbit to the brain, paranasal sinuses and cavernous sinuses increases the risk of life-threatening results. These complicated cases may require a multidisciplinary intervention such as neurosurgeon(s)-assisted ocular and orbital surgeries and pre-/intraoperative radiological imaging techniques<sup>2,3</sup>.

Herein, we report a 10-year-old girl with a knife stab wound to her right eye who presented to the emergency service in a relatively stable condition. The patient was treated nonsurgically in spite of the severe trauma.

## **Case Report**

A 10-year-old girl was presented to the emergency service one hour after being stabbed with a knife at the inner canthus of her right eye (Fig. 1). The knife seemed to have remained intact, and the patient was alert and cooperative at presentation. A gross penlight examination showed no signs of corneal or anterior scleral perforation. The medial canthal area and upper eyelid were ecchymosed and edematous. Neurological examination revealed no abnormal signs or findings. Plain X-rays (Fig. 2) showed the tip of the knife passing through the great wing of the sphenoid bone. There were no orbital or cranial bone fractures. Computed tomography (CT) was not available at that time because of a temporary technical problem. Based on ocular and radiological findings, the knife was thought to be localized at the apex of the orbital cavity adjacent to the medial rectus origin at the extraconal area, with no cranial penetration. The absence of neurological deficits and globe perforation encouraged us to remove the knife non-surgically with the assistance of neurosurgeons for potential complications. The procedure performed under general anesthesia included removal of the knife with careful and



Fig. 1. The patient as seen before removal of the knife.

slow motions and suturing of the skin laceration with 6-0 Vicryl sutures. No complications other than minimal hemorrhage occurred during the procedure. Detailed examination under general anesthesia confirmed our findings at presentation: there was no conjunctival laceration and no globe perforation or deep orbital penetration. Periorbital swelling, ecchymosis and minimal subconjunctival hemorrhage near the inner canthus were the only findings. The fundus examination from the dilated pupil and intraocular pressure level were both normal. Orbital and cranial CT performed on the first postoperative day revealed an increase in density in the medial part of the orbital fossa and little hemorrhage. The medial rectus muscle and lamina cribrosa were intact.

Intravenous ceftriaxone disodium hemiheptahydrate (50 mg/kg/day) was administered for one week. The Vicryl sutures were removed seven days after the operation. Ecchymosis and edema of the right eye had resolved completely at the first month visit. A dendritic corneal lesion due to herpes infection occurred in the first month and was treated with topical and systemic antiviral therapy. At the final ocular examination three months after the injury, visual acuity was 20/20, and anterior segment, fundus examination, and follow-up axial CT scans were normal. No strabismus or binocular eye movement abnormalities at nine cardinal positions were observed.

## Discussion

Orbitocranial penetrating injury is a very severe condition, as it may cause damage to the globe, brain, cavernous sinus, paranasal



Fig. 2. X-ray demonstrating the knife trajectory.

sinuses, orbit, or optic nerve, which can lead to blindness, eye movement abnormalities and even to death<sup>1-3, 8</sup>. A prompt evaluation and management of such a condition is essential to preserve the visual and vital functions.

Although the clinical examination including both ophthalmologic and neurological findings is crucial in determining the site of the injury, imaging techniques are very helpful in making the final decision. CT is an excellent means of documenting details of orbitocranial trauma such as bone fractures, soft tissue damage and the presence, localization and nature of foreign materials, and is indicated in all cases with suspected cranial penetration<sup>2,3</sup>.

In our case, we could not perform CT imaging at presentation because of a temporary problem. We had to exclude the suspected globe and cranial penetration with the help of a gross penlight examination, neurological examination and X-ray analysis. Even though a cranial penetration was not suspected, a neurosurgeon was present in the operating room for potential complications.

The procedures described in the literature for the removal of objects retained in the orbit with possible cerebral penetration range from simple extraction<sup>2,6</sup> to surgical removal<sup>9,10</sup> depending on the size, nature and location of the object. Okay et al.<sup>11</sup> reported a case of a bread knife that extended from the orbit to the tegmental dura mater of the temporal bone. The entire knife was removed surgically.

Decision-making to ensure a safe and appropriate management may be difficult, especially if the conditions for radiological interventions are limited. For patients injured with a small object having an intact globe with no neurological deficits, extraction should be attempted with caution and the assistance of neurosurgeons. In the current case, long-term results were excellent, with a complete absence of neurological and ocular deficits despite the fact that the penetrating object extended through the orbita.

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