Transorbital Stab Wound From A Speargun: A Case Report

Zıpkın ile Transorbital Delici Yaralanma Bir Olgu Sunumu

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Abstract: Penetrating stab wounds of the skull rarely occur in civilians. In the absence of direct injury to the brainstem or laceration of a major intracranial vessel, the prognosis for these injuries is good. Transorbital stab wounds causing intracranial complications are more common in children than in adults, and are reported more often in boys than girls. A 9-year-old girl presented with a spear penetrating her left orbita. A cranial computed tomographic scan confirmed that the tip of the spearhead had passed through the left orbital roof and was penetrating the left temporal lobe. The barbed spearhead was removed via craniotomy after cutting off three of the spear's prongs. The child recovered completely after surgery and was neurologically intact 1 year following the injury. Postoperative magnetic resonance angiography (MRA) was also normal. Barbed objects should not be removed by retracing their route of entry. MRA can be used to screen for important potential vascular complications.

Key words: Transorbital injury, speargun, magnetic resonance angiography, stab wound

Özet: Sivillerde kafatasının penetran yaralanmaları nadirdir. Beyin sapının doğrudan yaralanması ya da büyük intrakranial damarların laserasyonun olmadığı durumlarda prognoz iyidir. İntraknial komplikasyonlara yolaçan transorbital delici yaralanmalar çocuklarda erişkinlere göre daha sıktır ve kızlardan daha çok erkeklerde bildirilmiştir. Sol orbitaya penetre zıpkınla 9 yaşında bir kız çocuğu kliniğimize getirildi. Bilgisayarlı tomografide zıpkının uçlarından bir tanesi sol orbita tavanından sol temporal loba uzanmaktaydı. Zıpkının üç ucu kökünden kesildikten sonra kraniotomi ile kancalı uç çıkarıldı. Operasyondan sonra hasta tamamen düzeldi ve bir yıl sonraki takibinde nörolojik defisiti bulunmamaktaydı. Postoperatif manyetik rezonans anjiografi (MRA) normal bulundu. Ucu kancalı nesneler girdikleri yoldan çıkarılmamalıdır. MRA'ın vasküler komplikasyonları taramada kullanılabileceği akılda tutulmalıdır.

Anahtar Sözcükler: Transorbital yaralanma, zıpkın, manyetik rezonans anjiografi, delici yaralanma

INTRODUCTION

Penetrating stab wounds of the skull are very rare in civilians (5,6,10,13,22). These are typically seen in the young adult male, and are usually related to interpersonal violence, assaults, and gang warfare (5,6,10,11,12,13,22). Only a small number of reported cases, particularly in children, have resulted from accidental stabbing (3,4,8,9,18). Here we report a case of transorbital stab wound from a speargun.

CASE REPORT

A 9-year-old girl presented with a spear penetrating her left orbita. The patient's brother had accidentally shot her with a speargun. She had vomited several times before admission. On presentation, the girl was drowsy but coherent and cooperative. One of three prongs of the spearhead had penetrated near the left inner canthus, and the left periorbital region was swollen (Figure 1).

Figure 1: A photograph taken with the patient on the operating table shows one of the barbed spearheads in situ.

Neurological examination revealed no remarkable deficit. Plain x-ray films of the skull showed a spear with three barbs at the tip, one of which had penetrated the cranium (Figure 2). A cranial computed tomography (CT) scan confirmed that one tip had penetrated the left temporal lobe through the left orbital roof (Figure 3). Tetanus prophylaxis was administered and the patient was started on antibiotics that covered gram-positive, gram-negative, and anaerobic organisms. The patient was transported to the operating room. Once she was anaesthetized, the three prongs of the spear were cut with a metal saw used by orthopedic surgeons and the shaft of the spear was then removed and discarded. Next, a frontotemporal craniotomy was performed and the one barbed tip was located a few millimeters beneath the surface of the cerebral cortex. An incision was then made through the cortex and the TIP was removed through this new clean wound, as opposed to the route of entry. The wound was irrigated and the surgical site was then closed in standard fashion.

Within a week, the periorbital swelling and chemosis had subsided. The vision in the patient's left eye was normal. Postoperative magnetic resonance imaging (MRI) showed the trajectory of the spear in the temporal lobe (Figure 4), and magnetic resonance angiography (MRA) was normal 1 week after the injury. MRA was repeated 6 months later, and revealed no vascular complications. The patient was asymptomatic and neurologically intact 1 year after the injury.

DISCUSSION

The mechanism of injury in transcranial stab wounds differs from that of missile or gunshot injuries in that here is no concentric zone of coagulative necrosis (7). Also, unlike in motor vehicle accidents, brain damage is restricted to the wound tract (15). In the absence of direct injury to the

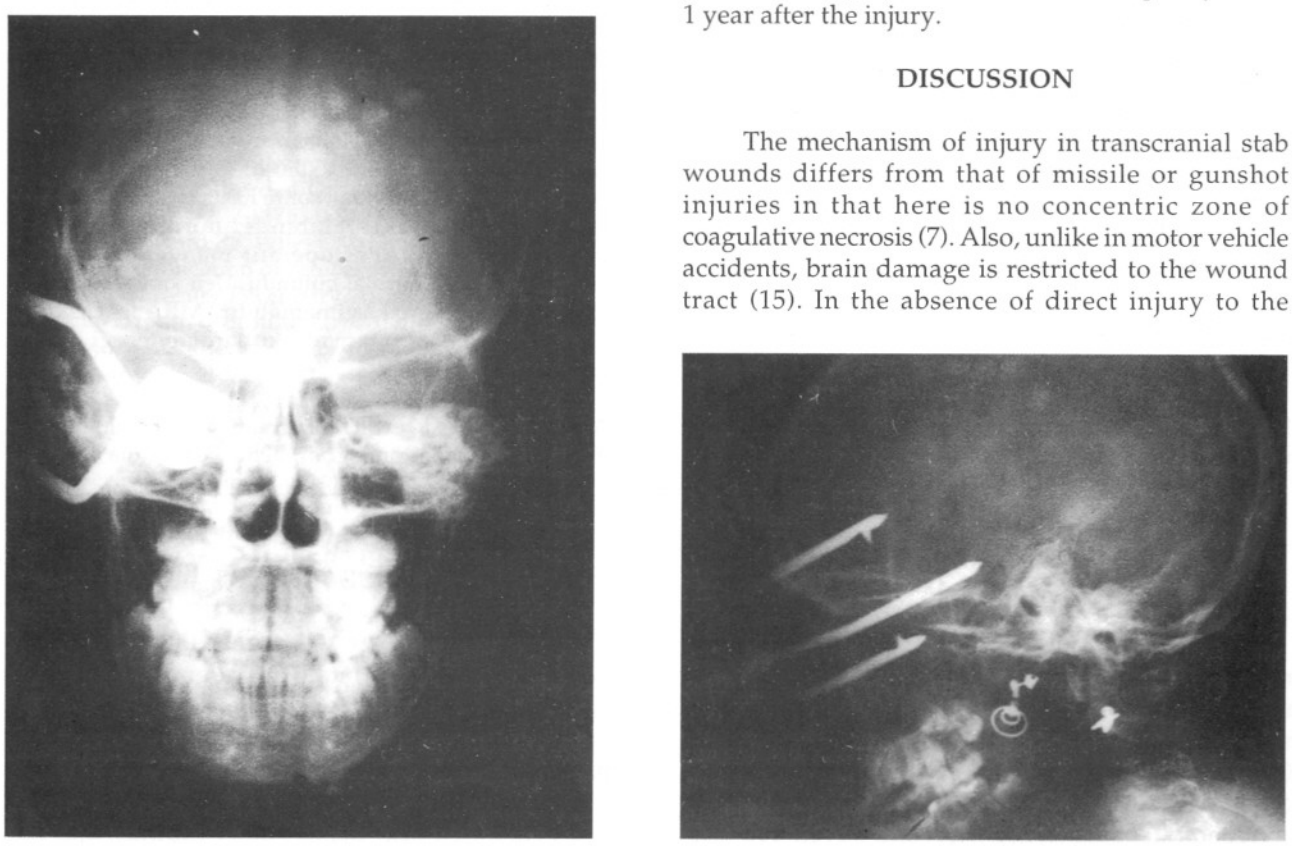

Figure 2: (a) Posterior-anterior and (b) lateral x-ray films of the skull show the penetrating spear.

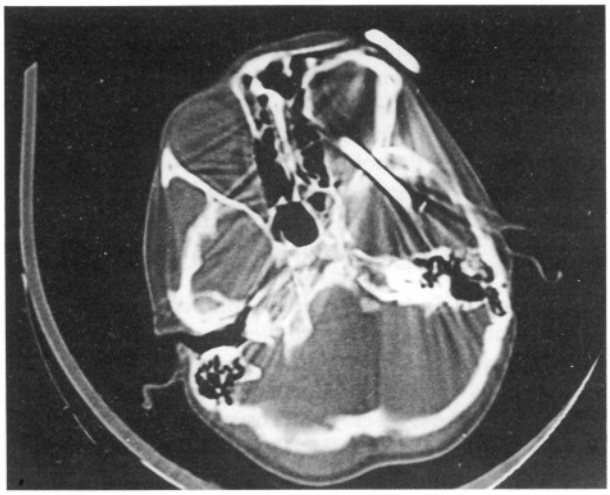

Figure 3: A CT scan shows one of the spearheads penetrating the left temporal lobe through the left orbital roof.

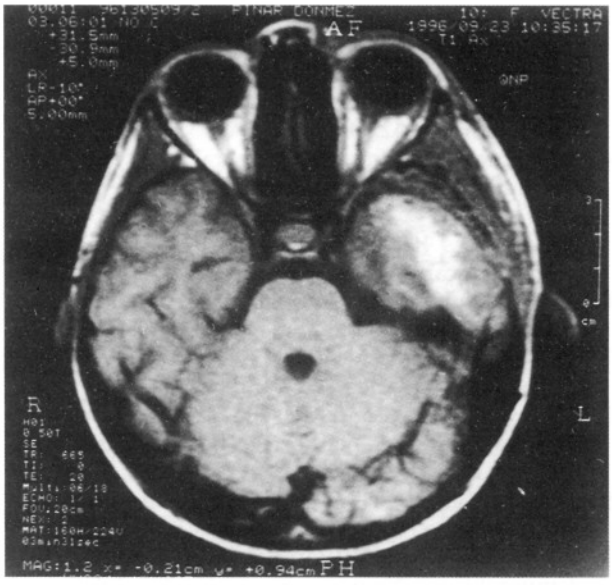

Figure 4: Note the blood in the trajectory of the spearhead on MRI.

brainstem or laceration of a major intracranial vessel, the prognosis is good for this type of injury. Transorbital stab wounds causing intracranial complications are more common in children than in adults, and are reported more often in boys than girls (6). Objects entering the orbit tend to be funneled toward the apex. Typically, the superior orbital fissure, or the thin orbital plate allows access to the intracranial contents in these cases. It has been noted that the globe often escapes injury if a slender-pointed instrument is used. In low-velocity stabbings, the eyeball moves into the space occupied by the copious orbital fatty tissue that surrounds the eye. However, the eyeball is frequently injured when a large object is involved (17,20).

Birch-Hirchfield (1) and Kjer (14) reported 30 cases of tetanus caused by transorbital injury. Ventricular damage, pneumocephalus, subdural, intracerebral and intraventricular hemorrhage damage to the cavernous sinus, carotid-cavernous fistulae traumatic cerebral aneurysms, occlusion of the carotid artery, and brain abscesses have all been reported as cerebral complications of transorbital stab wounds (2,6,13). CT scanning can detect intracranial damage or hematoma (19), but interpretation of CT scans may be seriously impaired by artifact when a penetrating metal object is embedded in the cranium.

Kieck and Villiers (13) found five cerebral aneurysms at the base of the brain in 20 cases following transorbital stab wound. They advised doing repeat cerebral angiograms to detect vascular damage. In 1969, Chadduck (4) operated on a 6-year-old girl with a traumatic aneurysm of the middle cerebral artery following a speargun injury. A traumatic aneurysm usually ruptures between 2 and 6 weeks, and it has been recommended that angiography be done 7 to 10 days after injury (16). Transorbital speargun injuries are very rare, and, to our knowledge, only two cases have been reported in the English literature (17,21).

Maximal tissue damage with a barbed object occurs when the removal attempt retraces the route of entry. If we had removed the penetrating barbed spearhead this way, there could have been serious damage to the optic nerve and globe. In conclusion, tetanus prophylaxis and antibiotics may prevent the infectious complications of a stab wound. Barbed objects should not be removed by retracing the route of entry. MRA is advised as screening for potential important vascular complications.

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