

## Transorbital stab penetrating brain injury.

### Report of a case



*Ann. Ital. Chir.*, 2009; 80: 463-465

Wellingson Silva Paiva\*, Felipe Saad\*, Eduardo Santamaria Carvalhal,  
Robson Luis Oliveira De Amorim, Eberval Gadelha Figueredo, Manoel Jacobsen Teixeria\*

*Hospital das Clinicas University of Sao Paulo Medical School, Brazil*

*\*Division of Neurosurgery (Chairmen: Prof. M. Jacobsen Teixeira)*

*\*\*Cerebrovascular Team Coordinator, Division of Neurosurgery)*

### Transorbital stab penetrating brain injury. Report of a case

**INTRODUCTION:** *Penetrating injury of the skull and brain is relatively uncommon, representing about 0.4% of head injuries. In this paper the Authors describe a case of patient victim of transorbital stab with brain injury with good recovery and review the literature about cranial stab wound.*

**CASE REPORT:** *A 23-year-old man was involved in an altercation which resulted in the patient sustaining wounds to the head, with penetrating in left transorbital, affecting the eye. At arrival to the first trauma center the patient was conscious and complete responsive with 15 points in Glasgow Coma Scale, and motor deficit grade III. CT scan demonstrated left periventricular brain hematoma and supraorbital fracture. A four-vessel cerebral angiogram demonstrated no abnormality. In this evolution patient presented good neurologic outcome.*

**CONCLUSION:** *In patients conscious with no surgical lesion like our patient, the hospital discharge must occur after the angiogram have excluded intracranial vascular lesion.*

**KEYWORDS:** Brain trauma, Penetrating head trauma, Stab Wound.

### Introduction

Stab wounds of the brain are relatively uncommon in Western countries because the adult calvarium usually provides an effective barrier<sup>1,2</sup>. However, there are areas of thin bone such as the temporal region where knives may penetrate easily and even full-thickness skull will not stop a forcefully thrust sharp object. Penetrating head injuries are usually caused by relatively high-velocity penetration by metal objects<sup>3,4</sup>. Transorbital penetrating brain injury is more rare occurrence in the general neurosurgical practice. In this paper the author describe a case of patient victim of transorbital stab with brain injury and good neurological recovery and review the literature about cranial stab wound.

### Case report

A 23-year-old man was involved in an altercation which resulted in the patient sustaining wounds to the head, with penetrating in left transorbital, affecting the eye, Snellen visual acuities were no perception of light left eye and 20/20 right eye. At arrival to the first trauma center the patient was conscious and complete responsive with 15 points in Glasgow Coma Scale. He presented hemiparesis grade III. The blade was retained by the trauma surgeons in the small hospital. Immediate CT scan of the head (Fig. 1) demonstrated left periventricular brain hematoma in subfrontal and periventricular region with ischemic component and supraorbital fracture, without cerebrospinal fluid leak. In this moment the patient was send to our hospital, a level one trauma center. A four-vessel cerebral angiogram was obtained to evaluate for vascular injury. This study demonstrated no abnormality. His recovery was uneventful and parenteral antibiotic agents (ceftriaxone and clyndamicyn) were continued prophylactically for 14 days, indicate motor rehabilitation. In late evolution patient presented good outcome with neurological

*Pervenuto in Redazione Settembre 2008. Accettato per la pubblicazione Gennaio 2009.*

*Correspondence to: Wellingson Paiva, MD, Teodoro Sampaio street 498, Ap 66 Pinheiros, 05406000 Sao Paulo, Brazil. (email: wellingsonpaiva@yahoo.com.br)*

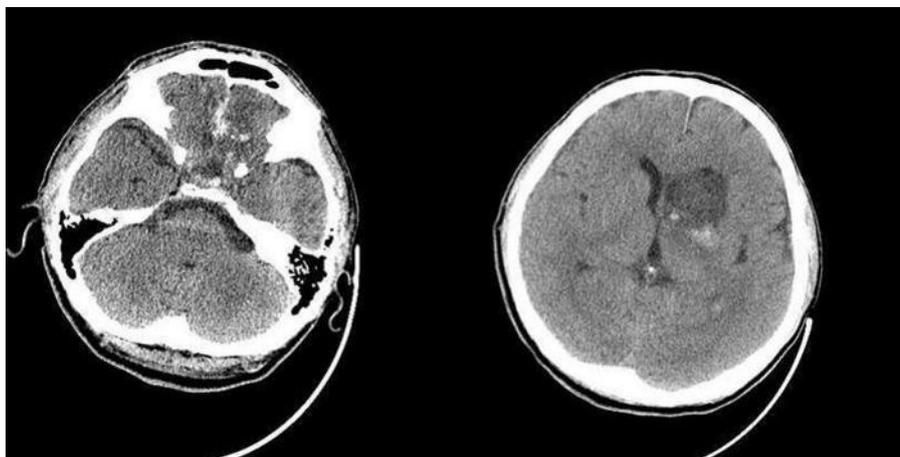


Fig. 1: CT skull demonstrate small brain hematoma with ischemic lesion in blade trajectory.

recovery without infectious disease, maintain the left visual loss.

## Discussion

Penetrating injury of the skull and brain is relatively uncommon, representing about 0.4% of head injuries<sup>5</sup>. Although some authors have reported penetrating cranio-cerebral injuries caused by foreign bodies during wartime and civilian incidents<sup>3-6</sup> orbitocranial injuries caused by high-speed projectile foreign bodies are quite unusual events, and some previous incidents were reported in the era prior to modern imaging. Khalil et al<sup>7</sup> describe that patients with cranial stab wounds, from whom the penetrating object had already been removed, found 12% had traumatic aneurysms. Also 10% of patients with cranial stab wound requiring urgent evacuation of intracerebral hematomas had traumatic aneurysms that could be managed simultaneously.

Penetration of the orbital walls may result in damage to the paranasal sinuses, which may give rise to emphysema of the orbit, cerebrospinal fluid fistulas, orbital cellulitis, meningitis, cerebral abscess, or pneumocephalus<sup>3,4</sup>. Others intracranial complications of transorbital stab wounds include ventricular damage, carotid-cavernous sinus fistula, subdural, subarachnoid, intraventricular, and intracerebral hemorrhage<sup>8</sup>. In our patient the transorbital stab occurred with brain morbidity, with late recovery. The prognosis of this type of injury is fairly good<sup>6</sup>, although penetration tends to occur near the internal carotid artery, which may be injured after the object passes through the optic canal or superior orbital fissure. This route may also be associated with injury to the optic nerve and other orbital structures<sup>6</sup>. The major complication of injury to the internal carotid artery is formation of a carotid-cavernous fistula<sup>7</sup>. In our patient, no lesion of major cerebral vessels had occurred. Brain injury was restricted to the periventricular region, with motor deficit. However, the neurologic outcome was good.

## Conclusion

Orbital stab wounds may mask serious underlying intracranial injuries and therefore is recommended that Computed Tomography be performed in cases where there is any suspicion of a secondary transorbital brain injury. We believe that angiogram is important to correct management of this case, and when patient admitted in emergency room, the blade must be retained only after CT skull and angiographic study has completed.

In patients conscious with no surgical hematoma like our patient, the hospital discharge must occur after the angiogram have excluded intracranial vascular lesion.

## Riassunto

Le ferite penetranti del cranio e del cervello sono relativamente rare e rappresentano lo 0,4% delle ferite alla testa.

Gli Autori descrivono un caso di un paziente di 23 anni vittima di una ferita transorbitale con lesione cerebrale. All'arrivo nel Trauma Center il paziente era cosciente e completamente presente a se stesso con 15 punti della Glasgow Coma Scale e un deficit motorio di grado III. La CT dimostrò un ematoma cerebellare sinistro periventricolare e una frattura sopraorbitale. L'angiogramma non ha dimostrato anomalie e il paziente ha avuto un buon recupero neurologico.

## References

- 1) Devi BI, Bhatia S, Kak VK: *Penetrating orbitocranial injuries - Report of two cases*. Indian J Ophthalmol, 1993; 41: 84-86.
- 2) Iwakura M, Kawaguchi T, Hosoda K, Shibata Y, Komatsu H, Yanagisawa A, et al.: *Knife blade penetrating stab wound to the brain: Case report*. Neurol Med Chir (Tokyo), 2005; 45(3):172-75.
- 3) Bauer M, Patzelt D: *Intracranial stab injuries: Case report and case study*. Forensic Sci Int, 2002; 129(2):122-27.

- 4) Domenicucci M, Qasho R, Ciappetta P, Vangelista T, Delfini R.: *Surgical treatment of penetrating orbito-cranial injuries. Case report.* J Neurosurg Sci, 1999; 43(3):229-34.
- 5) Gennarelli TA, Champion HR, Sacco WJ, Copes WS, Alves WM: *Mortality of patients with head injury and extracranial injury treated in Trauma Centers.* J Trauma, 1989; 29: 1193-201.
- 6) Kitakami A, Kirikae M, Kuroda K, Ogawa A: *Transorbital-transpetrosal penetrating cerebellar injury: Case report.* Neurol Med Chir (Tokyo), 1999; 39(2):150-52.
- 7) Khalil N, Elwany MN, Miller JD: *Transcranial stab wounds: Morbidity and medicolegal awareness.* Surg Neurol, 1991; 35: 294-99.
- 8) O'Neill OR, Gilliland G, Delashaw JB, Purtzer TJ: *Transorbital penetrating head injury with a hunting arrow: Case report.* Surg Neurol, 1994; 42: 494-97.

