Unusual Penetrating Cranioencephalic Injury By A Harpoon In A Brazilian Man: A Case Report

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Citation

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Abstract

Penetrating brain injury from low energy objects is an unusual cause of head trauma, unlike gunshot wounds. Most cases reported are interesting due to the large dimension of the penetrating instrument and, sometimes, good functional outcome. The purpose of the present report is to describe the case of a Brazilian man presenting a deep penetrating brain injury by a harpoon and no neurologic deficits. We discuss the main mechanisms of trauma and make a brief review of the literature upon epidemiological aspects and possible therapeutic approach. The early and appropriate neurosurgical management, on experienced hands, may improve considerably patient's outcome.

INTRODUCTION

According to the World Health Organization, 5.8 million people died worldwide in 2000 due to injuries from accidents and traumatic brain injury is one of the most common causes of morbidity and mortality in developing countries (1, 2). Gunshot wounds to the head are responsible for a significant portion of the mortality and poor neurological outcomes associated with penetrating brain injuries (3, 4). The changes that occur in intracranial pressure and cerebral blood flow following gunshot wounds to the brain are complex, but usually result from the vasogenic edema that develops along the missile track (5). Penetrating brain injuries from low-energy objects (foreign body), although also accompanied by many risk factor of polytrauma, frequently present less effect on the surrounding brain tissue adjacent to the foreign body track and fewer neurologic deficits (6, 7).

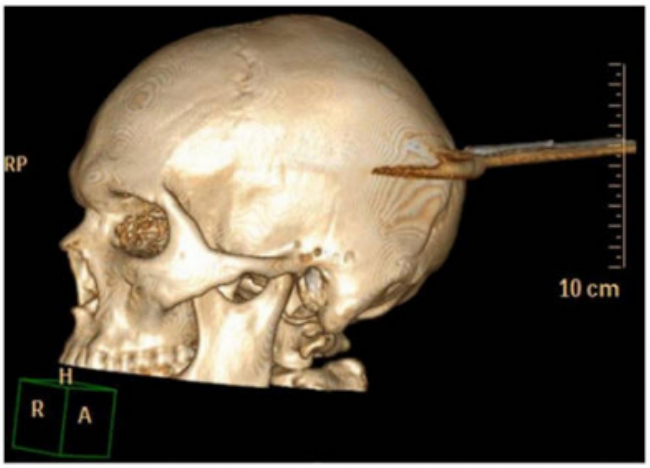
The aim of the present report is to describe the case of a Brazilian man presenting a deep penetrating brain injury by a harpoon and no neurologic deficits. We discuss the main mechanisms of trauma and make a brief review of the literature upon epidemiological aspects and possible therapeutic approaches.

CASE REPORT

A 32-year old Brazilian man was admitted on the Emergency Department presenting a penetrating head injury on the occipital region close to the median line. The patient referred that the accident happened while working 30-minutes before presenting at the hospital. He also referred an unremarkable past medical and surgical history being a previously health man. On clinical and neurological assessment, the patient was walking and talking normal and fluently, without any visuospatial, cognitive, motor or sensory deficits. Cranial nerve functions were found to be normal and Glasgow Coma Scale with 15 points. A small continuous bleeding on the accident site was noted. Cranial computed tomography revealed a deep penetrating foreign body lesion with little surrounding brain tissue edema (Figure 1). The patient was immediately taken to the operating room and submitted to an occipital craniotomy with careful dissection and removal of the harpoon. No hemorrhagic complications occurred during surgery and bleeding was controlled. The patient was maintained on clinical observation on Intensive Care Unit during 24 hours. He presented an uneventful surgical recovery and was discharged home in good clinical conditions and no neurologic deficits on the fifth postoperative day.

Figure 1

Brain computed tomography showing the traumatic brain lesion. Lateral view.



DISCUSSION

Trauma is an important cause of death in many countries, particularly in children and young adults, and head injury is the main cause of death in about 50% of trauma patients (8). Several epidemiological studies point automobile accidents as the leading cause of head trauma and motor vehicle accidents as the most important mechanism of severe brain injury (9-12). In Brazil, penetrating cranioencephalic injuries usually result from civilian gunshot wounds and are accompanied by a high morbidity and mortality rate with poor neurologic outcomes (4, 13). Low-energy objects (foreign bodies) producing penetrating brain injuries are an uncommon situation on neurosurgical practice (7, 14). In our case, the patient presented a deep penetrating lesion by a harpoon in the occipital region, a location that frequently raises concern and attention by the attending neurosurgeon due to the close proximity of important vascular and visual anatomical structures. Although some little continuous bleeding was noted on the accident site, it seemed that no significant vascular lesion occurred, which was confirmed during surgery.

The mechanisms of brain injuries of patients suffering gunshot to the head are complex, however it is believed that, beyond the direct effect of the projectile destroying the parenchyma and vascular structures, a propagated energy and pressure wave through the surrounding brain tissue of missile track would be responsible for many neurons and glial cells deaths (5, 15). In the case of low-energy penetrating brain injury, the main mechanism seems to be restricted to the direct lesion of the parenchyma. This may explain why many patients present at the Emergency Department with relatively good neurological function and outcome, despite dimensions of foreign body lesions. In the present report, despite the deep penetrating cranioencephalic injury observed, the patient presented to us walking and talking normal and fluently with no apparent neurological deficits.

Many therapeutic approaches have been proposed to the management of patients with penetrating brain injuries, varying from conservative with clinical support and control of the risk factor to decompressive craniotomy (16-18). The surgical approach of patients usually depends of many aspects, such as clinical presentation, location and dimension of the trauma, support of intensive care unit and neurosurgeon experience. In the present report, the harpoon proximity to the occipital median line and venous sinus made the neurosurgical procedure particularly challenging and required careful surgical access and dissection to avoid any additional vascular injury. We believe that, in such cases, the operative management must be performed by an experienced neurosurgeon with great anatomical knowledge of the region.

CONCLUSION

In conclusion, the present report highlights that the early and appropriate neurosurgical management, on experience hands, may improve considerably the outcomes of patients presenting low-energy penetrating cranioencephalic injuries.

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