

Unusual Head Trauma: About Three Observations at the Chu Pr Bocar Sidy Sall (BSS) of Kati

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Abstract

Introduction: Penetrating head injuries are often due to human-to-human violence, mainly by firearms, those by stab are rare. CT is the exam of choice in the assessment of emergency lesions. We report three observations, all victims of knife assault during the brawl in order to clarify the contribution of DTM in the care. **Observations:** 1) Mr. I S, 21-year-old, student, was admitted with the hillside implanted in the skull. There were traces of blood on his face and clothes. There was no neurological deficit on examination. The CT scan performed showed the knife penetrating the vault of the skull at the left parietal level, up to 5 cm in the cerebral parenchyma with a minimal subdural and intracerebral hematoma; 2) Mr. S C, 43-year-old, farmer, admitted with a large left fronto-temporo-parietal wound, bleeding and right hemiplegia. The CT scan performed showed a frontal linear fracture (with fronto-ethmoid hemosinus) and left temporoparietal with a parietal intraparenchymal hematoma and homolateral frontoparietal subdural hematoma; 3) Mr. S B: 40 years old, driver, admitted with a parietal wound. The CT scan performed objectified a left parietal cortical hematoma in relation to a metallic foreign body (3000 HU) corresponding to the distal end of the knife penetrating the vault of the skull. They all underwent emergency surgery and received antibiotics and preventive serotherapy. The postoperative follow-up was simple, the follow-ups are without neurological sequelae. **Conclusion:** Head trauma by knife is rare, it results from inter-human violence. The lesion diagnosis is computed tomography. The prognosis depends on the severity.

Keywords

Head Trauma, Stabbing, CT, CHU Kati

1. Introduction

Penetrating head injuries can be the result of many intentional or unintentional events, including missile injuries, stabbings, traffic or workplace accidents (nails, screwdrivers) [1]. Stab wounds are rarer [2]. These traumas can lead to various and varied complications. Computed tomography (CT) scans adequately identify the extent of the lesion, facilitating the detection of associated bruises, hematomas, major vascular lesions or brainstem lesions [3]. In addition, it allows a better evaluation of bone structures and provides information on the relationship of the penetrating object with adjacent structures. CT scans are also useful in monitoring postoperative complications [4]. There is a lot of data on trauma, but there are few studies on stab injuries in the world. We had not found similar data in the literature in Mali, this work is the first in our hospital. We report three observations, all victims of trauma by knives during the brawl, whose purpose is to clarify the contribution of DTM in the management of these traumatized.

2. Observations

Observation 1: Mr. I S, 21-year-old, student, victim of a stabbing attack during the brawl, was admitted to the emergency department on February 20, 2019, the knife remained implanted in the skull at the level of the left parietal region (**Figure 1(a)**). He was well aware with a Glasgow score at 15/15. There were traces of blood in the area of penetration and face. On initial examination, the interrogation noted headaches, but no neurological deficit was detected. The CT scan performed in emergency showed the knife penetrating the vault of the skull at the left parietal level, it ended up at 5 cm in the cerebral parenchyma with an oblique axis towards the midline (**Figure 1(b)**). There was a minimal subdural and intracerebral hematoma and dilaceration of the cerebral parenchyma (**Figure 1(c)**). The surgery was performed under general anesthesia, the knife was removed abstaining from any lateral movement and respecting the axis of the blade. A dressing, a broad-spectrum antibiotic injectable therapy based on Ceftriaxone 2 grams per day for 21 days and Gentamycin 160 mg per day for 5 days, and tetanus vaccination were made to prevent possible meningeal infection.

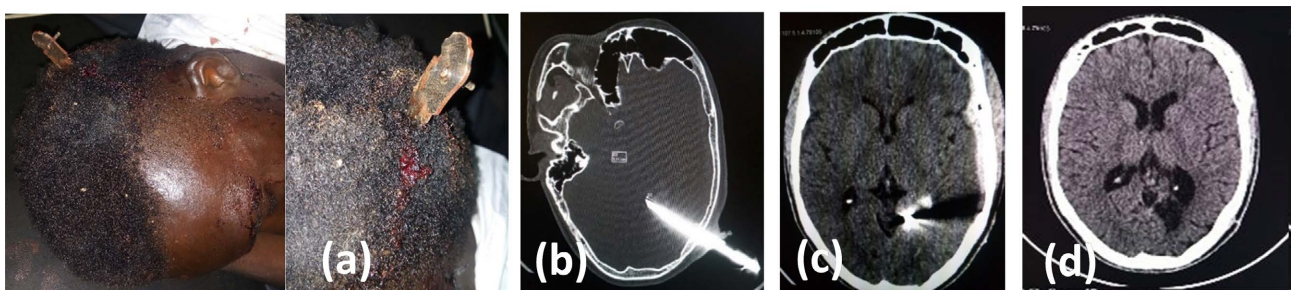


Figure 1. (a) Photo of the patient with knife implanted in the skull at the parietal level and traces of blood on the hair; (b) Cranioencephalic CT in bony window objectifying knife penetration; (c) Cranioencephalic CT in parenchymal window showing a left parietal hematoma under minimal and intraparenchymal subdural; (d) CT control at 06 months, axial section in parenchymal window objectifying an encephalic pore cavity.

The prognosis was good. The postoperative follow-up was simple, the evolution was good, without functional sequelae after a follow-up of 12 months. The scannographic control 01 year later revealed an encephalic pore cavity (compatible with the sequelae of hematoma) without pneumocephaly (**Figure 1(d)**), but the impact of the knife was still visible.

Observation 2: Mr. S C, 43-year-old, farmer, victim of an attack by two machete blows, one frontal, the other left parietal during brawl in a crop field about fifty km from the city of Kati, by a cousin, causing a loss of consciousness. He was admitted to the Kati reference health center where he received first aid, then referred to the imaging department of the CHU Pr BSS on September 29, 2022. He was unconscious with a Glasgow rated at 8/15, he had a large left fronto-temporo-parietal wound, bleeding despite the suture made at the reference health center, with right hemiplegia with edema of the face. An emergency CT scan revealed a left parietal intraparenchymal hematoma of 33×28 mm at the cortical level compared to a homolateral frontoparietal subdural hematoma of 79 mm thickness, all responsible for a 9 mm falcorial engagement on the right. There was a solution of bone continuity of the bones: parietal, temporal, left zygomatic arch and frontal bone with frontoethmoid hemosinus. It was associated with a subcutaneous contusion (**Figures 2(a)-(c)**). The rest of his care was done at the CHU by the neurosurgery unit to evacuate the hematomas but leaving a

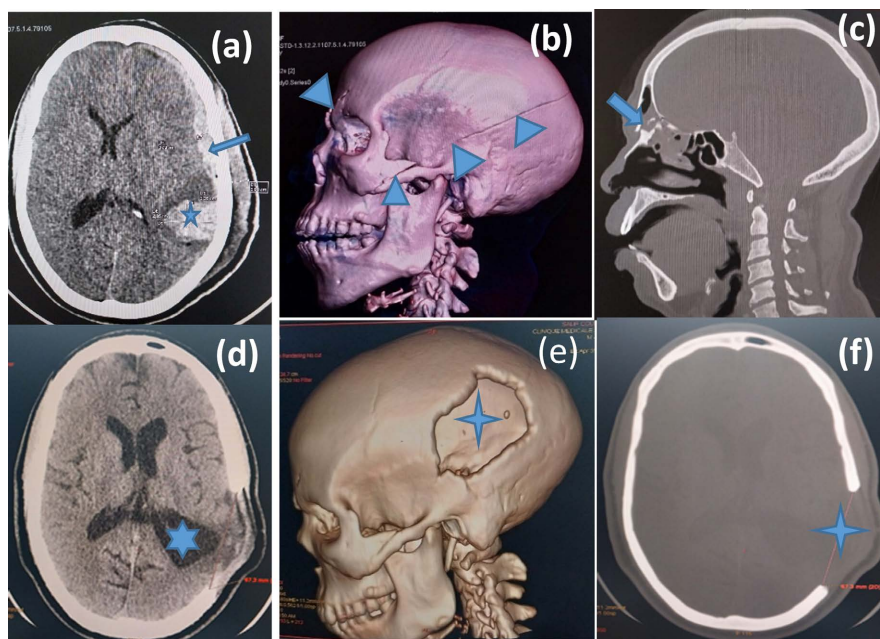


Figure 2. (a) Cranioencephalic CT performed highlighting a left parietal intraparenchymal hematoma of 33×28 mm (star) at the cortical level in relation to a homolateral frontoparietal subdural hematoma of 79 mm thickness (arrow), the whole responsible for a 9 mm right subfalcorial engagement; (b) Volumetric reconstruction: linear fracture (arrowheads) of the parietal bones, temporal, left zygomatic arch; (c) Sagittal and bone window reconstruction: frontal fracture with frontoethmoid hemosinus; (d) Control CT scan at 6 months: axial section in parenchymal window showing ventricular ectasia (6-pointed star); ((e), (f)) Control CT scan at 06 months: visible bone flap (4-pointed star).

cranial flap whose cranioplasty was not possible in an emergency given the risk of infection. A broad-spectrum antibiotic therapy injectable based on Amoxicillin + clavulanic acid at a dose of 02 grams per day for 21 days, Metronidazole 1.5 grams per day for 15 days and gentamycin 160 mg per day for 5 days to prevent possible infection and tetanus vaccination were made. The prognosis was guarded. The postoperative follow-up was simple, the evolution was good with a resumption of his functions, without sequelae after a follow-up of 4 months. Six months after a CT scan made for a preoperative cranioplasty assessment objectified the cranial flap of 7 cm with ventricular ectasia (**Figures 2(d)-(f)**).

Observation 3: Mr. S B: 40-year-old, taxi driver, also victim of a knife attack during the brawl by an apprentice driver 100 km from Kati. He was admitted to service on January 27, 2023 for a cranioencephalic CT scan which revealed a left parietal cortical hematoma, rounded in shape measuring 11.6 mm in diameter opposite a metallic foreign body (distal tip of the knife) penetrating the vault of the skull (**Figure 3(a)** and **Figure 3(b)**). This knife would be removed by the attacker. The tip of the knife was removed by the neurosurgery unit of the CHU. Medical treatment was made with Amoxicillin + clavulanic acid at a rate of 02 grams per day for 21 days, Metronidazole 1.5 grams per day for 15 days and gentamycin 160 mg per day for 5 days to prevent possible infection and tetanus vaccination was made. The prognosis was reserved. The scannographic control made a month later revealed a calcified hematoma (**Figure 3(c)**). The patient still complains of intermittent headaches.

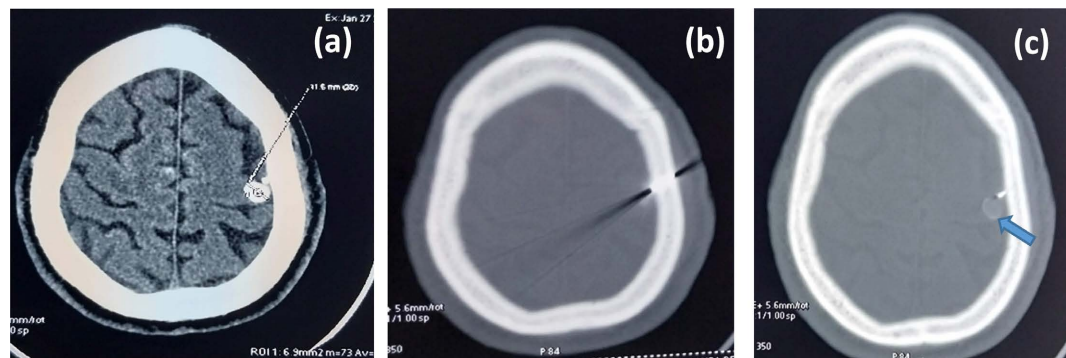


Figure 3. Cranioencephalic CT, axial section in parenchymal window objectifying a left parietal cortical hematoma (a) with respect to a bone continuity solution with metallic foreign body responsible for an artifact (b). A control made one month later for objective headache a calcification of the hematoma (c) arrow.

All patients benefited from filling solutions and analgesics postoperatively.

Considération éthique et déontologique: Le recueil des données a été effectué après l'obtention de l'autorisation des patients avec le respect de l'anonymat et de la confidentialité des informations.

3. Discussion

Penetrating head injuries are among the most severe injuries with a higher incidence of morbidity and mortality, accounting for approximately 0.4% of all inju-

ries [3]. These injuries are usually the result of both intentional and unintentional events caused by screwdrivers, chopsticks, wrenches, electric drills, knives, and pens [5]. The causes of head injuries (FCIs) are dominated by traffic accidents (50%), especially for young adult males and severe FCIs. Falls account for 21% - 32% of head injuries and are more common at extreme ages of life. The published work on penetrating head trauma by stab wounds concerns small series [6]. In Mali, as well as in the sub-region, there is not enough published data on stab wounds because they are rare and their incidence remains low. In the pathophysiological mechanism of stab trauma, there are primary lesions that are localized in the path of the blade or blunt object, unlike firearms or high-velocity projectiles. There is no massive tissue attrition by releasing significant energy, nor is there hemorrhage caused by shear forces tearing or stretching vessels, as in high-kinetic trauma or traffic accidents [6]. The irregular success rate of craniotomy, the morbidity associated with it and the likelihood of postoperative anosmia are disadvantages of intracranial procedures. Extracranial approaches have been reported to have a lower morbidity rate and a higher success rate [7]. Penetrating lesions in the skull and brain are classified as missiles and non-missiles, which differ in impact velocity. In non-missile lesions, the impact velocity is >100 m/s, causing laceration and maceration damage; On the other hand, missile injuries cause injuries due to kinetic and thermal energy. In addition, the penetration of objects can be of two types: those that pass through a natural orifice and objects that pass through the skull causing a fracture, giving rise to an artificial orifice [8]. In our series, all penetrations were outside the natural orifices. Radiological evaluation makes it possible to check the trajectory of the penetrating object and the secondary lesions present thus guiding the neurosurgical approach, it is also useful in the follow-up of postoperative complications. CT scan adequately identifies the extent of the lesion, facilitating the detection of bruises, hematomas, major vascular lesions, or associated brainstem lesions [9]. In addition, it allows a better evaluation of bone structures and provides information on the relationship of the penetrating object with adjacent structures. In our series, lesion assessments were made by cranioencephalic CT. Penetrating lesions caused by non-sterile foreign bodies tend to become infected and lead to intracranial suppurations and meningitis. Prophylactic treatment with broad-spectrum antibiotics crossing the blood-brain barrier is necessary to minimize these complications. In our context the knives being non-sterile, antibiotic therapy was made in this sense based on amoxicillin + clavulanic acid followed by vaccination and serotherapy. The prognosis of patients with this type of lesion depends on the site of penetration, timely initial management, and associated complications, among other factors. Two of our patients had a good prognosis but the third had a poor prognosis given the severity of the violence. The postoperative follow-up was simple in all cases.

4. Conclusion

Stab wound is rare, resulting from inter-human violence, affecting young adult

males. The lesion diagnosis is essentially scannographic. The removal of the knife should only be done in the operating room. The prognosis depends on the lesion but also on adequate and timely management.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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