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Epidemiological Profile of Craniocerebral Trauma in the Intensive Care Unit of Teaching Hospital of Bouake

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Abstract

Introduction: Craniocerebral Trauma is one of the leading causes of death in the world. The study of their epidemiology makes it possible to identify risk factors to better target prevention actions.

Patients and methods: This was a descriptive retrospective study carried out at the intensive care unit of the Bouake University Hospital from January 2013 to December 2014. It concerned patients admitted in intensive care units for a craniocerebral trauma with a Glasgow score of less than 14. The parameters studied were sex, age, occupation, circumstances of occurrence, mode of transport, and time of admission to hospital and duration of hospitalization.

Results: During the study period out of a total of 1244 admissions, 92 patients were hospitalized for a craniocerebral trauma, hospital prevalence in intensive care units of 7.39%. There were 86 men and 6 women. The median age was 32.6 years ± 17.03 (range 2 to 76 years). Motorcycle taxi drivers (49%) and students (24%) represented the most affected social groups. Traffic accidents were incriminated in 87% of cases and motorized two-wheeled vehicles accounted for 40% of craniocerebral trauma. None of the patients received medical transport from the accident sitetothehospitalandin48.9%the evacuationofthepatients was carried out by the military fire brigade. The majority of patients (61%) were admitted before the 6th h and the average admission time was 3 h. The average length of stay was 4.37 ± 4.23 days (range 1 to 21 days). The overall mortality was 66%.

Conclusion: Craniocerebral trauma is frequent in Bouake and follows a Public road accident involving a two-wheeled motor vehicle in the majority of cases. Prevention is based on awareness of compliance with the highway code.

Keywords: Epidemiology; Craniocerebral trauma; Resuscitation; Ivory Coast

Introduction

Craniocerebral trauma is defined as any direct or indirect mechanical aggression on the skull, immediately or subsequently responsible for disturbances of consciousness, resulting in diffuse or localized encephalic pain, ranging from obliteration to coma [1]. Craniocerebral trauma is a serious public health problem in the world and is responsible for significant morbidity and mortality [2]. Despite the many advances made in the knowledge of their pathophysiology and their management, the mortality attributable to them is still high even in developed countries where they are the leading cause of death in young adults [3]. In the United States, craniocerebral trauma accounts for 40-50% of traumatic deaths [4,5]. In Europe, they account for between 35% and 42% of all deaths among young people aged 15-25 years [6]. In Africa, management of craniocerebral trauma remains difficult and mortality is high by 70%, due to inadequate financial resources and weak technical facilities [7,8]. In Bouake, the second largest city in Côte d'Ivoire, craniocerebral traumaare a common reason for admission to surgical emergencies and pose an urgent problem of diagnosis and management. It is therefore essential to identify the epidemiological factors of craniocerebral trauma with a view to their prevention. The aim of this work was to describe the main epidemiological aspects of craniocerebral trauma in charge of identifying preventive measures with a view to reducing morbidity and mortality.

Patients and Methods

This was a retrospective descriptive study of hospitalized patients treated for craniocerebral trauma in the intensive care unit of the teaching hospital of Bouake over a one-year period from January 2013 to December 2014. The intensive care unit of the teaching hospital of Bouake, is the only intensive care unit in the country with a radius of coverage of 250 km^2. Included were all patients admitted for craniocerebral trauma with a Glasgow score below 14. Patients who died on arrival, those with a craniocerebral trauma with normal consciousness or unusable records did not include. The parameters studied were: age, sex, occupation, circumstances of occurrence, etiologies, risk factors,

transport modalities of trauma, time to hospital admission and evolution. The data was processed using a Microsoft Excel 2011 file.

Results

Of a total of 1244 patients admitted to hospital during the study period, 92 patients were hospitalized for craniocerebral trauma, a hospital prevalence of 7.39%. Craniocerebral trauma was observed mainly in young (**Table 1**) male subjects in 93.4% with a sex ratio of 14.3 and an average age of 32.6 years (range: 2 and 76 years). The etiology of craniocerebral trauma was variable. Road accidents were the most frequent (87%) followed by falls (4.3%) and brawls (4.3%) (**Table 2**). Drivers of motorcycle taxi (49%) and students (24%) were the most concerned social groups (**Table 3**). Two-wheeled vehicles (motorcycles) were incriminated in the occurrence of 40% of traffic accidents and pedestrians accounted for 31.5% of craniocerebral trauma victims. None of the motorcycle drivers were wearing helmets when the accident occurred.

Table 1: Distribution of trauma patients by age (n=92).

Age	Number	Percentage (%)
0-14	12	13
15-29	35	38
30-44	22	23.9
45-59	16	17.4
>60	07	7.7
Total	92	100
Craniocerebral trauma was observed mainly in young male subjects in 93.4% with a sex ratio of 14.3 and an average age of 32.6 years.		

Table 2: Distribution according to the etiologies of the trauma (n=92).

Etiology		Number	Percentage (%)
Accident traffic	Rider	37	40
	Pedestrians	29	31.5
	Motorist	10	10.8
	Cyclist	04	4.3
Fall		04	4.3
Brawl		04	4.3
Firearm		03	3.2
Domestic accident		01	1.08
Total		92	100
The etiologies of craniocerebral trauma were dominated by road accidents (87%), involving in 40% of cases a motorized two-wheeled vehicle (motorcycle).			

The risk factors associated with the occurrence of traffic accidents were speeding (92%) and drinking (8%). None of the patients had received pre-hospital care and medical transportation from the accident site to the hospital. In 48.9% of the cases, patients were evacuated by the military fire brigade and the majority of patients (61%) had been admitted before the 6th h following the trauma. The average time of arrival of patients in surgical emergencies was 3 h (extremes: 1 and 72 h) and that of their admission in intensive care of 6.5 h.

Table 3: Distribution of traumatized patients according to socio-professional categories (n=92).

Socio-professional categories	Number	Percentage (%)
Motorcycle taxi	45	49
pupils / students	22	24
officials	06	6.5
Workers	06	6.5
Cultivators	03	3.2
Trader	03	3.2
household	02	2.1
No occupation	05	5.4
Total	92	100
Motorcycle taxi drivers were the socio-occupational category most affected by craniocerebral trauma (49%).		

The Glasgow score was less than 8 in 61% of patients and 18% were polytrauma patients. Cranio-encephalic computed tomography was only possible in 20% of the trauma patients and the most objectivized brain lesion was oedematous haemorrhagic contusion (42%). The mean duration of stay was 4.37 ± 4.23 days (range: 1 and 21 days) with a mortality of 66%.

Discussion

The study found that craniocerebral trauma accounted for 7.39% of intensive care admissions, most often involving young people, motorcycle taxi drivers (49%) and students (22%). In 87% of the cases, they were the result of traffic accidents involving a two-wheel motorized machine in 40% of the cases. Pedestrians accounted for 31.5% of craniocerebral trauma victims per traffic accidents. Medical transport was non-existent and patient evacuation was provided by the military fire brigade in 48.9% of cases with an admission delay of less than 6 h in 61% of patients. The average length of stay was 4.37 days with a mortality of 66%. These main results should be qualified due to the retrospective nature of this study and the presence of bias. However, this work provides, for the first time in Bouake, epidemiological data on craniocerebral trauma and gives rise to many points of discussion. The prevalence of craniocerebral trauma in our series (7.39%) was higher than that reported by Coulibaly et al. [9] in Mali 5.9%; but lower than that reported by Bahloul et al. [10] 14.2% in Tunisia. This prevalence of craniocerebral trauma underestimates the reality since it did not take into account patients who died before admission and those with a normal level of consciousness and cared for in surgical emergencies. A clear male predominance was observed in our series (93.4%) and the sex ratio H/F was 14.3. This masculine

predominance is reported by several authors; Coulibaly et al. in Mali [9] 75%, Bahloul et al. in Tunisia [10] 90%, Wu et al in China [11] 76.6%, Privat et al. [12] and Rougier et al. [13] in France, with respectively 83.3% and 88%. It could be explained by the fact that men are an active population and engage in hazardous occupations such as those of taxi drivers or motorcycle taxi drivers who expose them to the risk of a traffic accident. Traffic accident was the main etiologies of craniocerebral trauma (87%). These results were superimposed on those of Sidibe et al. [14] in Mali, which reported thattraffic accident were incriminated in the occurrence of 82.8% ofcraniocerebral traumain Mali and different from those of Norman et al. [15] who found that physical violence was the main cause ofcraniocerebral trauma in South Africa. The increase in the number of traffic accident would be linked to the combination of several factors, such as a considerable increase in the number of motor vehicles and especially motorized two-wheeled vehicles, the presence of unskilled drivers, speeding, alcoholism and the ignorance of the Highway Code. Motor vehicles with two wheels were the most incriminated in the occurrence of traffic accident (40%). This frequency was superimposable to that reported by Sidibe et al. [14] 41.6% in Mali, Wu et al. [11] 33.4% in China and Chiu et al. [16] 64.5% in Taiwan. The high number of motorized two-wheeled vehicles (34.7%) among the agents responsible for traffic accident can be explained by their large use as the main means of displacement of populations and by the explosion of the phenomenon of motorcycles in Bouake. Also, the users of these two-wheeled motorized vehicles with a very varied socio-professional profile are not always respectful of the rules of the traffic and are without wearing protective helmet while driving. According to the WHO, helmet use in developing countries would help reduce mortality by 40% and craniocerebral trauma morbidity by 70% [17]. The high proportion of pedestrians (31.5%) among victims of craniocerebral trauma by traffic accident was due to their frequent presence on roadways and to the absence of pedestrian walkways in Bouake. None of our patients had been provided with medical transport, and the evacuation of traumatized persons from the accident site to the hospital was most often carried out by the non-medicalized ambulances of the military fire brigade (48.9%). These results were consistent with those of Ouedraogo N. et al. [18] in Ouagadougou, which found a predominance of the evacuation of traumatized people in Ouagadougou by non-medical ambulances (54.9%). On the other hand, they differed from those of Rouxel JPM, who in his study carried out at the hospital in Bicêtre (France) reported that all cranial traumatized patients (100%) benefited from pre-hospital care and medical transport [19]. In our series, the average wait time was 3 h (extremes: 1 h and 72 h) and 61% of our patients were admitted before the 6th h following the trauma. All authors agree that craniocerebral trauma should be taken care of in the very early hour to prevent life-threatening systemic secondary brain stress factors [20]. Our results were superior to those of Motah M. et al. [21] in whom 27.09% of the traumatized were admitted less than 6 h after their accident. This short period of admission could be explained on the one hand by the occurrence of most accidents in the town of Bouake and on the other by the high availability of the military fire brigade. Craniocerebral trauma is the leading cause of mortality and disability worldwide [22]. Hospital mortality in our study was 66%. This mortality was higher than that reported by Emejulu et al. [23], Coulibaly et al. [9], and Bahloul et al. [10], which reported mortality rates of 19.1%, 30% and 38%, respectively. This significant lethality in our series is related to the initial severity of trauma (61% severely traumatized with a Glasgow score of 8), lack of prehospital care, lack of medical transportation, Insufficiency of the technical platform of the resuscitation department of the teaching hospital of Bouake.

Conclusion

Craniocerebral trauma are common in Bouake, they are secondary to traffic accidentinvolving motorized two-wheeled vehicles and are responsible for heavy mortality among the young working population. The improvement of their prognosis requires on the one hand the implementation of a prevention policy through awareness campaigns on compliance with the Highway Code.

State of current knowledge on the subject

- Craniocerebral trauma is a major source of morbidity and mortality in young adults, mostly male.
- The etiologies are dominated by traffic accident, most often involving cars.
- Contribution of our study to knowledge.
- Epidemiological profile of patients suffering from craniocerebral trauma in Bouake.
- Etiologies of craniocerebral trauma are dominated by traffic accidents, most often involving two-wheeled motorized vehicles.
- The need for public awareness campaigns on compliance with the Highway Code and the creation of an urgent medical assistance service in Bouake.

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

All authors have read and approved the final version of the manuscript.

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