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Management of Traumatic Brain Injuries in the Intensive Care Unit at the National Hospital of Niamey (HNN)

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ABSTRACT

Objective: *To assess the management of patients with traumatic brain injury in the intensive care unit of the National Hospital of Niamey (HNN).*

Patients and Methods: *This was a descriptive and analytical retrospective study conducted from January 1, 2020 to December 31, 2021. The study includes patients of any age with isolated traumatic brain injury or traumatic brain injury associated with other injuries, admitted to the intensive care unit of the National Hospital of Niamey. The variables studied were epidemiological, clinical, paraclinical, therapeutic, and outcome-related characteristics of patients with traumatic brain injury.*

Results: *A total of 92 cases of traumatic brain injury (TBI) were recorded among 544 patients admitted to the HNN intensive care unit during the study period, representing a frequency of 16.91%. Men accounted for 80.43% (n=74), with a sex ratio of 4:1. The mean age of the patients was 24.29 years. Road traffic accidents were the main cause of TBI, representing 85.88% (n=79). On brain computed tomography, epidural and subdural hematomas were each found in 26.09% (n=24) of cases. TBI was isolated in 70.06% (n=65) of patients and associated with other injuries in 29.34% (n=27). Vasoactive drugs were administered in 7.61% (n=7) of cases. Fifty-one percent (51.09%) of patients required neurosurgical intervention. The mean length of stay in the intensive care unit was 7.54 days, and 44.56% (n=41) of patients died.*

Conclusion: *Traumatic brain injury is a severe and frequent condition in intensive care units and is one of the leading causes of mortality and disability worldwide. Improving patient outcomes requires effective prehospital care and rapid, standardized management to prevent secondary brain injuries.*

Keywords

Traumatic brain injury, Intensive care, National Hospital of Niamey, Niger.

Introduction

Traumatic brain injuries (TBI) are direct or indirect mechanical traumatism to the skull that may cause immediate or delayed disturbances of consciousness, reflecting brain injury. They constitute a major public health problem because of their frequency and the healthcare costs they generate, and they are a cause of mortality and severe functional disability.

Traumatic brain injuries are considered severe when the Glasgow Coma Scale score is less than or equal to 8. Several factors contribute to their severity, particularly secondary systemic brain insults. Prevention and control of those insults are essential in the management of these patients, from the scene of the accident through the hospital phase.

In Niger, traumatic brain injuries are the leading cause of death among adolescents and young adults, and brain injuries are frequent and severe both in the short and long term [1-4].

Patients and Methods

This was a descriptive and analytical retrospective study conducted from January 1, 2020 to December 31, 2021, over a 2-year period. Patients of any age with isolated traumatic brain injury or traumatic brain injury associated with other injuries, hospitalized in the HNN intensive care unit during the study period, were included. The variables studied were frequency, age, sex, medical history, circumstances and mechanisms of the accident, mode of transport, neurological status on admission, hemodynamic status, respiratory status, associated injuries, laboratory and radiological findings, treatment, length of stay in the intensive care unit, occurring of secondary systemic brain insults during hospitalization, and patient outcome. Data were entered and analyzed using Microsoft 2016 and Sphinx v5 software. Chi-square tests were used to compare variables and were interpreted using a significance threshold of 5%; 95% confidence intervals were calculated

Results

We recorded 92 cases of traumatic brain injury among 544 patients admitted to the intensive care unit of the National Hospital of Niamey over a 24-month period, representing a frequency of 16.91%. Male patients predominated, accounting for 80.43% (n=74), with a sex ratio of 4:1. The mean age was 24.29 years, ranging from 23 days to 68 years. Forty-seven patients (51.09%) were aged between 16 and 40 years. Road traffic accidents were the main cause of TBI, accounting for 85.88% (n=79) (Table 1). Transport was medically supervised in 38.04% (n=35) of cases. The admission delay was less than 6 hours in 44.57% (n=41) of patients. On brain CT, epidural and subdural hematomas each accounted for 26.09% (n=24) (Table 2). TBI was isolated in 70.06% (n=65) of patients and associated with other injuries in 29.34% (n=27). The most frequent associated injuries were limb trauma, 28.26% (n=26), followed by chest trauma, 10.86% (n=10). On admission to the intensive care unit, 73.91% (n=68) of patients had severe TBI with a Glasgow Coma Scale score ≤8, and 21.74% (n=20) had bilateral mydriasis. Neurological deficits were found in 21.73% (n=20). Hemodynamic instability was noted in 29 patients, representing 21.73%, requiring vasopressors in addition to fluid resuscitation. Hypoxia was present in 35.87% of cases, and 52.17% (n=48) of patients were intubated, sedated, and mechanically ventilated. Regarding secondary systemic brain insults, hyponatremia was found in 3.2% (n=3), hypoglycemia in 7.6% (n=7), and hyperglycemia in 10.08% (n=10) (Table 3). Anticonvulsants were administered to 95.65% (n=88) of patients. Blood transfusion was required in 27.17% (n=25). Osmotherapy with 20% mannitol was used in 71.74% (n=66). Surgery was performed in 51.08% (n=47) of patients and consisted of hematoma evacuation in 33 patients (35.86%). The mean length of stay in the intensive care unit was 7.54 days, and 44.56% (n=41) of patients died. The chi-square test at a 95% confidence level showed, with a p-value of 0.000, that the association between Glasgow Coma Scale score and patient death was statistically significant. Fifty-seven point thirty-five percent (57.35%) of patients with a Glasgow Coma Scale score below 8 died, compared with 8.33% of patients with a Glasgow Coma Scale score between 9 and 13. The association between pupillary status and patient death was also statistically significant. Eighty-one point fifty-eight percent (81.58%) of patients with abnormal pupils died, compared with 18.52% of patients with normal pupils (Tables 4 and 5).

Discussion

During our study, 544 patients were recorded in the intensive care unit of the National Hospital of Niamey, including 92 cases of traumatic brain injury, representing an overall frequency of 16.91%. The frequency of traumatic brain injury varies in the literature. It is difficult to assess because of discrepancies in the statistics according to the selection criteria used for patients with TBI. Some authors consider only hospitalized patients, whereas others take into account only the severity of the traumatic brain injury. This variation in the literature may explain differences in incidence, which depend on the study year, region, and study methods [4].

In our series, the patients were young, with a mean age of 24.29 years, ranging from 23 days to 68 years. The most represented age group was 16 to 40 years, accounting for 51.09%. The young age of patients with TBI is confirmed by several studies, including those by Sanoussi S. in Niger, Masson F. in France, and Elombila M. in Congo, who reported mean ages of 27 years, 38.4 years, and 34 years, respectively [4-6]. TBI is particularly common among young people because of a combination of behavioral and environmental factors.

Male patients predominated, accounting for 80.43%, with a sex ratio of 4:1. This male predominance has been reported by many authors [4-6]. Male gender appears to be a predisposing factor, mainly because of greater exposure to activities carrying a risk of accidents.

Road traffic accidents were the main cause of traumatic brain injury, with a frequency of 85.88% in our series. Road traffic accidents as the most frequent cause of TBI have been reported by several authors, including Sanoussi in Niger, Elombia in Congo, and Motah in Cameroon, with frequencies of 77.7%, 75%, and 91.35%, respectively [4,6,7]. Excessive speed, road conditions, inadequate driver training regarding traffic regulations, and lack of a driving license are implicated in the occurrence of road traffic accidents [8].

In our series, 44.57% of patients were admitted within less than 6 hours. Our result was lower than those reported by Kessely Y. in Chad and Irie G. S. in Côte d'Ivoire, who found that 67.22% and 61% of patients, respectively, were admitted within the first six hours [8,9]. The delay in consultation and management is not a major concern in Western countries, unlike in our countries, where prehospital transport is mostly provided by inadequate means [10]. Indeed, the limited use of prehospital medical services, difficulties in accessing specialized healthcare facilities, and the population's

limited financial resources may explain delays in consultation and management in our healthcare facilities.

Traumatic brain injury was severe (Glasgow Coma Scale score ≤8) in 73.91% of patients, with a mortality rate of 57.35% among these patients (p=0.000). In the study by Sanoussi S., mortality among patients with a Glasgow Coma Scale score ≤8 was 90.14% [4].

Among the patients, 38 had pupillary abnormalities, representing a frequency of 41.30% and a mortality rate of 81.54% (p=0.000). A Glasgow Coma Scale score ≤8 and pupillary abnormalities were the main prognostic factors for mortality, as they reflect severe brain injury.

A neurological deficit was found in 20 of our patients, representing 21.73%. Our result was similar to that of Van Haverbeke in France, who reported a frequency of 20.9% [11].

In our study, 31.52% (n=29) of patients had hypotension requiring vasopressors. Our result was markedly higher than those reported by Aguemon A. in Benin and Tentillier in France, who found rates of 12% and 8%, respectively [12,13]. In adults, isolated traumatic brain injury, even when severe, does not cause arterial hypotension, and any decrease in blood pressure requires a search for associated injuries.

The most frequent associated injuries were limb injuries, occurring in 26 of our patients, representing a frequency of 28.88%. Our result was higher than that of Kessely Y., who also found limb trauma to be the most frequent associated injury, with a frequency of 5.97%. However, our result differed from that of Thiaremby in Madagascar, who found facial injuries to be the most frequent associated injuries, with a frequency of 23.72% [8,14].

All our patients underwent brain computed tomography (CT). Our result was similar to that of Sanoussi S., in whose series all patients underwent brain CT [4]. Brain CT allows rapid detection of brain and bone lesions requiring immediate management. In our series, 35.87% (n=33) of patients had hypoxia. Our result was similar to that of G. Boto in Spain, who reported 32%, but higher than that of Van Haverbeke, who reported 23.2% [11,15].

Intubation with sedation and respiratory support was performed in 52.17% (n=48) of patients. Sanoussi reported a rate of intubated patients receiving sedation and respiratory support close to ours, at 43.22%, but our result was markedly lower than that of Van Haverbeke in France, who reported a frequency of 96.3% [11].

The outcome was favorable in 56.52% of cases, corresponding to 52 patients, all of whom were transferred to the neurosurgery department, while 44.56% (n=41) died. This high mortality rate is within the range of mortality rates for severe traumatic brain injury reported in the literature: 58.3% in Congo, 66% in Côte d'Ivoire, 70% in Benin, and 47.9% in Île-de-France [6,9,11,12].

Table 1: Distribution of patients according to the mechanism of the accident.

Mechanism		Number	Percentage (%)
Road traffic accident		79	85.88
Assault	Knife wound	2	2.17
	Stick	5	5.43
Domestic accident		4	4.35
Work-related accident		2	2.17
Total		**92**	**100.00**

Table 2: Distribution of patients according to brain CT findings.

Brain CT findings	Number	Percentage (%)
Epidural hematoma	24	26.09
Subdural hematoma	24	26.09
Cerebral contusion	20	21.74
Skull fracture with depression	9	9.78
Intracranial hypertension	6	6.52
Subarachnoid hemorrhage	2	2.17
Cranio-cerebral wound	2	2.17
Bilateral subdural hematoma	1	1.09
Multiple cerebral contusions/edema	1	1.09
Subarachnoid hemorrhage/Subdural hematoma	1	1.09
Subdural hematoma/Contusion	1	1.09

Table 3: Distribution of patients according to secondary systemic brain insults during hospitalization.

Secondary systemic brain insults		Number	Percentage (%)
Hyperthermia		42	45.66
Blood pressure Pression artérielle	Arterial hypotension	29	31.52
	Arterial hypertension	17	18.48
Hemoglobin	Anemia	25	27.17
Blood glucose Glycémie	Hypoglycemia	7	7.61
	Hyperglycemia	10	6.52
Serum sodium	Hyponatremia	3	5.43
Hypoxia		33	35.87

Table 4: Distribution according to Glasgow Coma Scale score and patient death.

Glasgow Coma Scale	Death	
	Yes (n=41)	No (n=51)
≤ 8	39 (57.35%)	29 (42.65%)
9-13	2 (8.33%)	22 (91.67%)
P-value = 0.000		

Table 5: Distribution according to pupillary status and patient death.

Death		
Yes (n=41)	No (n=51)	
Normal	10(18.52%)	44(81.48%)
Abnormal P-value=0.00	31(81.58%)	7(18.42%)
Anormal P-value=0,00		

Conclusion

Our study shows that traumatic brain injury is a frequent and severe condition in the intensive care unit of the National Hospital of

Niamey. It is a public health problem in Niger, as in other countries worldwide. Road traffic accidents were the most frequent cause. All age groups were represented, with a predominance of young male patients. Improving outcomes in patients with traumatic brain injury requires effective prehospital care, rapid and standardized initial management, and prevention of secondary systemic brain insults.

References

1. Diop MT, Magane MI, Almeimoune A, et al. The polytraumatized in the Emergency Hosting S and the Service of Resuscitation Gabriel Touré Mali. Surgical Science. 2018; 9: 157-163.
2. Tazarourte K, Kleitz O, Laribi S, et al. Prise en charge des traumatismes crâniens graves. Encyclo méd-chir Médecine. 2005; 2: 605-616.
3. Tagliaferri F, Compagnone C, Korsic M, et al. Systematic review of brain injury epidemiology in Europe. Acta Neurochir. 2006; 148: 255-274.
4. Sanoussi S, Abass BA, Baoua M, et al. Aspects Epidémiologiques Cliniques Thérapeutiques des Traumatismes crâniens à l'Hôpital National de Niamey au NIGER. Rev Int Sc Méd. 2009; 11: 27-32.
5. Masson F. Epidémiologie des traumatismes crâniens graves. Ann Fr Anesth Réanim. 2000; 19: 261-269.
6. Elombila M, Ekouele Mbaki HB, Mpoy Emy Monkessa CM, et al. Aspects épidémiologiques, cliniques et évolutifs des traumatismes cranio-encéphaliques en Réanimation polyvalente du Centre Hospitalier Universitaire de Brazzaville. Health Sci Dis. 2022; 23: 117-121.
7. Motah M, Ngonde Sende C, Beyiha G, et al. Prise en charge des traumatismes craniens isolés à l'hopital général de Douala. Health sciences and disease. 2007; 12: 122.
8. Kessely YC, Karamadine M, Ouambi OL, et al. Profil clinico-épidémiologique des traumatismes cranio-encéphaliques chez l'adulte à N'Djamena (Tchad) :étude à propos de 1022 cas. Journal de Neurochirurgie. 2023; 18: 13.
9. Irie G, Pete Y, Nda Koffi C, et al. Profil épidémiologique de traumatismes cranio- encéphaliques au Centre Hospitalier et Universitaire de Bouaké. Med Afr Noire. 2017; 64: 607-612.
10. Rabiou M, Adamou H, Habou O, et al. Traumatismes cranio- encéphaliques à l'Hôpital National de Zinder: étude rétrospective à propos de 153 cas. Annales de l'Université Abdou Moumouni. 2016; 143-151.
11. Van Haverbeke L, Deraedt S, Fourgon R, et al. Traumatismes crâniens graves de l'adulte : prise en charge à la phase précoce en Ile-de- France. Revue médicale de l'assurance maladie. 2004; 35.
12. Aguemon AR, Padonou JL, Yévégnon SR, et al. traumatisme crânien grave en réanimation au Benin de 1998 à 2002. Ann Fr Anesth Réanim. 2005; 24: 36-39.
13. Tentillier E, Comte de Luzy S, Reydy F. La prise en charge du traumatisé crânien grave en pré-hospitalier. Conférence d'Essentiel Sfar. 2015.
14. Tsiaremby MG, Rasolonjatovo CE, Bemora JS, et al. Prise en charge des traumatismes crânio-encéphaliques graves et de gravité moyenne à Antsiranana, Madagascar. Rev Anesth-Reanim Méd Urg et Toxicol. 2023; 15: 25-31.
15. Boto GR, Gomez PA, De la Cruz J, et al. Severe head injury and the risk of early death. J Neurol Neurosurg Psychiatry. 2006; 77: 1054-1059.

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