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Management of Traumatic Brain Injuries at the Kara Regional Hospital

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Abstract

Introduction: Traumatic Brain Injury (TBI) is a major public health problem causing significant morbidity and mortality in young adults. This study aimed to describe the epidemiological, diagnostic, therapeutic, and evolutionary aspects of TBI. **Materials and Methods:** This was a prospective, descriptive study conducted from 1 April 2022 to 31 March 2023 on patients admitted to and treated for cranioencephalic trauma in the General Surgery department of Kara Regional Hospital. **Results:** Eighty-three (83) patients with cranioencephalic trauma were managed out of 773 patients admitted to the department during the study period. The mean age was 34 ± 14.98 years and the sex ratio was 3.6 in favour of men. Motorbike taxi drivers were the social group most affected (n = 33, 40%). The causes of trauma were dominated by public road accidents (n = 80; 96%). TBI was mild (n = 40; 48%), moderate (n = 35; 42%) and severe (n = 8; 10%). Cerebral CT scans were performed in 19 patients (23%). Cerebral contusion (n = 4) was the most frequent cerebral lesion. Six patients (7%) with severe head injuries were transferred to Kara University Hospital. Six deaths (7%) occurred in patients with severe head injuries. The main sequelae were intermittent headaches in all patients reviewed, and memory problems (6%). **Conclusion:** Traumatic brain injuries are common at Kara Regional Hospital. Severe cranial trauma is less frequent but leads to death because of financial difficulties and limited technical facilities.

Keywords

Traumatic Brain Injury, Road Accident, Motorcyclist, Cerebral Contusion,

Togo

1. Introduction

Traumatic brain injury (TBI) is one of the major public health issues worldwide, in terms of mortality, morbidity and socioeconomic repercussions [1] [2]. They are the leading cause of death and disability in young adults [3] [4]. In the United States, an estimated 1.5 million patients a year are admitted to emergency departments with TBI. Of these, 50,000 will die and a third will suffer mild to severe neuropsychological consequences that will persist over time [5]. The incidence of TBI in developing countries varies between 150 and 316 cases per 100,000 inhabitants per year [6]. In Togo, TBI accounted for 27.13% of patients admitted to the intensive care unit in Lomé in 2011 [7]. Road traffic accidents are the main cause in both developed and developing countries [7] [8]. Statistics show that at least 70% of those injured by two-wheeled vehicles are either killed as a result of head injuries or suffer sequelae for the rest of their lives [8]. The treatment of patients with head injuries has long been disappointing, with an uncertain prognosis and serious sequelae. Improving the prognosis of patients with severe TBI depends on initial treatment being carried out properly, right from the pre-hospital phase. The main aim will be to ensure satisfactory cerebral haemodynamics by combating the peripheral (hypoxaemia and/or hypotension) or central (cerebral involvement) causes of cerebral ischaemia [9].

In Africa, the management of severe TBI remains difficult and mortality is high, at around 70%, due to insufficient financial resources and poor technical facilities [10] [11]. In Kara, Togo's second largest city after Lomé, they have a high frequency in surgical emergencies. This study aimed to describe the epidemiological, lesional, therapeutic and evolutionary aspects of TBI received at the Kara Regional Hospital.

2. Patients and Method

This study was prospective and descriptive over 12 months, from 1 April 2022 to 31 March 2023. It included all patients admitted during the study period and treated in the surgical department of the Kara Regional Hospital for cranioencephalic trauma. Our study included patients with isolated head trauma or polytrauma. Patients who died before admission, patients who did not consent to the study and those who were discharged against medical advice were excluded. The variables studied were epidemiological (frequency, age, sex, occupation, month of accident), diagnostic (stage of head injury according to Glasgow Coma Scale, craniocerebral lesions on CT scan), therapeutic and evolutionary.

The data was collected on a pre-established survey form containing a questionnaire addressed to the patient or his or her family, and completed according to the type of hospital care provided. This form was completed before the patient

was discharged or transferred to a more specialised University Hospital. Clinical assessment of the patient's state of consciousness was defined by the Glasgow Coma Scale [12]. A CT scan was requested to assess intracerebral lesions.

Assessment of treatment outcome was mainly clinical, based on level of consciousness.

Data were analysed using SPSS software. The chi-2 test was used to compare percentages with a significance level of 5%.

3. Results

3.1. Epidemiological Data

During the study period, 96 patients with head trauma were recorded out of 773 admitted to the department, representing a frequency of 12.4%. Of the 96 head trauma patients, 83 met our selection criteria. The number of patients admitted per month is shown in Figure 1. The average was 7 cases per month.

The mean age was 34 ± 14.98 years, with extremes of 4 and 70 years. The [20 - 30] and [30 - 40] age groups were the most represented, with proportions of 27% and 25% respectively (Table 1).

There was a predominance of males in 65 cases (78.3%); and the females were represented in 18 cases (21.7%), giving a sex ratio of 3.6. By occupation, motorbike taxi drivers, followed by craftsmen and workers, were the social strata most at risk, with 40% and 21% respectively (Table 2).

Road accidents were the main cause of injury (n = 80; 96%), followed by domestic accidents (4%; n = 3). Motorbikes were involved in 67 of the road accidents (84%). No motorbike driver or passenger was wearing a helmet. Patients were admitted to emergency by non-medical means in 55% of cases. In 45% of

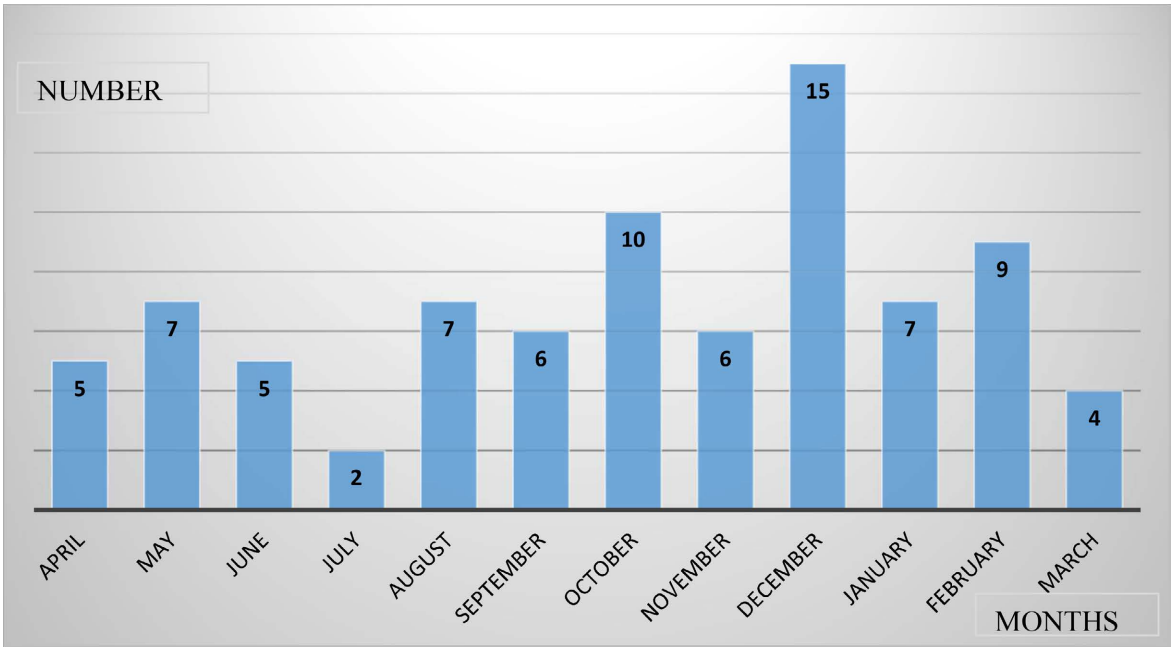

Figure 1. Distribution of patients according to month of admission.

cases, an ambulance was used to transport the injured.

3.2. Clinical Aspects

The majority of patients presented with mild head trauma according to the Glasgow Coma Scale (GCS) (Table 3).

Cerebral CT scans were performed in only 19 patients (23%). The CT result was normal in 10 cases. Cerebral contusion was the most common lesion found in 4 cases (Table 4).

Head trauma was associated with limb fracture in 6 cases (7%), and cervical spine contusion in 4 cases (5%).

Table 1. Distribution of patients according to age group.

Age groups	Number	Percentage
[1 - 10]	4	5%
[10 - 20]	8	10%
[20 - 30]	22	27%
[30 - 40]	21	25%
[40 - 50]	16	19%
[50 - 60]	5	6%
[60 - 70]	7	8%
Total	**83**	**100%**

Table 2. Distribution of patients according to occupation.

	Number	Percentage
Motorbike taxi drivers	33	40%
Craftsmen/workers	17	21%
Farmers/breeders	12	14%
Pupils/students	11	13%
Tradespeople	6	7%
Civil servants	4	5%
Total	**83**	**100%**

Table 3. Distribution of patients according to type of consciousness.

	Number	Percentage
Mild cranial trauma GCS > 13	40	48%
Moderate cranial trauma GCS: 9 - 12	35	42%
Severe cranial trauma GCS < 9	8	10%
Total	**83**	**100%**

Table 4. Distribution according to scan lesions.

	Number (19)
Normal findings	10
Cerebral contusion	4
Intraparenchymal haematoma	3
Skull fracture	2

3.3. Therapeutic and Evolutionary Data

Oxygen therapy with oxygen masks was used in 43 patients (64%). All patients had received paracetamol and/or anti-inflammatory analgesics. In addition to the usual analgesics, 75 patients (90%) had received morphine. Crystalloid-based vascular filling was administered in all cases. Antibiotic therapy (51 cases; 61%) and serum and anti-tetanus vaccine were administered in cases where there was a wound. Corticosteroids were administered in 13 patients (15.7%). Blood transfusion was necessary in 10 cases (12%) where there were associated lesions. Anticonvulsants (12%; n = 10) and anti-oedematous agents (3.6%; n = 3) were also used.

Associated lesions were managed by the relevant specialities.

Fifty-one (n = 51; 62%) patients were discharged within the first 24 hours. Twenty (20) other patients (24%) were discharged between 25 and 48 hours. Six patients (7%) with severe TCE were referred to Kara University Hospital. We recorded 6 deaths, corresponding to a mortality rate of 7%, including four patients classified as severe TBI and two patients classified as moderate head trauma.

Patients reviewed (n = 71) at one month and three months reported intermittent headaches (n = 71; 100%) and memory problems (n = 4; 6%).

4. Discussion

Our study is a prospective and descriptive one on the epidemiological, diagnostic, therapeutic, and evolutionary aspects of TBI at the Kara Regional Hospital. The main limitation of this work is its short duration. In addition, the study setting is a General Surgery department without a neurosurgeon or an equipped intensive care unit. Nevertheless, this is the first study which reports the frequency of head trauma in the centre and their management, which needs to be improved.

The frequency of TBI at the Kara Regional Hospital was 12.4%. This is comparable to the frequency reported by Mbaki *et al.* in Congo in 2018 (10.25%) [13]. There was an average of 7 admissions per month, with peaks in December, October and February. The high frequency in December can be explained by traffic jams in the city linked to the end-of-year festivities, while the high frequency in February and October is due to the funeral period in Kabyè country and the start of the new school year, respectively. These are periods of high population concentration, leading to traffic jams and excessive consumption of al-

coholic beverages during the festivities. This leads to an increase in road accidents. The average age of the patients in our study was 34 years. This is explained by the youth of the Togolese population, as observed in most developing countries [14]. Young, male subjects are the most exposed to the risk of TBI because they are involved in accident-prone activities. Our results are in line with those of Rosenberg *et al.* in Kigali and Mbaki *et al.* in Congo Brazzaville, who found an average age of 30.5 and 34 years respectively [15] [16].

Motorbike taxi drivers (39.8%) were the most represented socio-professional group in our study. The increased use of two-wheeled means of transport has been widely observed, and young unemployed people are making it their profession. These young people, generally from rural areas, have come to the city to find a job to support themselves. As the profession is not regulated and a driving licence is not currently required to drive a motorbike, they mostly start with no experience, no knowledge of the highway code, and, for the most part, no helmet. [17]. This explains the high frequency of accidents on public roads, which accounted for 96% of aetiologies in our study. This predominance of road accidents was also found in the series by Tomta *et al.* in Lomé in 2011, who reported 76.96% [18]; similarly, Akodjènou *et al.* in Benin in 2019 found a frequency of 90% [14].

In our series, none of the patients had received medical transport. Head injury patients were collected and transported by private vehicles or public transport, exposing patients to the risk of secondary injuries. According to the recommendations of the French Society of Anaesthesia and Intensive Care (SFAR) 2016 [19], a serious cranioencephalic trauma patient must be cared for by a pre-hospital medical team, regulated by the Emergency Medical Service (SAMU), and referred as soon as possible to a specialised centre including, in particular, a neurosurgical technical platform and an intensive care unit. This initial treatment aims to stabilise vital functions and avoid secondary cerebral attacks of systemic origin. The lack of pre-hospital management in our series has also been reported by several authors in African countries [8] [14] [16]. This is due to the lack of medical transport in health facilities in these developing countries, as well as the absence of a pre-hospital management system in our countries.

In our series, mild head injuries accounted for the majority (48%), while severe head injuries represented only 10%. Several studies report a higher frequency of severe head trauma. Forty-three percent (43%) for Tomta and 61.7% for Elombila [16] [18]. This difference can be explained by the study setting. Our study was carried out in the surgical department of a Regional Hospital, while the other series came from intensive care units. In our study, only 23% of patients had performed a brain scan. Our result is low compared with other series: 87.75% for Barboza; 90.16% for Doleagbenou [8] [20]. This is because the cost of a brain scan, as well as the rest of the treatment, is borne by the patients and their families. Financial difficulties therefore explain the low rate of CT scans. Cerebral CT without injection is the reference examination for diagnosing cerebral lesions. Its negative predictive value is close to 100% for eliminating lesions

for which neurosurgery is indicated [21]. In our series, CT lesions were dominated by cerebral contusions and intra-parenchymal haematomas. These lesions reflect the trend reported in the literature. Doleagbénou in Lomé found 53.33% contusions [20]. Elombila *et al.* in Brazzaville found 40% contusions and 16.7% intra-parenchymal haematomas [16]. Barboza in Ziguinchor reported 42.85% haemorrhagic contusions and 23.8% intra parenchymal haematoma [8]. Mendy. reported simple skull fractures, cerebral contusions and diffuse cerebral oedema as the main CT lesions found in children admitted to intensive care in Senegal for severe TBI [22].

Deaths were recorded among severe and moderate cases of TBI. The mortality rate was 7%. This significant rate in our study is due to the lack of financial resources and the inadequacy of the technical facilities. Our results are identical to those reported by Doleagbenou *et al.* in Lomé in 2019, who reported a rate of 7.3% [20]. The sequelae found in our series were intermittent headaches and memory problems. Granier *et al.* in 2006 reported in their series auditory sequelae such as tinnitus, which predominated in 5% of cases [23].

5. Conclusions

The incidence of TBI in the surgical department of the Kara Regional Hospital is 12% of admissions. These conditions mainly affect young males, more often motorbike taxi drivers (40%). In 96% of cases, they are caused by road accidents. Mild head injuries are more common, and financial difficulties and the lack of a nearby scanner mean that very few patients are able to undergo brain scanning. Cerebral contusions are the most frequently observed scannographic lesions

Serious head injuries are transferred to the Kara University Hospital Centre for better care. Mortality is significant, with a rate of 7%, due to the inadequacy of the technical facilities and financial difficulties. The sequelae are represented by intermittent headaches and memory problems.

Conflicts of Interest

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

References

[1] Peeters, S., Blaine, C., Vycheth, I., Nang, S., Vuthy, D. and Park, K.B. (2016) Epidemiology of Traumatic Brain Injuries at a Major Government Hospital in Cambodia. *World Neurosurgery*, **97**, 580-589. https://doi.org/10.1016/j.wneu.2016.09.127

[2] Peeters, W., van den Brande, R., Polinder, S., Brazinova, A., Steyerberg, E.W., Lingsma, H.F., Maas, A.I.R. (2015) Epidemiology of Traumatic Brain Injury in Europe. *Acta Neurochirurgica*, **157**, 1683-1696. https://doi.org/10.1007/s00701-015-2512-7

[3] Maas, A.I., Stocchetti, N. and Bullock, R. (2008) Moderate and Severe Traumatic Brain Injury in Adults. *The Lancet Neurology*, **7**, 728-741. https://doi.org/10.1016/S1474-4422(08)70164-9

[4] Masson, F. (2004) Épidémiologie des traumatismes crâniens. *Annales Françaises d'Anesthésie et de Réanimation*, **19**, 262-269. https://doi.org/10.1016/S0750-7658(99)00145-8

[5] Capizzi, A., Woo, J. and Verduzco-Gutierrez, M. (2020) Traumatic Brain Injury. *Medical Clinics of North America*, **104**, 213-238. https://doi.org/10.1016/j.mcna.2019.11.001

[6] Hyder, A.A., Wunderlich, C.A., Puvanachandra, P., Guruaj, G. and Kobusingye, O.C. (2007) The Impact of Traumatic Brain Injuries: A Global Perspective. *NeuroRehabilitation*, **22**, 341-353. https://doi.org/10.3233/NRE-2007-22502

[7] Tomta, K., Djibril, M.A., Mouzou, T., Sama, H., Chobli, M. and Ahouangbevis, S. (2011) Traumatismes Cranioencephaliques (TCE) au Centre Hospitalier Universitaire Tokoin de Lomé (Togo). Journal de la Recherche Scientifique de l'*Université de Lomé*, **13**, 47-57.

[8] Barboza, D., Diédhiou, M., Boudhir, A., Traoré, M.M., Leye, P.A., Diaw, M., *et al.* (2019) Prise en charge des traumatismes crâniens par accident de la voie publique à la réanimation du centre hospitalier régional de Ziguinchor: impact des motos Jakarta. *Revue Africaine d'Anesthésiologie et de Médecine d'Urgence*, **24**, 40-45.

[9] Bouhours, G., Ter Minassian, A. and Beydon, L. (2006) Severe Head Injury: Initial Management. *Réanimation*, **15**, 552-560. https://doi.org/10.1016/j.reaurg.2006.10.004

[10] Odimba, E.B. (2007) Aspects particuliers des traumatismes dans les pays peu nantis d'Afrique. Un vécu chirurgical de 20 ans. *E-Mémoires de L'Académie Nationale de Chirurgie*, **6**, 44-56.

[11] Tchaou, B.A., Tchégnonsi, N.C.F., Bikolo, H.P.M., Mfin, P.S.K. and Chobli, M. (2020) Prognosis Value of Two Gravity Scores in Patients Admited to the Intensive Care Unit at University Hospital of Parakou in Benin. *Open Journal of Anesthesiology*, **10**, 144-156. https://doi.org/10.4236/ojanes.2020.104013

[12] Teasdale, G. and Jennett, B. (1974) Assessment of Coma and Impaired Consciousness. A Practical Scale. *The Lancet*, **2**, 81-84. https://doi.org/10.1016/S0140-6736(74)91639-0

[13] Mbaki, H.B.E., Outman, P.D.O., Elombila, M., Essie, D.E.M., Monkessa, C.M.M.E., Kala, R.G.B., Boukassa, L. and Otiobanda, G.F. (2019) Socio-Demographic Profile of Adults Admitted in Emergency for Brain Trauma Injuries at the University Hospital of Brazzaville (Congo). *Open Journal of Modern Neurosurgery*, **9**, 43-48. https://doi.org/10.4236/ojmn.2019.91006

[14] Ahounou, E., Biaou, C., Yvan, N. and Zoumenou, E. (2019) Traumatismes crâniens graves au Centre Hospitalier Universitaire Départemental de l'Ouémé-Plateau (CHUDOP): Aspects Étiologiques, Thérapeutiques et Évolutifs. *Revue Africaine d'Anesthésie Réanimation*, **24**, 59-67.

[15] Rosenberg, A., Mukeshimana, L., Uwamahoro, A., Dworkin, M., Nsengimana, V., Kankindi, E., Niyonsaba, M., Uwitonze, J.M., Kabagema, I., Dushime, T. and Jayaraman, S. (2020) The Initial Prehospital Management of Traumatic Brain Injuries in Kigali, Rwanda. *Prehospital and Disaster Medicine*, **35**, 533-537. https://doi.org/10.1017/S1049023X20000813

[16] Monkessa, C.M.M.E., Elombila, M., Leyono-Mawandza, P.D.G., Ekouele-Mbaki, H.B. (2022) Aspects Épidémiologiques, Cliniques et Évolutifs des Traumatismes Crânio-Encéphaliques en Réanimation Polyvalente du Centre Hospitalier Universitaire de Brazzaville. *Health Sciences and Disease*, **23**, 117-121.

[17] Madougou, S., Chigblo, P., Tchomtchoua, A., Lawson, E., Yetognon, L. and Akue,

A.-M. (2016) Incidence et impacts des accidents de la voie publique chez les conducteurs de taxi-moto en milieu tropical. *Revue de Chirurgie Orthopédique et Traumatologique*, **102**, 211-214. https://doi.org/10.1016/j.rcot.2016.01.005

[18] Tomta, K., Djibril, M.A., Mouzou, T., Sama, H., Chobli, M. and Ahouangbevis, S. (2011) Traumatismes Cranioencephaliques (TCE) au Centre Hospitalier Universitaire Tokoin de Lomé (Togo). *Journal de la Recherche Scientifique de l'Université de Lomé*, **13**, 47-57.

[19] Geeraerts, T., Velly, L., Abdennour, L., *et al.* (2016) Prise en charge des traumatisés crâniens graves à la phase précoce (24 premières heures). *Anesth Réanim*, **2**, 431-453. https://doi.org/10.1016/j.anrea.2016.09.007

[20] Doléagbénou, A.K., Ahanogbé, H.K., Kpélao, E., Békéti, K.A. and Egu, K. (2019) Aspects Épidémiologiques et Prise en Charge Neurochirurgicale des Traumatismes Cranioencéphaliques de l'Adulte au Centre Hospitalier Universitaire Sylvanus Olympio de Lomé. *Health Sciences and Disease*, **20**, 74-78.

[21] Bouzat, P. (2015) Le traumatisme crânien non grave: Quelle imagerie et pour qui? *Urgences*, **75**, 1-4.

[22] Mendy, J., Kpelao, E., Sakho, Y., *et al.* (2012) Traumatismes crâniens graves de l'enfant: prise en charge et pronostic à court terme à Dakar (Sénégal). *Revue Africaine d'Anesthésiologie et de Médecine d'Urgence,* **17**, 57-61.

[23] Granier, M., Renaud-Picard, L., Chobaut, J.C. and Tavernier, L. (2006) Traumatismes crâniens légers: Complications et séquelles audio-vestibulaires. *Revue de Stomatologie et de Chirurgie Maxillo-Faciale*, **107**, 253-263. https://doi.org/10.1016/S0035-1768(06)77047-4