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EC NEUROLOGY
Research Article

Epidemio-Clinical Profile of Head Trauma at the Neurosurgery Unit Morafeno University Hospital Toamasina, Madagascar

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Received: October 03, 2019; **Published:** October 29, 2019

Abstract

Introduction: Head trauma remains the main reason for consultation and hospitalization in Neurosurgery. It is a real public health problem. The objective of this study is to describe the epidemiological and clinical profile of head trauma patients at Neurosurgery Unit in Morafeno University Hospital.

Methods: We conducted a single-center descriptive retrospective study over a 15-month period from June 2017 to September 2018.

Result: Head injuries accounted for 67.1% of hospitalization in the Neurosurgery department. The male gender accounted for 86.5%. There was a predominance of the age group between [15 - 35 years] which represented 42.3%. The circumstance of the accident was dominated by traffic accidents in 52.9%, followed by the civil liability accident 22.1% and the domestic accident 11.5%. Motor-cyclists' fall was the most frequently encountered accident mechanism (32.7%). After brain scans, 37.4% were bone lesions, 32.5% pericerebral lesions and 30.1% intracerebral lesions.

Conclusion: The vast majority of head injuries are due to anarchic circulation in the city of Tamatave. Accessibility to brain imaging remains a major limitation in optimizing the management of these brain trauma patients.

Keywords: *Epidemio-Clinic; Head Trauma; Tamatave; Madagascar*

Introduction

Head trauma is a mechanical damage to the skull, the structures that envelop it and what it contains. These cranio-brain lesions are common and potentially severe, both in the short term (vital prognosis) and in the long term [1]. They are a major public and socio-economic health problem, both in developing and industrialized countries, particularly for young adults in the labour force. The interest of this study lies in the fact that craniosor-brain trauma is very common in the city of Tamatave and becomes the daily bread of the Neurosurgery department. Our goal is to describe the epidemiological-clinical profile of traumatized brain patients in the city of Tamatave, Madagascar.

Methodology

We conducted a retrospective, descriptive study of head trauma, observed in the Neurosurgery Care, Training and Research Unit at Morafeno University Hospital, from early June 2017 to the end of September 2018, over a 16-month period. The data of one hundred and four patients were collected from medical observation sheets, inpatient records, admission sets, and the operating report book. All patients hospitalized for or not operated head injuries were included in our study. We studied epidemiological parameters such as the

frequency, age, gender of brain-traumatized patients and clinical parameters such as the circumstance of the accident, the patient's state of consciousness, the notion of loss of initial knowledge, the physical signs presented at admission, the point of impact of the trauma, the associated lesions.

Results

Head injuries accounted for 67.1% of hospitalization in the Neurosurgery department. The most affected age is between the interval [15 - 35 years] which represents 42.3% of patients with an extreme age of 2 months and 85 years. Male gender predominates with 90 cases (86.5%) 14 women's cases (13.5%). Traffic accidents account for 52.9% of the circumstances of head injuries, followed by the civil liability accident 22.1% and the domestic accident 11.5% (Figure 1). The fall of motorcycle drivers was the most common traffic accident mechanism with 32.7% of cases, or 18 traumatised (Table 1).

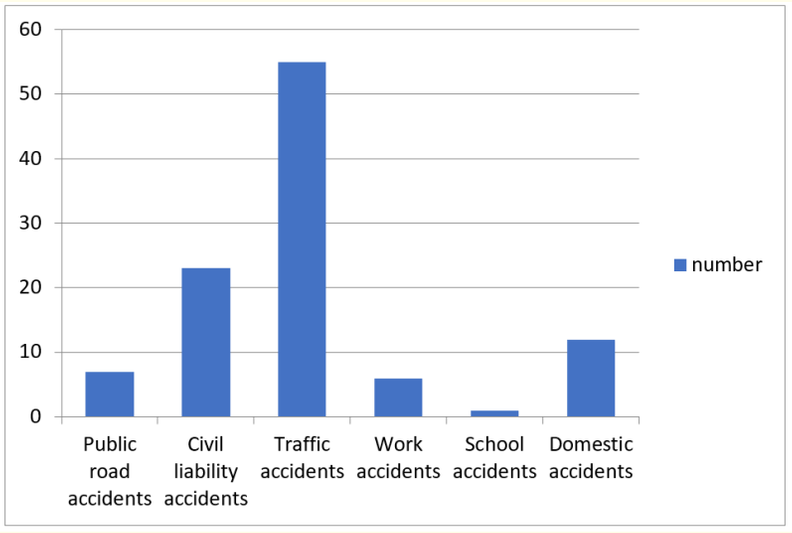

Figure 1: *Nutrition, nutraceuticals and pharmaceuticals.*

Mechanism	Number of people (n = 53)	Percentage (%)
Motorcycle driver's fall	18	32,73
Car versus motorcycle	9	16,36
Two motorcycles collide	4	7,27
Overturned car with passenger	4	7,27
Falling from a moving car	4	7,27
Fall of a motorcycle passenger	4	7,27
Motorcycle versus post	2	3,63
Cyclo pushes against car	2	3,63
Two cars colliding	2	3,63
Twotuctuccollide	1	1,82
Cyclo pushes against motorcycle	1	1,82
Two cyclo shoots collide	1	1,82
Motorcycle vs. kalesa	1	1,82

Table 1: *Breakdown of victims by the traffic accident mechanism.*

Out of 39 bikers, 21 drove without a helmet (53.8%) and 20 of them (51.3%) driving while intoxicated.

The frontal impact is the most encountered with 31.7%, followed by the parietal impact with 18.3% and temporal 14.4% (Table 2). The concept of initial loss of consciousness (NPCI) signifying a cranios headache trauma (TCE) was found in 76% of patients. Regarding local signs found, 47.1% of patients presented scalp wounds, 21.2% epistaxis, 15.4% an otorrhagia, 8.7% unilateral or bilateral periorbital bruising, 6.7% a subcutaneous hematoma, 1% an otolromania. For functional signs, 91.34% had headaches, 22.11% vomiting, 5.8% dizziness, 1.92% hypoaccousia. Patients with a mild head injury (Glasgow score (GCS) - 14) accounted for 78, 84%, those with moderate severe head trauma 12.5% (GCS between 9 and 13) and those with severe head trauma, (GCS-8) 8.65%. On neurological examination, the main signs found were consciousness disorder (11.6%), seizures (9.6%), motor deficits (7.9%) (Table 3). The majority of traumatized individuals had equal and reactive pupils (86.5%) and four patients (3.8%) have had anisocoy.

Name	Number of people (n = 104)	Percentage (%)
Frontal	33	31,71
Parietal	19	18,27
Temporal	15	14,42
Fronto-parietal	10	9,61
Fronto-temporal	8	7,70
Occipital	8	7,70
Parieto-temporal	6	5,77
Parieto-occipital	3	2,88
Multiple	2	1,92

Table 2: *Breakdown by point of impact of trauma.*

	Number of people (n = 63)	Percentage (%)
Consciousness disorder	12	11,5
Seizures	10	9,6
Coma	9	8,9
Engine deficit	8	7,9
Hemiplegia	8	7,9
Agitation	5	4,8
Hemiparesis	3	2,9
Somnolence	3	2,9
Memory problems	2	1,9
Hallucinations	1	1
Behavioural disorders	1	1
Aphasia	1	1

Table 3: *Distribution of head trauma by neurological signs at entry.*

For injuries associated with head trauma, maxillofacial trauma was found in 13.9% of patients, limb trauma in 7.9%, chest trauma in 5.9%, spinal trauma in 2%, and trauma 2%. No abdominal trauma was encountered.

Discussion

In Europe, TCs account for one million hospital admissions each year. The incidence of TC is 235 per 100,000 inhabitants per year and the mortality rate is 15 per 100,000 per year. In 11% of cases, death occurs immediately at the time of TC [2]. In Africa, in Bamako, ac-

cording to Diallo M, neurosurgical activity reported 2,443 patients seen in neurosurgical and/or trauma counselling, operated on or not, including 277 cases of cranios headache trauma (a rate of 11.34% of pathologies neurosurgical management) [3]. In Madagascar, according to a study by Andrianah, it reports a frequency of 87,8% of head injuries in the neurosurgery department of the JosepheRavoahangy University Hospital Center (CHUJRA) [4]. In our series, the frequency of craniospinal injuries in the Neurosurgery Department is 67.1%. This frequency could be explained by the fact that the incidence of head trauma varies from region to region and from time to time.

In Mali,Assétou D. found an average age of 28.9 years with a predominance of the age range between 21 and 30 years. A study conducted in Antananarivo at the University Hospital of Soavinandriana (CENHOSOA), from January 2009 to December 2011, found an average age of 25 years with a predominance of the trache of between 15 and 30 years [5]. This youthful prevalence of head trauma was confirmed in our study. An average age of 26 years was found, with extremes of age from 2 months to 85 years; whose age is most affected between the interval [15 - 35] years. This predominance is largely explained by the youth of the Malagasy population, which has an average age of 21.4 years.

Male predominance was noted: 90 patients (86.5%) compared to 14 women, or 13.37%, with a sex ratio 6.42. This male predominance has been found in France, all ages included, the ratio of men to women of head trauma is 2 to 1, with an incidence of 384 cases per 100,000 inhabitants for men and 185 cases per 100,000 inhabitants among women [6]. In Africa, in the Maghreb, Khay H's study, objective 95% of male gender, with a sex ratio of 8.5 [7]. In Antananarivo, Adrianah EPG found in his study that the sex ratio was 7, in favor of men and with a frequency of 87.5% [4]. Masculinity would have a direct effect of strengthening risk-taking, while femininity inhibits risk-taking through its effect on the perception of danger and the internalization of rules [8].

The majority of head trauma patients in our study were traffic accident victims (AC) (52.9%). According to Hyder., *et al*. globally, nearly 60% of TCs are due to traffic accidents [9]. In France, Woronoff AS., *et al*. showed that ACs are eight times out of ten, the causes of head injuries in their study, 82% [10].

The study by Coulibaly O, showed that 88.4% were victims of AC [11]. In Madagascar, in the city of Antananarivo, Velonjara V found that 47.4% of the traumatized were victims of traffic accidents [12]. After the traffic accident, the Civil Liability Accident (CRA) accounted for 22.11% of the causes of head injuries. This is similar to that of the Ratovondrainy W., et al. study, which found that the CRA holds second place in the causes of head injuries, they found 27.23% of cases [13].

For the mechanism of the accident, the study done by Diallo M found that the accident between motorcyclist and motorist was predominant (26.9%) [3]. According to Cissé OM, 45.1% of injuries are due to Moto-Auto collisions [14]. Bouakar C found in his research that the Moto-Moto and Moto skid mechanisms were the most common with a percentage of 32.7%, each followed by the Moto-Auto mechanism with a rate of 22.4% [15]. In our series, the skid bike was 32.73%, followed by the motorcycle-auto collision with 16.37%. This is believed to be due to speeding, poor road conditions, lack of bike lanes and narrowness. Safety materials/requirements (self protection), seasonal factors.

For risk factors, impaired driving increases both the risk of an accident and the likelihood of death or serious injury. In our series, 21 out of 39 bikers drove without a helmet and 20 of them drove drunk. Ambininjafintabany S in his study came out that non-helmet use is observed in 58.5% of cases, and the notion of alcohol intake in 33.3% of cases. Unlicensed users are more likely to die and have brain-brain lesions than mapped users [16].

It is important to know the point of impact of trauma. The study by Moussa D showed that the preferred seat of head injuries was the fronto-parietal (39%) and right location (48.74%) [4]. According to Ambininjafitabany S in his majunga study, the impacts of trauma are most often either frontal in 35.1% of cases, temporal in 35.7% of cases, or parietal in 21.6% of cases [16]. Similarly for Ousmane B, the impact of trauma was frontal in 32% of cases and parietal in 18% of cases [17]. These data were found in our study, the frontal impact is the majority with 31.71%, followed by the parietal impact with 18.27%.

Initial Loss of Knowledge (or ICP) is the period during which the head trauma patient remained completely unconscious. It can be followed, after regaining consciousness, of disorders such as confusion or disorientation, which should not be taken into account in calculating the duration of the PC. PC and its duration have not been shown to be a statistically significant risk factor for intracranial impairment and therefore initial severity of TC. Pc measurement is a diagnostic and severity-rating tool for TC, widely used and recommended

both nationally and internationally [18]. In our study, 75.97% of traumatized people all had ICH and only 24.03 was lucid. This is in line with Ratovondrainy W data, which he found that out of 392 cases of TC, 61.25% had an IBD [5]. Velonjara V in 2013 at CENHOSOA in Antananarivo found that 67.8% of patients had ICH [12].

In our series, 47.11% of the traumatized had a scalp wound, followed by natural orifices, such as epistaxis 21.15% and otorrhagia 15.39%. Adrianah EPG also found that soft wounds accounted for 90%, with scalp damage dominating 66% of cases. Epistaxis and otorrhagia were 20.4% and 22.4%. These epistaxis and otorrhagia suspect an attack on the base of the skull Lamiree M.S found that there is a clear predominance of scalp wounds or bruises (54.5%), followed by peri-orbital bruising (20.5%) and subcutaneous hematoma (16.4%) [5].

The functional signs, 88.56% of the traumatized in our study all presented headaches; this can be explained by brain contusions or shock. These results were comparable to those of Adriannah EPG, who found that 87.5% of trauma patients complained of headache [4] and those of Ambinionjafitambany S who found that functional signs are dominated by headache in 81,3% of cases [16].

The Glasgow score (or Glasgow Coma Scale) has been used to assess the level of consciousness of patients with neurological impairment, mainly post-traumatic stress disorder, provided it is used in a very rigorous manner to preserve its objective value.

In our series, those who had a mild head injury was 78.8%, 13 patients or 12.5% had moderate head trauma and 9 patients or 8.7% had severe head trauma. This predominance of patient slices with a Glasgow score between 14 and 15 is found by Benaim., *et al*. has seen that among survivors, TC is considered mild in 80% of cases, moderate in 11% and severe in 9% of cases [19].

According to Berte O, neurological disorders were found in 37.6% of his patients and were dominated by hemiparesis in 13.2% of cases, agitation in 10% of cases, hemiplegia in 7.4% of cases, seizures in 4% of cases and monoparesis in 3% of cases [20]. In the Ambininjafitambany S study, neurological disorders accounted for 31.6% of cases. These disorders are dominated by agitation in 15.2% of cases, seizure crisis in 3.5% of cases, sensory deficits in 3.5% of cases and motor deficits in 2.9% of cases [16]. In our series, neurological disorders are dominated by consciousness disorders 11.5%, followed by seizures 9.6% and comatose states 8.9%.

Examination of pupils should note size, symmetry and responsiveness. A uni- or bilateral mydrias found in a head traumatized person may be related to mechanical compression of the third cranial pair during a temporal engagement, but it may also be related to a decrease in blood flow brainstem, direct damage to the eye nerve, peduncular or brain stem lesions, metabolic or ischemic disorders, or intoxication (ethyl poisoning, psychotropic intake, drugs) [21]. Observation of the pupil state is essential for diagnosis and prognosis. In our study, the majority of traumatized people had a normal pupil state 86.5% and 4 traumatized, or 3.8%, had anisocoria. Our result is similar to that found by Khay H 30 cases of anisocoria, or 7%, 7 cases of myosis, or 1%, 24 cases of bilateral mydriasis and 397 traumatized, or 87%, had normal pupils at admission [7].

In our study, associated lesions were represented by, maxillofacial trauma dominates in lesions associated with 13.9%, followed by limb trauma with 7.92%, chest trauma 5.9%, spinal, and finally oral 2%. Khay H found that associated lesions are dominated by maxillofacial impairment 21.2%, followed by limb trauma 13.1%, chest trauma 12%, spinal trauma 6.8%, abdominal trauma and finally pelvic trauma [7]. Coulibaly B. found in his study that more than half, or 51.5%, of the patients had associated lesions, which were mostly lesions of the maxillofacial mass, or 62.4% [15]. According to Ousmane B maxillofacial fractures were predominant at the odonto-stomatological level with 12% [17].

For Lamirée MS, facial trauma in 11.5% of cases, limb trauma in 7.2% and spine trauma in 5.9% of cases [22].

Conclusion

Head trauma remains a source of public health concern in both developed and underdeveloped countries. Our study found that the primary cause of head trauma is a traffic accident. This is due to uncontrolled traffic secondary to non-compliance with the Highway Code, inadequate road infrastructure and the lack of proper helmets for drivers of two-wheeled vehicles. Accessibility to brain imaging remains a big problem to optimize the management of traumatic brain injury; on the one hand by its high cost of and examination relative to the monthly income of a Malagasy household and on the other hand by the number of scanners on Tamatave. The resolution of these different obstacles requires the involvement and commitment of the different factors generated in the suggestion.

Bibliography

1. Drake R., *et al*. "Gray's anatomy for students". Paris: Masson (2006).

2. Tagliaferri F., *et al*. "A systematic review of brain injury epidemiology in Europe". *Acta Neurochirurgica* 148.3 (2006): 255-268.

3. Diallo M. "Epidemiological and clinical study of brain injuries in the Department of Orthopaedic and Trauma Surgery at the Gabriel Touré Hospital in Bamako from January 2006 to June 2006". [Thesis: medicine]. BAMAKO: University of BAMAKO (2007).

4. Andrianah EPG. "Clinical-scannographic aspects of cranio-brain trauma seen at HJRA about 40 cases". Thesis: Medicine No.8427]. Antananarivo: Antananarivo University (2010).

5. Lamirée MS. "Epidemio-clinical, paraclinical and therapeutic study of head trauma at CENHSOA Antananarivo". [Thesis: Medicine, No. 8532]. Antananarivo; University of Antananarivo (2013).

6. Dereix A. "A history of head trauma in a population of prison arrivals". [Thesis: Medicine No. 2015PA06G012]. Paris 6: Pierre and Marie Curie University (2015).

7. Khay H. "Head injuries in the Eastern region (about 458 cases) hospitalized in the neurosurgery and resuscitation department at the Eastern AL FARABI Regional Hospital Center in Oujda". [Thesis: Medicine, No.029/15]. FES: FeS University (2015).

8. Granié MA. "Influence of adherence to gender stereotypes on the perception of pedestrian behaviour in adults". *Research - Transportation - Safety* 101 (2008): 253-264.

9. Hyder AA., *et al*. "The impact of traumatic brain injuries: a global perspective". *NeuroRehabilitation* 22.5 (2007): 341-353.

10. Woronoff AS., *et al*. "Head injuries: Study of the physical, psychological and social consequences of motorcycle accidents in Franche County". Regional Road Safety Observatory (ORSR Franche-County) (2013): 1-4.

11. Coulibaly O. "Head injury management in KATI's multi-purpose resuscitation unit". [Thesis: medicine]. Bamako: University of Bamako (2010).

12. Velonjara V. "Epidemiological-clinical aspects of intracranial hematomas seen at CENHOSOA". [Thesis: medicine, no.8535]. Antananarivo: University of Antananarivo (2013).

13. Ratovondrainy W., *et al*. "Cranio-brain trauma: the reality of his care at the Soavinandriana Antananarivo Hospital Center". *Annales Françaises d'anesthèsie et de Rèanimation* 7.1 (2015): 1-5.

14. Kamoye C. "Bringing CT scans to diagnose cranio-brain injuries in the radiology and medical imaging department of the Gabriel Touré University Hospital in 115 cases". [Thesis: medicine]. Bamako: University of Bamako (2013).

15. Coulibaly B. "Epidemiological and prognostic study of cranio-brain injuries in motorcycles in the neurosurgery department of the Gabriel Touré Hospital and University Centre in BAMAKO". [Thesis: medicine]. Bamako: University of Bamako (2015).

16. Ambininjafitabany S. "Cranio-brain trauma by motorcycle accident seen at PZAGA Mahanjanga University Hospital". [Thesis: Medicine No. 1450]. Majunga: Majunga University (2016).

17. Ousmane B. "Become severe head injuries in resuscitation at the Gabriel Touré Hospital in Bamako from February 2006 to February 2007". [Thesis: medicine]. Bamako: University of Bamako (2009).

18. Lapierre F and Wager M. "Cranio-Brain Trauma. College of Teachers". Paris: Masson (2001): 291-293.

19. Benaïm C and Benatru I. "Head trauma: prognosis". *The Neurologist's Letter* 13.11 (2009): 359-364.

20. Alliez JR., *et al*. "Post-traumatic intracranial hematomas in acute phase". Encyclopédie medico-chirurgicale (2008): 17-585-A-20.

21. Irthum B and Lemaire J. "Intracranial hypertension". Encyclopédie medico-chirurgicale 17035-N-10.

22. Tazarourte K., *et al*. "Epidemiology of head injuries". MAPAR (2008): 141-146.

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