ORIGINAL RESEARCH PAPER

Management

EPIDEMIOLOGICAL, CLINICAL, COMPUTED TOMOGRAPHY AND EVOLUTIONARY PROFILE OF ISOLATED SERIOUS HEAD INJURIES SEEN IN THE RESUSCITATION DEPARTMENT OF TAMBOHOBE-FIANARANTSOA TEACHING HOSPITAL

KEY WORDS: : severe head injury, Resuscitation, Fianarantsoa

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ABSTRACT

Objective: To determine the epidemiological, clinical, tomodensitometric and evolutionary profile of severe head injuries in the Intensive Care Unit of Tambohobe Fianarantsoa Hospital.
Material and Methods: This is a descriptive retrospective study of patients with severe head injury isolated from January 2016 to December 2017. Data was analyzed using IBM SPSS Statistics 20.0 software.
Results: The average age was 31.5 years with extremes of 10 years and 78 years. The sex ratio was 5.3. Voluntary aggression was responsible for 52 (68.4%) serious head injuries. Serious traumatic brain injury presented a coma from the outset in 54 cases (71.1%). Other clinical signs were anisocoria (n = 24), focal motor deficit (n = 17) and convulsive seizure (n = 6). The CT scan achievement rate was 26.3% (n = 20). All CT scan examinations were performed beyond 24 hours of the onset of head trauma. Surgery was indicated in 14 patients (18.4%). The surgical indication was only based on the clinic in 6 cases. The postoperative course was unfavorable in 12 patients (85.7%). The hospital mortality rate for severe head injury was 78.9% (n = 60).
Conclusion: Serious head injuries mainly affected young males. Voluntary aggression was the main etiology. The mortality was very high.

Introduction

Serious head trauma is defined as head injury with a Glasgow score of 8 or less. This definition extends after the correction of vital functions [1-2]. In the world, head injuries are a major cause of death and severe morbidity, especially in the young population [3-4]. A French study on the epidemiology of head trauma in Aquitaine has found an incidence of 281 people per 100,000 inhabitants per year [5]. In Benin, in 2004, a study reported a prevalence of 236 severe head injuries in 673 head injuries hospitalized in a multipurpose intensive care unit [1]. In Madagascar, in 2016, a study reported 26 cases of severe head injury among the 392 traumatized cranial patients hospitalized at the Soavinandriana Hospital Center, ie 6.63% of cases [6]. In Fianarantsoa, to our knowledge, no study on severe head injury has yet been conducted. The objective of this study is to determine the epidemiological, clinical, computed tomography and evolutionary profile of severe head injuries in the Intensive Care Unit of Tambohobe Fianarantsoa Hospital.

Material and methods

This was a descriptive retrospective study performed in the Intensive Care Unit of Fianarantsoa Teaching Hospital for a period of 24 months, from January 2016 to December 2017. Patients with isolated severe brain injury who had or had not had a brain scan were included in this study. Serious head injury is defined as head trauma with a Glasgow score of 8 or less. The non-inclusion criteria were non-traumatic comas, head trauma with a Glasgow score greater than 8, and polytrauma.

For this purpose, the following parameters were studied:

- Socio-demographic characteristics of patients: age, gender, origin
- Family income: in Madagascar, income is related to the monthly minimum wage. In 2016 (Decree N° 2016-232 of the Ministry of Public Service, Labor and Social Law), the minimum monthly wage is 146,000 Ar (42 Euros). We classified as low income, the individual who lives below the minimum monthly wage and as a middle class, the individual whose familyincome is above the monthly minimum wage, and finally, as belonging to the wealthy class, the one who receives more than double

the average income.
- mechanism of the accident,
- notion of a coma immediately or after a free interval,
- circumstances of the accident,
- delay in taking charge (the time elapsed between the accident and the management of the Tambohobe Hospital),
- methods of transportation,
- Clinical signs (state of the pupil, presence or absence of focal motor deficit)
- time required to perform a brain scan (the time elapsed between the accident and the completion of a brain scan),
- delay in surgical management (the time elapsed between the accident and the surgical procedure),
- tomodensitometric aspect of the lesions,
- evolution and
- duration of hospitalization.

Data collection was done from the individual survey form. Data entry was done from the Excel software. The data was analyzed using the IBM SPSS Statistics 20.0 software.

Results

During the 24-month study period, 1856 patients were hospitalized for surgical pathologies in the Polyvalent Resuscitation Department of the Tambohobe-Fianarantsoa Teaching Hospital. Seventy-six patients were admitted for a clinical presentation of severe head injury, ie 4.1% of hospitalization of surgical pathologies. The average age was 31.5 years with extremes of 10 years and 78 years. The socio-demographic characteristics of the patients are summarized in Table 1. Severe head injury was predominantly male. The sex ratio was 5.3. The majority of patients (65.8%) lived with a low family income. Only two patients benefited from unsafe ambulance transport (2.6%). The clinical data of the patients are summarized in Table 2. The voluntary aggression was responsible for 52 (68.4%) serious head injuries. Serious traumatic brain injury presented a coma from the outset in 54 cases (71.1%). Other clinical signs were mainly anisocoria (n = 24), focal motor deficit (n = 17) and convulsive seizure (n = 6). The CT scan achievement rate was 26.3% (n = 20). Of the 20 patients who received a brain scan, 12 (60.0%) had a cerebral contusion (Figure I). All brain scan examinations were performed beyond 24 hours of the onset of head trauma. Surgery was indicated in 14 patients (18.4%). Surgical treatment is summarized in Table 3. The surgical indication was clinically based alone in 6 cases and performed in less than 24 hours. The surgical indication was asked in 8 patients after the results of the CT scan. The postoperative course was unfavorable in 12 patients (85.7%). The hospital mortality rate for severe head injury was 78.9% (n = 60). The average duration of hospitalization was 5.4 days.

Table 1: Sociodemographic characteristics of patients (n = 76)

Parameters			
Average age (year)		31.5	
		Number (n)	Frequency (%)
Gender	Male	64	84.2
	Female	12	15.8
Family income	Low	50	65.8
	Middle	24	31.6
	Rich	2	2.6
Origin	Less than15 Km	22	28.9
	15 – 50 Km	10	13.2
	More than 50 Km	44	57.9
Consultation period (%)	Less than 6 hours	26	34.2
	6 - 12 hours	16	21.1
	More than 12 hours	34	44.7
Means of transport (%)	Private car	74	97.4
	Ambulance	2	2.6
Cerebral Scanner	Done	20	26.3
	Not done	56	73.7

Table 2: Clinical Data of Patients (n = 76)

Patients clinical data	Number (n)	Frequency (%)
Etiological mechanism		
Voluntary aggression	52	68.4
Traffic accident	20	26.3
Fall	4	5.3
Coma		
Immediately	54	71.1
After free interval	22	28.9
Glasgow Score		
6 – 8	62	81.6
4- 5	8	10.5
3	6	7.9
State of the pupils		
Anisocoria	24	31.6
Reactive Equal Pupils	22	28.9
Bilateral mydriasis	18	23.7
Bilateral myosis	12	15.8
Focal Motor Deficiency	17	22.3
Seizure	6	7.9

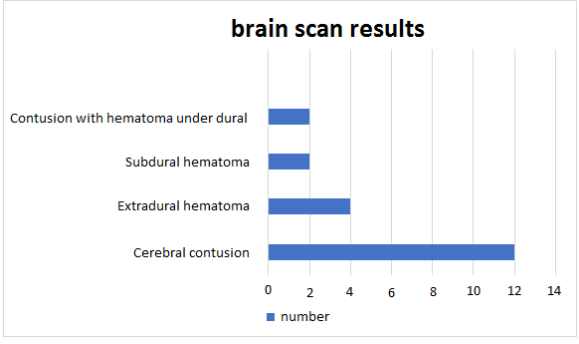

Figure I: Results of the brain scanner

Table 3: Surgical Treatment of Serious Head Trauma (n = 14)

Surgical Treatment	Number (n)	Frequency (%)
Time for surgical management		
Less than 24 hours	6	42.9
More than 24 heures	8	57.1
Surgical indication		
Based only on the clinic (Associated or not wih radiological lesions)	6	42.9
Based on the clinic and the scanner	8	57.1
Types of intervention		
Extradural hematoma evacuation	6	42.9
Subdural hematoma evacuation	6	42.9
Recovery of embarrassment	2	14.2
Evolution		
Death	12	85.7
Favorable	2	14.3

Discussion

This study allowed us to observe that serious head injuries were engraved with high mortality. Severe head injury was predominantly male and mainly caused by voluntary assault. In our study, severe head injuries occurred in young male subjects. Our results are comparable to those of the literature [1-6-7]. Young

male subjects have risk factors for trauma such as more aggressive traits, alcohol use, drug use, and delinquency [6]. In our study, more than half (68.4%) of serious head injuries were due to voluntary assaults followed by the traffic accident (26.3%). In Madagascar, in 2016, a study conducted in the capital reported contradictory results with a predominance of traffic accidents in 55.17% of cases [6]. The high frequency of voluntary assaults in our study could be explained by growing insecurity in rural areas. However, aggression and traffic accidents are the apanage of young people [1-4-6]. We have seen a delay in care as in many developing countries [7-8-9]. However, management in the first hour following the trauma reduces the risk of cerebral ischemia [1-10]. In developed countries, pre-hospital management of severe trauma was around the first hour [11-12-13-14]. This speed of support is explained by the information system performance, and the presence of a backup and pickup system in place and well organized [6]. In our study, the delay in management could be due to the absence of pre-hospital medicine and the distance from the reference center. The majority of patients came from remote areas (more than 50km dance 57.9%). In our study, the evaluation of the neurological state was based essentially on the evaluation of the state of the consciousness, the state of the pupil, the search for a focal motor deficit. In our series, we observed 17 cases (22.3%) of focal motor deficit and 24 cases (31.6%) of anisocoria. Van Haverbeke L et al, observed a motor deficit of 21% and a pupillary abnormality of 38% [15]. In developing countries like ours, in the absence of a brain scanner, the surgical indication is based on the clinic. In other words, the simultaneous presence of a disorder of consciousness, a motor deficit and a unilateral mydriasis was an indication of an exploratory craniotomy and the surgical approach was in principle on the side of mydriasis [16]. In our study, the achievement rate of brain scanner was 26.3%. In developing countries, the low achievement of CT can be explained by the prohibitive cost of the examination which is not proportional to the socioeconomic level of the patients [17]. In our study, all brain scan examinations were performed beyond 24 hours of the occurrence of head trauma. This delay could be explained by two reasons. On the one hand, for technical reasons, the CT scan was done only in the morning. On the other hand, this imaging service is located 5 km from the Tambohobe Teaching Hospital. In our study, only 14 patients (18.4%) underwent surgical treatment. This could be explained by the weak realization of brain CT thus limiting the surgical indication. As in developing countries, the mortality of severe head injuries in our study was very high (78.9%). In Benin, one study reported an almost similar mortality rate (70%), which would be explained by the shortage of diagnostic and therapeutic means, the frequent absence of pre-hospital medical care and the morbid state of patients at home. admission [1]. However, in France, in 2004 [15], and in the USA, in 2012 [18], studies have reported mortality rates of 47.9% and 41%, respectively. In developed countries, mortality rates for serious head injuries are lower due to medical and technological advances in intensive care units.

Conclusion

This study showed that severe head injuries mainly affected young males. Voluntary aggression was the main etiology. The mortality was very high. Access to the brain scanner was very limited, which is the limit of this study.

References

1- A.R. Agučmon, J.L. Padonou b, S.R. Yévčgnon, et al. Traumatismes crâniens graves en réanimation au Bénin de 1998 ŕ 2002. Ann Fr Anesth Réanim. 2005; 24: 36–39.
2- K. Tazarourte, O. Kleitz, S. Laribi, et al. Prise en charge des traumatisés crâniens graves. EMC – Médecine d'urgence. 2007; 25 : 1-9.
3- J.A. Langlois, S.R. Kegler, J.R. Butler, et al. Traumatic brain injury related hospital discharges. MMWR Surveill Summ. 2003; 52: 1-20.
4- F. Masson. Epidémiologie des traumatismes crâniens graves. Ann Fr Anesth Réanim. 2000; 19(4): 261-269.
5- L. Tiret, E. Hausherr, M. Thicoďpé, et al. The epidemiology of head Trauma in Aquitaine (France). Int J Epidemiol 1990; 19: 133-140
6- W Ratovondrainy , L. Raobela, E.C. Rasolonjatovo et al. Traumatisme crânien : réalité de sa prise en charge au Centre Hospitalier de Soavinandriana, Antananarivo. Rev. anesth.-réanim. med. Urgence. 2015; 7(1): 1-5.
7- Y. Coulibaly, A.Dially, M. Fresner,et al. Le traumatisme crânien ŕ l'hôpital du point G : ŕ propos de 80 cas. Mali Médical. 2004; 19: 3-4.
8- S. Koskinen, H. Alaranta. Traumatic brain injury in Finland 1991-2005; Brain Inj. 2008; 22(3): 205-14.
9- F. Masson, M. Thicoipe, F. Aye, et al. Epidemiology of severe brain injuries: a prospective population-based study. J Trauma. 2001; 51(3): 481-489.
10- G. Boulard, J. ChazalPascal, Adnet, et al. Prise en charge des traumatismes crâniens graves précoces. Ann fr Anesth Réanim. 1999; 18: 1-172.
11- G. Regel, P. Lobenhoffer, M. Grotz, et al. Treatment results of patients with multiple trauma: an analysis of 3.406 cases treated between 1972 and 1991 at a German Level I Trauma Center. J Trauma. 1995; 38: 70-8.
12- F. Cohadon, J.P. Castel, E. Richer, et al.Les traumatisés crâniens de l'accident ŕ la réinsertion. 2čme éd. Paris: Arnette Initiative Santé, 2002.
13- E. Mackenzie. Acute hospital costs of trauma in the United States: implications for regionalized systems of care. Trauma. 1990; 30: 101-3.
14- Lapierre F. Mise au point concernant la neuro-traumatologie au Service de Neurochirurgie de CHU la Milétrie. Paris: Doin. 2003; 49: 595-9.
15- V. Haverbeke, S. Deraedt, B. T. Lemoine, et al. Traumatismes crâniens graves de l'adulte : prise en charge ŕ la phase précoce en Île-de-France. Rev Med Ass Maladie. 2004; 35(1):19-25.
16- E.C. Rasolonjatovo, M.G .Tsiaremby, K.T. Rakotovao, et al. L'hématome Extradural Opéré Au Chu Joseph Ravoahangy, Andrianavalona Antananarivo, Madagascar. AJNS. 2016; 32(1).
17- T.A. Adoukonou, J.M. Vallat, J. Joubert et al. Revue neurologique. 2010; 166(11): 882-893.
18- D. M. Panczykowski, A. M. Puccio, B. J. Scruggs, et al Okonkwo Prospective Independent Validation of IMPACT Modeling as a Prognostic Tool in Severe Traumatic Brain Injury. Journal of neurotrauma. 2012; 29: 47–52.