Journal of the Neurological Sciences 371 (2016) 100–104

Contents lists available at ScienceDirect

Journal of the Neurological Sciences

journal homepage: www.elsevier.com/locate/jns

Mortality of head injuries in Sub-Saharan African countries: The case of the university teaching hospitals of Cameroon

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ARTICLE INFO

Article history:
Received 10 December 2015
Received in revised form 7 September 2016
Accepted 11 October 2016
Available online 12 October 2016

Keywords:
Head injuries
Head trauma
Mortality
Sub-Saharan Africa

ABSTRACT

Background: Reliable data on severe head injury mortality is rarely reported in Sub-Saharan African countries and in Cameroon in particular. It was for this reason that for the first time ever a prospective study was carried out during a one year period in the university hospitals and some selected regional and district hospitals in Cameroon.
Materials and methods: All the patients admitted for head injury in the emergency units of the selected hospitals were enrolled and followed up over a period of one month.
Results: A total of 2835 consecutive patients were included with a sex ratio M/F = 3.7/1. One hundred and seventy nine (179) patients lost to follow up were not included. The mortality rate was 77% in the severe head injury group, 16% in the moderate head injury group and 1% in the mild head injury group. In the group of severely injured patients, the mortality rates were very high in the academic hospitals (Laquintinie Hospital of Douala, General Hospital of Douala, Yaounde Central Hospital, and Yaounde University Hospital; 83%, 83%, 81%, and 73% respectively) and in the Regional Hospital of Garoua (84%).
Conclusion: Mortality rates associated with head injury remain very high in Cameroon, and this is likely true in many countries across Sub-Saharan Africa. The figures approach the mortality expected in the natural history of the disease. Strategic plans should be taken at the local and national levels as in the case of maternal mortality and HIV infections.

1. Introduction

Head injuries are frequent and disabling conditions. The incidence ranges between 150 and 300 cases per 100,000 inhabitants per year in developed countries [1,2]. However, the incidence is not yet well known in developing countries especially in Sub-Saharan African countries.

The mortality rate ranges from 17.5 to 70% among head injury patients in recent studies from developing countries [3–7]. Much data remains unavailable and unrepresentative in some countries, including Cameroon where the mortality is expressed as a global rate calculated from small cohorts including mild to severely injured patients grouped together or patients from different departments with selection bias (departments of Surgery, Intensive Care Units or both) [2,3,8–10].

Our study was the first prospective study carried out at the emergency units of some selected hospitals in Cameroon during a one year period to contribute to the epidemiologic profile of head injuries and to determine the mortality rate of head injuries in Cameroon.

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http://dx.doi.org/10.1016/j.jns.2016.10.016
0022-510X/

2. Materials and methods

This was a descriptive study carried out at the emergency units of all the teaching hospitals of Cameroon, and a selected regional hospital and district hospital:

- The university hospitals of the political capital of Cameroon: the Yaounde Central Hospital (YCH), the University Teaching Hospital of Yaounde (UTH), the Essos Hospital Center (EHC) and the Yaounde General Hospital (YGH).
- The university hospitals of the economic capital of Cameroon: the Douala Laquintinie Hospital (DLH) and the Douala General Hospital (DGH).
- The Garoua Regional Hospital (GRH) in the Northern Region of Cameroon
- The Bonassama District Hospital (BDH) in the Littoral Region of Cameroon.

The patients were prospectively included during a one year period, from the 1st of May 2010 to the 31st of April 2011. Patient data was recorded on admission: the age, sex, mechanism of trauma, Glasgow Coma Scale, associated injuries, type of lesion on CT scan, the treatment received and complications. Head injuries were classified based on the GCS as severe (GCS ≤ 8), moderate (GCS = 9–13) and mild (GCS = 14–15). The patients were followed up for a maximum of 30 days and the mortality rate in the acute phase (0 to 30 days) was calculated.

The university hospitals are equipped with CT scans and have neurosurgeons which is not the case with the regional and district hospitals (Table 1). A CT scan was requested for all patients presenting head injury with altered consciousness, focal signs or suspicion of skull base fracture but the financial situation of patients was usually the more decisive factor whenever the technology was available in the hospital (Table 1). It was done freely in evident life-threatening conditions; but patients had to pay the full fee for the CT scan in a non-life threatening condition.

3. Results

During the period of the study, 2835 consecutive patients were recruited as follows: DLH (1330 patients), DGH (280 patients), BDH (199), YGH (102), UTH of Yaounde (166), YCH (368), EHC (54) and GRH (336). One hundred and seventy nine (179) patients lost to follow up by the end of one month were not included (Table 2). There was no significant difference between those lost to follow-up and study participants.

The mean age was 31.17 years ± 15.52 [range: 2 months to 93 years]. The age group 21 to 30 years was most represented (Fig. 1). In the pediatric group, 4% of patients were aged below 2 years; 22% from 2 to 5 years and 74% from 6 to 10 years. Two thousand two hundred and thirty two (2232) patients were male (79%) and 603 patients were female (21%) with a sex ratio of 3.7/1 (M/F).

The various mechanisms of head injury (Fig. 2) were road traffic accidents (77%), assaults (13%), falls (4%), and others (4%). Road traffic accidents represented a total of 2177 cases (77%). Fifty-nine percent (59%) of motorbike victims were not protected by helmets. Road traffic accidents involving motorcycles (51%) were the most frequent mechanism leading to death. The factors associated with TBI severity were gender, RTA and associated lesions (Table 3).

The patients were grouped according to the Glasgow Coma Scale (GCS) into severe (16%), moderate (16%) and mild (68%) head injury patients. Eighteen percent (18%) of patients presented with an isolated head injury while the remainder had associated lesions involving limbs (50%), abdomen (30%), maxillary and facial region (17%), spine (31%), and chest (22%). The delay between the accident and hospital admission was as follows: <1 h (26%), 1–2 h (54%), 3–6 h (7%), 7–12 h (3%), >12 h (7%) and unprecised (5%). Referral was via ambulance in only 4% of the cases.

A CT scan was performed in 851 patients (30%). It revealed acute subdural hematomas in 104 cases (17%), parenchymal hematomas in 89 cases (15%), epidural hematomas in 76 cases (13%), fractures in 285 cases (47%), subarachnoid hemorrhage in 34 cases (6%) and the scan was normal in 160 cases (18%).

The mortality rate was 16% in the total series: 77% in severe head injuries, 16% in moderate head injuries and 1% in minor head injuries (Table 4). In the group of severely injured patients, the mortality rates were very high in the academic hospitals (Laquintinie Hospital of Douala, General Hospital of Douala, Yaounde Central Hospital, and

Table 1
Availability of CT scan and neurosurgeons.

	UTH	YCH	LHD	GHY	GHD	EHC	RHG	BDH
CT scan	0	1	1	1	1	1	0	0
Number of neurosurgeons	0	2	1	1	5	0	0	0
Intensive care unit	1	1	1	1	1	1	0	0

UTH: University Teaching Hospital; YCH: Yaounde Central Hospital; DLH: Douala Laquintinie Hospital; YGH: Yaounde General Hospital; DGH: Douala General Hospital; EHC: Essos Hospital Center; GRH: Garoua Regional Hospital; BDH: Bonassama District Hospital.

Table 2
Comparison of study population to patients lost to follow up.

Parameters	Study population		Patients lost to follow up	
	n (effective)	Percentage (%)	*n* (effective)	Percentage (%)
Age range (year) (*p*-value = 0.3)				
≤10	227	8	5	3
11–20	315	11	20	11
21–30	973	34	84	47
31–40	614	22	47	26
41–50	333	12	13	7
>50	373	13	10	6
Mechanism of trauma (*p* value = 0.10)				
RTA = Road Traffic Accident	2177	77	138	77
Assault	383	14	24	13
Fall	100	4	6	3
Household accident	51	2	3	2
Other	109	4	7	4
Undetermined	15	1	1	1
GCS (*p* value = 0.12)				
3–8	463	16	5	3
9–13	458	16	34	19
14–15	1914	68	140	78

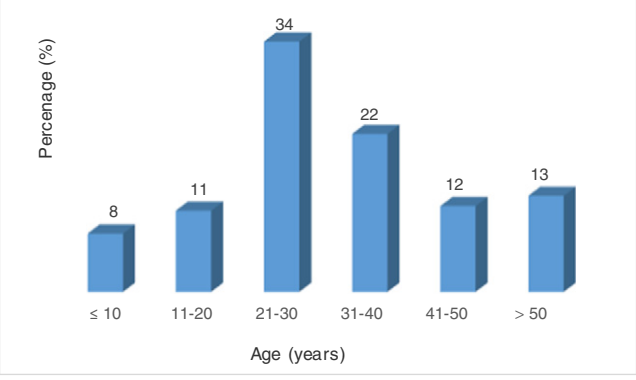

Fig. 1. Age distribution.