

Pre-Hospital Management of Craniocerebral Trauma in South Saharan Africa: Cotonou Experience

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Abstract

The management of craniocerebral trauma begins at the site of the accident. This is one of the diseases for which pre-hospital care is well codified. The objective of this study is to report the experience of the Emergency Aid Medical Service (EMAS) of BENIN in the pre-hospital management of craniocerebral trauma. 146 head injuries were cared for. 116 were male. The mean age was 32 years with extremes ranging from 2 to 77 years. Etiology in 68% of patients was a public road accident. And the request for the use of the EMAS was made by highway users for 41% of the injuries. About 5.5% were severe cranio-brain injuries, more than 75% of which had died in intensive care. In 77% of the EMAS interventions, there was an intensive care physician in the team. 34 wounded had been transported in a vacuum mattress. The rigid cervical collar was used in 8 major traumas. All the wounded were transported by ambulance. The duration of hospitalization varied from a few hours in the emergency department to 90 days in the hospital ward. 9 patients died. One of them, who died in an ambulance, was a woman. The prehospital medical care of head trauma in BENIN is still progressing.

Keywords

Emergency, Craniocerebral, Africa South-Sahara, Pre Hospital Management

1. Introduction

Craniocerebral trauma is the result of direct or indirect physical aggression of the cranial case and its content. The immediate evolution can be unpredictable. Its care begins at the scene of the accident. It is one of the pathologies for which pre-hospital care is well codified in developed countries [1]. Prehospital emergency management means all acts of care or not performed on a patient in an emergency before admission to the emergency room. The aim is to minimize the consequences of the emergency on the patient's condition by ensuring a conditioning, first aid and transportation of the fastest, most secure and most suitable to the state of the patient. In many African countries, pre-hospital medicine is considered as luxury. Thus, the cranial-cerebral traumatized are transported under difficult conditions. In Benin, it was in 1999 that the Emergency Aid Medical Service (EMAS) service had been set up with the military fire brigade of Benin to provide assistance to the wounded in all situations [1] [2]. They intervene upstream, with the aim of reducing secondary complications to inappropriate transport conditions [3].

The objective of this study is to report, the experience of the EMAS Benin, in the pre-hospital management of the traumatized cranial.

2. Patient and Method

This was a retrospective study of cranio-cerebral trauma patients who had been taken in charge, by the EMAS at Cotonou from January 1st to December 31st 2003, still in Cotonou prior to their admission to the Emergency Department of the University Hospital Center (EDUHCC) of Cotonou. The data were collected from patient files at EMAS BENIN on counting cards and analyzed by epi-info version software.

The data collected concerned the characteristics of interventions, information on the identity and clinical features of patients.

Intervention characteristics are: the type of intervention, the person requesting the emergency intervention, the place of intervention, the composition of the response team, the time of departure of the response team, the time of arrival at the intervention site, the duration of the intervention, the time of departure and the time of arrival at the hospital reception center.

Patient data included identity, sex, age, mechanism, circumstances surrounding the occurrence of the trauma, the mode of locomotion involved for traffic injuries, signs of clinical examination, lesion associations, first aid at the scene of the trauma, the patient's condition for transport, care during transport, the patient's condition upon arrival at the emergency room, patients who were alive or died before in the emergency department.

3. Results

1835 patients had been treated by the EMAS BENIN in Cotonou during the study period. Among the 146 traumatized crania-brain patients censured, 116

were males, 79%, with an average age of 32 years, the extremes between 2 and 77 years. 08 patients were less than 15 years old. 131 traumatized were under 45 years old. 06 patients were over 60 years old. The etiology of the trauma was the road accident for 68.5% (**Table 1**). 8% of the traumatized suffered a brawl. 43% of requests for assistance from the EMAS were made by doctors, 41% by road users and 2% by the police (**Table 2**). Facial trauma was associated with 96 patients (65.75%). There was an initial loss of initial knowledge of variable duration of 2 to 30 minutes in 37 patients (25.34%) and 1 patient had a secondary loss of consciousness. 123 traumatized, or 84%, had a Glasgow score above 12. There were 15 patients (10.2%) who had a Glasgow ranging from 8 to 12 and 8 other patients who had a Glasgow score of 3 to 7.

15 patients had a motor deficit. 33 patients had associated limb trauma. 5 had spinal trauma and other 5 had abdominal bruising. 2 had pelvic trauma. 8 patients were polytrauma and 1 was poly-fractured. There was a notion of ethyl poisoning in 2 patients before their trauma.

All patients received blood pressure and heart rate care, and oxygen saturation. A peripheral venous voice was inserted in 135 patients (**Table 3**). The isotonic saline 0.9% placed in 102 patients, the Ringer lactate in 21 patients and the isotonic glucose serum in 12 patients. Macromolecules were used in 9 patients who were in shock. The shell mattress had been used for 34 patients and the cervical collar had been used for 26 patients, including the 8 polytrauma patients. All patients were transported to the Emergency Department of the National University Hospital Center (EDNUHC), except one pregnant. She had been taken to the University Clinic of Gynecology and Obstetrics. The clinical status of 11 patients improved (**Table 4**). One patient died in the course of transportation. 8 patients had not been hospitalized. The length of hospital stay varies from 4 hours to 90 days. 9 patients died. Among these 9 deaths, 5 had a Glasgow score below 8 and 4 had a Glasgow score between 8 and 12. All 123 patients who had an initial Glasgow score greater than 12 had evolved favorably. 5 patients with a Glasgow score less than or equal to 8 had also progressed favorably. Among the 8 polytrauma patients, 5 died. All deaths occurred between the 1st and 5th day (**Table 5**).

4. Discussion

All cranial trauma patients in the EMAS during the study period are predominantly young male subjects. 40% were under 30 years old and 90% were under 45 years old. Public road accident is the circumstance of occurrence of cranial trauma. This is the finding throughout the literature review [3] [4] [5]. The young male subject is the first victim of road accidents [3]. Nearly 50% of EMAS emergency responders are nursing staff. The population itself hasn't yet acquired the reflex of calling the EMAS, which is paying, in case of emergency and prefers to call the military fire-fighters whose intervention is free. In France, the situation is quite different. Indeed, as in all the countries of the North, the

Table 1. Circumstances of occurrence of the accident.

CIRCUMSTANCES	Workforce	Percentages
Public highway accident	100	68.50
Aggressions	12	08.21
Other	34	23.29
Total	146	100.00

Table 2. Applicants of intervention.

APPLICANTS OF INTERVENTION	Workforce	Percentages
Doctor	64	43.84
Nursing	8	05.48
Road User	60	41.09
Parents	4	02.74
Police	3	02.06
Other	7	04.79
Total	146	100.00

Table 3. Technical conditioning before patient transport.

Technical conditioning before patient transport	Effectifs	Pourcentages
Peripheral venous way	135	92.46
Use of mattress shell (misprint)	34	23.28
Necklace cerv	6	04.11

Table 4. Patient evolution from accident site to emergency department arrival.

Workforce	Workforce	Percentages
Stationary stat	134	91.78
Worsening	1	00.68
Improvement	11	07.54
Total	146	100.00

Table 5. Number of deaths relative to the length of hospital stay.

Duration of Hospitalization	<24 Hours	1 Day	2 Days	3 Days	4 Days	5 Days
Number of dead patients	03	02	02	01	00	01

EMAS is the first reflex in terms of medical emergency extra hospital [6] [7]. The 50% of the EMAS-Benin applicants who are health professionals is higher than the 37% found by a previous study on the same population [8]. This increase reflects the growing of the confidence that health professionals are putting in the

EMAS in terms of trauma transportation, in secure conditions, as well as inter-hospital medical transfers. Compared to the figures found in Guadeloupe by LUPERON. Our figures are very high [9]. The reason is the same as the one we have just advanced. The appeal of the EMAS is easy, the first reflex of the population in developed countries, whereas in the developing countries, in Benin, not only that the EMAS does not have an emergency code but also the taxi is the first reflex of the populations to evacuate the patient. The main means of transport is the motorcycle (two-wheeled vehicle) without a helmet. This explains why 66% of the patients had an associated facial trauma, 22% had limb trauma and 8% had polytrauma. 75% of our patients could be classified as Group II and III Master. 5% polytrauma, and 14% of cranial trauma group III. This indicates the violence of accidents, probably in relation to the speed of traffic and the non-use of protective helmets.

100% of our patients had been monitored for hemodynamic constants during their transport far ahead of the 30.9% reported by the authors in Argentina for children [5]. 92% of our patients benefited a peripheral venous course. This rate is higher than the 77% found by APLOGAN and 88% by MOUMOUNI [1] [8] [10] [11]. We explain this difference by the gradual improvement of the services provided by the EMAS. The solutes most used for head trauma still remain at 70% for Saline Serum. Still, 23% of the patients had been transported in a shell mattress and 18% had a cervical collar.

7% of our patients were improved before arriving at the emergency room. This rate is lower than the 14% of MOUMOUNI in the same population [1]. This rate is much lower than 75% clinical improvement, found by J.M.ROUXEL in France [6]. Two reasons might explain why this difference. The material and logistical resources available to the pre-hospital medical emergency services in the northern countries far exceed what is available to young EMASs in the Southern countries. While the EMAS is sought in developed countries, in the south, especially in Benin, the EMAS is sought for patients in groups II and III of the cranial trauma classifications. These two groups are already at higher or lesser risk. 7% of the traumatized died, half of whom had a Glasgow score below 8 and the other half had a Glasgow score above 8.

Almost 62% of the trauma patients had died. ALLODE reports in 2008 a study of nearly 2072 traumatized public roads a mortality rate of 74% of patients, traumatized cranial [4]. One-third of the deaths in our series occurred before the 24-hour post-traumatic period. They were polytrauma patients. This indicates the violence of trauma, not only cranial, but also other trauma associated with polytrauma.

5. Conclusion

The head trauma of the emergency medical service in Benin is predominantly young male subjects, victims of road accidents. The lesions are often classified as group II and III master, in relation to the violence of trauma. The helmet had to

be mandatory for all motorcycle users in order to improve the prognosis of the traumatized by reducing the violence of the shocks on the skull. In all cases, it is no longer necessary to demonstrate that early management of head trauma can greatly improve the prognosis of the patient in all aspects.

Ethical Statement

- Funding: This study was not funded.
- Conflict of Interest: The authors declare that they have no competing interest.
- Ethical approval: Yes.

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