

# Conditions for the Transfer of Patients with Cranial Trauma to the University Hospital Center of Brazzaville

Ekouele Mbaki Hugues Brieux<sup>1,2,\*</sup>, Bianza Eloïse Marthe Anasthasia<sup>1</sup>, Elombila Marie<sup>1,3</sup>, Tiafumu Konde Christ Arnaud<sup>4</sup>, Mbou Essie Darius Eryx<sup>1</sup>, Boukaka Kala Rel Gerald<sup>2</sup>, Boukassa Léon<sup>1,2</sup>, Otiobanda Gilbert Fabrice<sup>1,4</sup>

<sup>1</sup>Faculty of Health Sciences, Marien Ngouabi University, Brazzaville, Republic of Congo

<sup>2</sup>Department of Multipurpose Surgery, University Hospital Center of Brazzaville, Brazzaville, Congo

<sup>3</sup>Department of Intensive Care, University Hospital of Brazzaville, Brazzaville, Congo

<sup>4</sup>Department of Emergency, University Hospital Center of Brazzaville, Brazzaville, Congo

## Email address:

[hugues.ekouele-mbaki@umng.cg](mailto:hugues.ekouele-mbaki@umng.cg) (Ekouele Mbaki Hugues Brieux)

\*Corresponding author

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**Abstract:** The aim of this study was to assess the conditions under which patients suffering from traumatic brain injury (TBI), initially admitted to a peripheral hospital, were cared for and then transferred to the emergency department of the University Hospital Center (UHC) of Brazzaville. We conducted a descriptive study, with a prospective data collection, from March to August 2021, i.e., a period of six months, in the emergency department of the UHC of Brazzaville. We included all adult patients referred from another hospital and who had consented to participate in the study. The variables studied were related to the care at the secondary hospital and the conditions of transfer to the emergency department of the UHC of Brazzaville. We selected 150 cases of TBI, including 43 cases (28.7%) from a peripheral hospital. The age was between 18 and 40 years old in 104 cases (69.3%), a sex ratio of 4. The Glasgow coma scale from peripheral hospital was between 13-15 in 7 cases (16.3%) and unspecified in 30 cases (69.7%). The parameters regarding peripheral oxygen saturation were unspecified in 76.7%, blood pressure was unspecified in 72.1%. The mode of transport used during the transfer was ambulance in 23 cases (53.6%), followed by taxi in 14 cases (32.6%) and personal vehicle in 5 cases (11.6%). Information relating to the initial management of patients is insufficient. Transfer conditions are poorly coordinated. Strengthening inter-hospital cooperation and developing teleconsultation can help improve the quality of transfers.

**Keywords:** Cranial Trauma, Transfer, Brazzaville

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## 1. Introduction

Traumatic brain injury (TBI) refers to all the lesions of the brain and or its envelopes, i.e., the scalp, the bone (skull) and or the meninges, resulting from the sudden action of an external force. The National Head Injury Formation defines cranial trauma as “any cerebral aggression consecutive to an external force which provokes a decreased or altered state of consciousness, which leads to an alteration of the cognitive or physical capacities”. In any case, it must be considered as

a traumatic brain injury [1, 2]. The worldwide prevalence of TBI is estimated at 235 cases per 100,000 inhabitants per year. In the United States of America, studies estimate between 0.5 and 1% the annual frequency of TBI. In Europe, the annual incidence is 235 cases per 100,000 inhabitants. In Africa, the hospital frequency is estimated at 7.3%, with TBI accounting for 5.1 to 10.2% of emergency room admissions [3-6].

The initial hospital management of TBI must take into account the existence of polytrauma, because moderate

trauma increases the morbidity and mortality of the multiple trauma patient. This treatment combines measures for resuscitation, prevention and the fight against secondary cerebral attacks of systemic origin and diagnostic imaging. It makes it possible to organize the transfer of the patient under the appropriate conditions, to an authorized center, in particular in the event of an indication for surgery. Clinical and paraclinical monitoring is essential during the first hours after the trauma [7-10].

The aim of this study was to assess the conditions under which patients suffering from TBI, initially admitted to a peripheral hospital, were cared for and then transferred to the emergency department of the University Hospital Center (UHC) of Brazzaville.

## 2. Materials and Methods

We conducted a descriptive, cross-sectional study, with a prospective data collection, from March to August 2021, i.e. a period of six months, in the emergency department of the UHC of Brazzaville.

The UHC of Brazzaville is a tertiary level center, occupying the top of the health pyramid in the Republic of Congo. He is the only one with a neurosurgical activity for adults in the city of Brazzaville. There were two other tertiary hospitals in the city, the Central Army Hospital (without neurosurgeon) and the Mother and Child Hospital (one neurosurgeon). For the secondary level, there were three reference hospitals operational in three of the nine arrondissements in the city. During the study period, the municipal hospital (secondary level) was dedicated to the management of cases of Covid 19 coronavirus infection. The Emergency Department is made up of three functional units: the medical unit, the surgical unit and the resuscitation room.

The study population consisted of all adult patients who were victims of TBI, among whom we included those referred from another hospital and who had consented to participate in the study. We excluded cases of death on arrival and those for which no information was available. The sampling was exhaustive.

Data were collected from the admissions register, referral letters and patient medical records. They were then recorded on a survey sheet.

The variables studied were related to the care at the secondary hospital and the conditions of transfer to the emergency department of the UHC of Brazzaville. Admission time was considered short (less than 3 hours), medium (between 3 and 6 hours) and long (more than 6 hours).

Data were entered into Cs Pro 7.2 software and configured with the Dropbox server. After collection, data were exported to Excel 2013 spreadsheet for processing. Statistical analyses were performed using SPSS 25 software.

The opinion of the ethics committee and the agreement of the UHC of Brazzaville were obtained. We declare no conflict of interest.

## 3. Results

### 3.1. Population Studied

We selected 150 cases of TBI, including 43 cases (28.7%) from a peripheral hospital (tertiary or secondary). Among the 150 cases of TBI, the age was between 18 and 40 years old in 104 cases (69.3%), between 41 and 60 years old in 34 cases (22.7%) and over 60 years old in 12 cases (8%). There were among them, 120 men and 30 women, a sex ratio of 4.

### 3.2. Care and Transfer Conditions

Table 1 represents the clinical profile of the 43 cases from peripheral hospitals. In these peripheral hospitals, a venous approach was performed in 23 cases (53.4%), an analgesic treatment in 18 cases (42%), the wearing of a neck brace and oxygen therapy in two cases (4.6%).

Table 2 represents the distribution of patients according to the mode of transport used during the transfer.

Admission time was short in 11 cases (25.6%), medium in 12 cases (27.9%) and long in 20 cases (46.5%).

**Table 1.** Distribution of patients from peripheral hospitals according to the parameters of their clinical assessment prior to transfer.

	n	%
SPO <sub>2</sub> (%)		
< 95 %	2	4.7
≥ 95 %	8	18.6
Unspecified	33	76.7
SBP (mmHg)		
100-130	9	20.9
> 130	3	7
Unspecified	31	72.1
DBP (mmHg)		
< 60	1	2.3
6 - 8	11	25.6
Unspecified	31	72.1
GCS		
13 - 15	7	16.3
9-12	3	7
≤ 8	3	7
Unspecified	30	69.7
TOTAL	43	100

SPO<sub>2</sub>: peripheral oxygen saturation

SBP: systolic blood pressure

DBP: diastolic blood pressure

GCS: Glasgow coma scale

**Table 2.** Distribution of patients according to the mode of transport used during the transfer.

	n	%
Ambulance	23	53.6
Taxi	14	32.6
Personal vehicle	5	11.6
Public transport	1	2.3
Total	43	100

## 4. Discussion

Several limitations were identified during this study. The first limit concerned the size of the series which was reduced,

probably influenced by the coronavirus pandemic (social restrictions, limitation of population mobility, confinements, etc.). The second limitation to the study was related to the insufficient data on the referral sheets for patients from peripheral centers. Indeed, Rouxel et al. [11] were able to demonstrate the importance of pre-hospital management, taking into account data on admission. In our series, the majority of patients were transferred without precision of the Glasgow coma scale (69.7%), blood pressure (more than 72%), or pulsed oxygen saturation (76.7%). We can say that the clinical evaluation of head trauma patients transferred to a specialized environment is not sufficient in our context. The reference sheet did not provide the information necessary for the transfer. In hospitals without a neurosurgery or resuscitation referent, the question often arises of whether or not to refer a head trauma patient. Especially when there is the problem of availability of space in a specialized area. Thus, some cases are taken care of in a non-specialized environment [12]. Also, it is essential to note that patients with a Glasgow coma scale between 9 and 11, even if they are not serious, need to be taken care of as serious cases, because it has been shown that more than a third of these patients evolve towards an aggravation requiring specialized care. [13]. In our series, the frequency of TBI patients with a Glasgow coma scale between 9 and 13 was 7%.

The decision to transfer a head trauma patient to a specialized center requires a prior assessment. This, due to limited resources in medical teams in our context, to ensure transport. When the decision is made, the fastest possible transfer is desirable. The best strategy is to send serious cases directly to a specialized center from the scene of the accident, except in the case of uncontrolled hemorrhagic shock, where the patient must be taken to the nearest center in order to stabilize him [14].

In a context with limited resources to ensure optimal quality of transfers, it is interesting to use the means of tele-consultation, with the tele-transmission of radiological images. This, in order to improve the management of emergencies in neurosurgery. This would make it possible to obtain better transfer conditions, to specify the modalities (urgent or non-urgent transfer), to give another opinion, to modify the care or to advise a treatment during the transfer. This approach would also contribute to the implementation of protocols and the reduction of unnecessary transfers. It also makes it possible to prepare for the reception of the patient in a specialized environment [15, 16]. This telemedicine is possible in our context, through the development of specific secure software, through mobile phones or other media.

## 5. Conclusion

Transfer cases represent a little less than 30% of patients admitted for head trauma in a specialized environment. The information relating to the care of these patients in the initial reception center is insufficient. Transfers are poorly documented and uncoordinated. The strengthening of inter-

hospital cooperation and the development of tele-consultation can contribute to improving the quality of transfers for these patients.

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