# *Serious abdominal traumatic emergencies in the emergency department of a "Trauma Center" hospital of Libreville (Gabon): Epidemiological, diagnosis and outcomes aspects*

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## Abstract

**Background**: Abdominal trauma (AT) represents about 15-20% of lesions observed in traumatology. It may be serious and a life-threatening condition. This study aimed to describe the epidemiological, diagnosis and outcomes aspects of severe AT (SAT) admitted to the emergency department of Owendo University Hospital (Gabon).

**Methods**: A cross-sectional and descriptive study with retrospective collection of data. It was conducted over a period of twenty-four months, in the Emergency Department of the CHUO. Only patients with traumatic abdominal pathology classified as serious were included. The variables of the study were: age, sex, mechanism of trauma, pre-hospital management, clinical signs, paraclinical assessment carried out, surgical treatment and evolution. The data were analyzed by Microsoft Excel Pro version 2019 software.

**Results:** during this period, 4.6% (n=105) of patients presented with abdominal trauma. The average age of the patients was 29.8 ± 13.8 years. In 70% of cases (n=49), road traffic accidents (RTA) were the main etiologic mechanism, then assaults (11.4%). In per operative settings, the splenic lesions were the most found in 60% (n=42) of the cases. Crude mortality was 20% (n=14). Deaths occurred in 64.2% of patients during the first forty-eight hours.

**Conclusion:** Serious abdominal trauma is still responsible for high mortality in Gabon, as in other African countries, and the above-mentioned factors remain the cornerstone. Improving its management requires better development of pre-hospital medicine in Gabon, emphasis on training in the use of "Fast-echo" in emergencies and perhaps by strengthening surgical practices such as "damage control" or "abbreviated laparotomy".

**Keywords:** Abdomen; Serious; Owendo; Outcomes; Trauma; Emergency.

## INTRODUCTION

Traumatic pathology is the first cause of death in young adults and abdominal trauma represents about 15-20% of the lesions observed in traumatology, and is associated with high mortality, of the order of 20% [1-2]. The frequency of blunt abdominal trauma is predominant and estimated between 70 and 86% of abdominal trauma [2]. Traumatic abdominal emergencies are characterized by their immediate severity, extreme in the event of damage to the large vessels, the liver, or the spleen. The management of these traumas requires a multidisciplinary collaboration which begins from the prehospital phase with continuity in hospital reception, until the treatment of the lesions and their specific monitoring. The hospital phase requires, if possible, a hospital specializing in severe traumatology such as a "Trauma Center" with an appropriate technical platform and a team well-trained in the management of traumatological emergencies. The objective of this work is to describe the epidemiological, diagnostic, and evolutionary aspects of serious traumatic abdominal emergencies admitted to the emergency department of the University Hospital Center of Owendo, a hospital with the vocation of "Trauma Center" in Libreville (Gabon).

## METHODS

This was a cross-sectional and descriptive study with retrospective data collection. It took place over a period of twenty-four months, from January 1st, 2021, to December 31st, 2022. The emergency, operating theater, and intensive care service of the Owendo University Hospital Center (CHUO), "Trauma Center" in Libreville, served as a place of study. Only patients with abdominal traumatic pathology classified as serious based on the presence of a failure of at least one vital function with proven abdominal morphological lesions were included. All other traumatic emergencies (thoracic trauma, polytrauma without abdominal injury) admitted in emergency care during the same period were excluded from this work. The variables of the study were: age, sex, mechanism of trauma, pre-hospital management, clinical signs, paraclinical assessment carried out, surgical treatment, and outcomes. The data were analyzed by Microsoft Excel Pro version 2019 software. This work was carried out according to the recommendations of the Declaration of Helsinki on the use of human beings. The authorizations of the officials of the University Hospital Center of Owendo have been obtained.

## RESULTS

During the study period, 2300 patients were admitted to the emergency department for trauma. Among the latter, 4.6% (n=105) had abdominal trauma, including 66.7% (n=70) with disruption of at least one vital function. The average age of the patients was 29.8 ± 13.8 years. The male gender was predominant in 80% of cases (n=56) with a sex ratio of 4M/1F. In 70% of cases (n = 49), road traffic accidents (RTA) were the main etiological mechanism, followed by assaults (11.4%) (Table 1). Only 8.6% of cases (n=6) had benefited from medical transport.

***Table 1: Retailing of patients according to etiological mechanisms***

| Etiological Mechanisms | Number (n) | Percentage (%) |
|---|---|---|
| **Public road accident** | **49** | **70** |
| • Car-Car | 16 | 32,7 |
| • Car-pedestrians | 14 | 28,6 |
| • Car-motorbikes | 10 | 20,4 |
| • Car-hurdles | 09 | 18,3 |
| Falls | 11 | 16 |
| Assaults | 08 | 11 |
| Sport | 01 | 1,5 |
| Work accident | 01 | 1,5 |
| Total | **70** | **100** |

The majority (82.9%) of these abdominal trauma emergencies were blunt, and only 5 were penetrating (7.1%). On admission to the emergency department, the main functional sign found was abdominal pain in 87.1% (n=61) of patients. Skin hypoperfusion criteria were observed in 25.8% of cases, and 66% of patients (n=46) presented with tachycardia ≥ 120 bpm. The majority of patients (n= 46) had SBP ≤ 90 mmHg (Table 2).

***Table 2: Retailing of patients according to hemodynamic and respiratory parameters***

| Hemodynamic and respiratory parameters | Number (n) | Frequency (%) |
|---|---|---|
| Cardiac frequency (bpm) | | |
| 90 ≤ Fc ≤ 99 | 07 | 10 |
| 100 ≤ Fc ≤ 109 | 12 | 17 |
| 110 ≤ Fc ≤ 119 | 05 | 7 |
| Fc ≥120 | 46 | 66 |
| Systolic blood pressure (mmHg) | | |
| 100 ≤ PAS ≤ 110 | 24 | 34 |
| 80 ≤ PAS ≤ 90 | 05 | 7 |
| 60 ≤ PAS ≤ 70 | 16 | 23 |
| Respiratory frequency (cpm) | | |
| 12 ≤ FR ≤ 18 | 37 | 52,9 |
| 19 ≤ FR ≤ 25 | 08 | 11,4 |
| 26 ≤ FR ≤ 30 | 15 | 21,4 |
| FR > 30 | 10 | 14,3 |

On the respiratory, 14.3% (n=10) of the patients had a respiratory rate higher than 30 cycles/min. An altered state of consciousness with a Glasgow score between [9-12] was noted in 14.3% (n=10) of patients. On the digestive level, evisceration was found in 5.7% of cases (n=04), abdominal defense in 80% of cases (n=56), and navel pain in 75.5% of cases (n=53). At the morphological paraclinical level, the “Fast-echo” was performed in 66% of cases (n=46), conventional ultrasound in 34% of cases (n=24), and abdominal computed tomography in 10% (n=07) of patients. Hemoperitoneum was found in all patients who underwent ultrasound. The average hemoglobin level was 7.2 g/dl with extremes ranging from 3g/dl to 12g/dl. The time to surgery was less than 2 hours in 2.8% (n=02) of patients, between 3-6 hours in 37.14% (n=26) of patients, and more than 24 hours in 11 % (n=08). In per operative setting, the splenic lesions were the most found in 60% (n=42) of the cases. (Table 3). Total splenectomy was the rule in case of splenic involvement (100%), the retroperitoneal hematomas had been respected and a nephrectomy had been performed in front of the bursting of the kidney. (Table 3). In intensive care after the block, the average length of stay was 3.9 days with a mortality rate of 20% (n=14) of patients.

Deaths occurred in 64.2% of patients during the first forty-eight hours.

***Table 3: Retailing of patients according to lesions and surgical procedure***

| Damage | Number (n) | Surgical act |
|---|---|---|
| Rupture of the spleen | 30 | Splenectomy |
| Spleen crack | 12 | Splenectomy |
| Mesenteric wounds | 12 | Suture |
| Liver wounds | 02 | Packing |
| Liver crack | 04 | Suturing + surgical |
| Liver contusion | 04 | No movement |
| Colon wounds | 08 | Excision - suturing |
| Kidney burst | 01 | Nephrectomy |
| Kidney contusion | 03 | No movement |
| Hail wounds | 04 | Excision - suturing |
| Retroperitoneal hematoma | 04 | No movement |
| Bladder wounds | 03 | Suture |
| Diaphragm wounds | 02 | Suture |

## DISCUSSION

Serious abdominal traumatic emergencies represent 4.6% of all traumatic emergencies and 2.3% of admissions to the CHUO emergency care. They generally concern the young adult male population. Abdominal traumas are lesions observed in the abdomen, its contents, or its walls, by a mechanism that may or may not have respected parietal continuity. They can be isolated (sports accident, aggression), or more frequently, in the context of polytrauma [3]. The prevalence shown by our results is not very far from that of Itéké et al in the DRC with 10.9% of traumatic emergencies and 2.7% of admissions to emergency departments [4]. Among the mechanisms involved, TRA ranks first (70%, n=49), explaining the seriousness of the injuries. TRAs are also incriminated in the work of Ndong A in Senegal with 54.1% of cases [5]. The lack of pre-hospital care in this study reflects the under-medicalization of trauma transport in sub-Saharan Africa in general, most often contributing to the worsening of patients' states and the delay in medical care. This observation was also made by Choua O in Chad and Obame R in Gabon. In this study, thirty-six patients (51.4%) had benefited from an abdominal ultrasound including the "Fast-echo" used in 61.1% (n = 22) of cases [2-6]. "Fast" type ultrasound is of great importance in the initial evaluation of abdominal trauma patients. It aims at detecting post-traumatic peritoneal effusions and also looks for the presence of pleural effusion, however, it does not identify the damaged organs. This underuse of ultrasound finds its root in the lack of extension of its practice among general practitioners working in the emergency department. The majority of emergency services in the sub-Saharan African context are run by general practitioners barely out of medical school. There is also the fact that some serious pictures of patients in shock were immediately taken to the operating room for an exploratory laparotomy leaving no time for this examination to be carried out. The stabilization of vital distress must be done without delay. In this study, only 2.8% (n=02) of the patients had a delay in treatment in the operating room of less than 2 hours. The block delay was between 3 and 6 hours in 37.14% (n=26) of the patients. These delays are still acceptable given the results of Belemlilga in Bobo-Dioulasso which were

beyond 24 hours in 22.2% of patients [7]. Several factors could explain this delay in care in our context, in particular, the unavailability of surgical equipment (gowns, gloves) and consumables during the period of this work, which have been to be brought by the patient's relatives. Early management of operable lesions is a good prognostic factor in this type of traumatic pathology. Surgical management remained classic; a laparotomy had been performed in the face of any clinical or paraclinical picture suggestive of frank haemoperitoneum. The surgical procedures performed depended on the lesions observed. In this work, splenectomy was the rule (42/42), a result close to that of Bio Tamou Sambo et al (17/18) in Benin. [8]. None of the patients had undergone "damage control" or "shortened laparotomy" often recommended in trauma patients presenting with major abdominal bleeding with a risk of coagulopathy [9]. The average length of stay in intensive care was 3.94 days. It can be explained by the effectiveness of the reanimation undertaken but also because of the insufficient number of postoperative complications. The prognosis of a traumatic hemoperitoneum, whatever the circumstances of occurrence, is conditioned by the speed and accuracy of the diagnosis of the lesion and also by the therapeutic option [10]. The mortality rate found was 20%. This rate is similar to that found by Itéké (20.6%) [4], but higher than the rate of Rakotoarivony et al (6.7%) in Madagascar [11]. Among the deaths, 9 cases (35.2%) occurred before the first 48 hours. This observation had already been made by Itéké et al in Congo, which recorded a mortality rate of 42.9% within the same period. Indeed, uncontrolled post-traumatic hemorrhage is the main cause of this mortality [4]. The concept of "damage control" or "shortened laparotomy" is not yet well practiced by CHUO surgeons, despite the indications; this may also be an explanation for the irreversibility of these hemorrhagic shocks on severe abdominal trauma.

## CONCLUSION

Serious abdominal traumatic emergencies affect an almost young, male population with the circumstances of occurrence being road accidents and falls. It is characterized by a glaring insufficiency of pre-hospital care with the consequence of a worsening of the vital prognosis, which leaves little chance for hospital practitioners. On one hand, prehospital care sets difficulties but on the other hand, it makes the hospital improve in the diagnostic means as well as in the surgical relay and resuscitation. The accession of FAST-type ultrasound greatly facilitates early diagnosis and surgical management. Serious abdominal trauma is still responsible for high mortality in Gabon, as in other African countries, and the above-mentioned factors remain the cornerstone. Improving its management requires better development of pre-hospital medicine in Gabon, emphasis on training in the use of "Fast-echo" in emergencies, and perhaps by strengthening surgical practices such as "damage control" or "abbreviated laparotomy".

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