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Epidemiology of Surgical Emergencies in a University Hospital in Cameroon

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Abstract

Introduction: The aim of this study is to establish an epidemiological profile of surgical emergencies in a country with limited resources and to determine their prevalence and mortality. **Methods:** This was a retrospective descriptive study conducted between June 2023 and July 2024 at Laquintinie Hospital in Douala, Cameroon. All patients admitted to the hospital with a surgical emergency and who consented to participate in the study were included. **Results:** The emergency department recorded 11370 cases of surgical emergencies in all specialties, including 3517 cases, a prevalence of 31%. There were 2,472 men and 1045 women, with a male/female sex ratio of 2.4. The mean age was 38.74 ± 18.7 years. The most common age group was between 20 and 30 years (22%). The surgical emergency was traumatic in 2589 cases (73.6%) and atraumatic in 928 cases (26.4%). The three main reasons for consultation were, in order of frequency: pain and functional impotence in 927 cases (26.4%), post-traumatic loss of consciousness in 682 cases (19.4%) and acute abdominal pain in 439 cases (12.5%). Road traffic accidents accounted for 1938 cases (55.1%) of traumatic surgical emergencies. The surgical specialties most frequently requested for advice were orthopaedics and traumatology (30.4%), neurosurgery (24%), digestive surgery (23%). 64% of admitted patients were admitted to the operating theatre for surgery, with 32% undergoing damage control surgery and 68% undergoing early total care. The mortality rate is 7%, with deaths primarily attributable to haemorrhagic shock at 41.5%. **Conclusion:** The prevalence rate of surgical emergencies in Cameroon university hospitals is 31%. The mortality rate is 7%. The population most affected is young adults.

Keywords

Surgical Emergency, Epidemiology, Prevalence, Mortality, Damage Control Surgery

1. Introduction

The health system in Africa is confronted with a series of challenges pertaining to health planning. Health planning can be defined as the implementation of a systematic approach to the achievement of specific health objectives through the efficient utilisation of available resources [1]. Based on primary health care, the health planning model has, over the years, become an essential tool for designing, implementing and evaluating health programmes on the African continent [2]. While there are a number of public health programmes to tackle the many health problems, notably the expanded HIV/AIDS Programme and the fight against which are working quite effectively, there are still difficulties with financial planning for hospital health. The demographic explosion, increasing road traffic, and risky behavior are leading to a growing demand for health services in hospitals, which seem ill-prepared to meet this demand due to inadequate health planning [3]. The degree to which hospitals are performing in accordance with the six pillars of the World Health Organization's strategy for health system strengthening, namely governance and leadership, the health information system, human resources, health financing, essential medical products and technologies, and service delivery, is not yet optimal. As all these pillars are inadequate, hospital training centres continue to be overwhelmed by the growing number of users requiring their services and patients suffering from pathologies for which there is no medical cover [4]. Surgical emergencies represent a significant component of surgical practice, and their management is characterised by sensitivity from both a clinical and medico-legal perspective. The management of these events within the context of a healthcare system that remains predominantly influenced by scheduled surgical interventions poses a significant challenge. In sub-Saharan Africa, and in Cameroon specifically, the development of health insurance systems remains in its infancy. The range of available healthcare services is constrained by several limitations, including an inadequately equipped technical platform as well as logistical and professional resources that still need to be optimized [5]. In countries with limited resources, most emergency surgery facilities are under-equipped and often become overcrowded relatively quickly. This has a detrimental effect on the efficiency of the service, and there is a concomitant increase in morbidity and mortality [6]. The discrepancy between the supply and demand for care is perpetually escalating, frequently necessitating the implementation of arduous decisions regarding the effective utilisation of increasingly scarce personnel and constrained resources [7]. Although surgical emergencies are a common reason for admission to these hospitals, the lack of epidemiological data on them is a major obstacle to

the development of effective health policies to combat this public health problem. The aim of this study is to establish an epidemiological profile of surgical emergencies in a country with limited resources, and to determine their prevalence and mortality.

2. Materials and Methods

2.1. Study Design

This was a retrospective descriptive study conducted between June 2023 and May 2024 at Laquintinie Hospital, Douala. The study population consisted of all patients admitted for emergency surgery and seen by the on-call team. This team consisted of one surgeon, one surgical registrar, three general practitioners and four nurses. Each of the surgical specialties was available to provide specialist advice if required.

2.2. Inclusion and Exclusion Criteria

All patients admitted to the hospital with a surgical emergency and who consented to participate in the study were included. Patients who died in the emergency department, those admitted for obstetric emergencies, and/or those who did not consent to the study were excluded from participation.

2.3. Data Collection

A previously tested data collection form was used. This form was used when the patient was transferred to another service after their vital functions had stabilised. The first part included socio-demographic data such as sex, occupation and age. The second part concerned clinical data and therapeutic follow-up. The third part concerned outcome and transfer. Ethical and administrative approval for the study was obtained from the Ethics Committee of the Laquintinie Hospital (**No.063/LHD/HLD/MC/ECLH**). Informed consent was obtained from participants or their family members, and all data collected were treated with the utmost confidentiality using physical and electronic security measures.

2.4. Statistical Analysis

Data were entered using Epi InfoTM software version 7.1.5.2, and analysis was performed using R Studio statistical software version 1.0.143 (R Development Core Team, Vienna, Austria). General and clinical characteristics of the patients were described using standard descriptive statistics. For quantitative variables, medians and interquartiles or means with standard deviation were calculated. For qualitative variables, counts and percentages were calculated. Student's t-test was used to compare quantitative variables. The significance level was set at $P < 0.05$.

3. Results

Between June 2023 and July 2024, the emergency department recorded 11,370 cases of surgical emergencies in all specialties, including 3517 cases, a prevalence

of 31%. There were 2472 men and 1045 women, with a male/female sex ratio of 2.4. The mean age was 38.74 ± 18.7 years, with extremes of 2 and 96 years. The most common age group was between 20 and 30 years (22%). Table 1 provides a concise overview of the socio-demographic characteristics of the patients included in the study. The three main reasons for consultation were, in order of frequency: pain and functional impotence in 927 cases (26.4%), post-traumatic loss of consciousness in 682 cases (19.4%) and acute abdominal pain in 439 cases (12.5%). As illustrated in Figure 1, the distribution of reasons for consultation yielded 3517 surgical emergencies, of which 2589 (73.6%) were traumatic and 928 (26.4%) were atraumatic. Road traffic accidents accounted for 1938 cases (55.1%) of traumatic surgical emergencies, followed by fights and assaults in 360 cases (10.2%); domestic and work-related accidents accounted for 4.3% and 4% respectively. The breakdown by diagnosis showed that the most frequent conditions were limb trauma in 1088 cases (31%), head and facial trauma in 1065 cases (30.4%), acute abdominal injuries in 344 cases (9.8%), soft tissue infections in 229 cases (6.5%), polytrauma in 160 cases (4.5%), spinal cord trauma in 137 cases (3.9%), urine retention in 115 cases (3.3%), thoracic and vascular trauma in 91 cases (2.6%) and isolated abdominal trauma in 59 cases (1.7%) (Table 2). Of the 3517 patients received for surgical emergencies, 3886 requests for specialist advice were required. The surgical specialties most frequently requested for advice, ranked by frequency, were orthopaedics (34%), neurosurgery (24%), digestive surgery (23%), otorhinolaryngology and maxillofacial surgery (14%), urology (9%), cardiothoracic and vascular and paediatric surgery (8%) (see Figure 2). Of the 3517 patients, 64% were transferred to the operating room for surgery, with 32% undergoing damage control surgery and 68% undergoing early total care. 20.5% were admitted to the surgical intensive care unit immediately for stabilisation before surgery, 7.8% were discharged against medical advice, 0.6% were referred to a higher level health facility and 7% died. Figure 3 illustrates the different outcomes of patient care. The primary cause of death was identified as haemorrhagic shock in 41.5% of cases, followed by septic shock in 21.4% (see Table 3). Statistical analysis (see Table 4) showed that male sex (76.8% of patients who died were male, $p = 0.01$) and age group 20 - 39 years were significantly associated with mortality in surgical emergencies. Patients working in the informal sector and students had a higher risk of dying after a surgical emergency than other patients. Road traffic accidents were associated with a higher risk of death ($p = 0.01$). The emergencies with the highest risk of death were head trauma, polytrauma and acute abdomen, all with p values less than 0.05.

Table 1. Sociodemographic characteristics of patients.

Sociodemographic characteristics	***N*(%)**
Age (years) [min - max]	38.7 ± 18 [2 - 96]
Age group	
0 - 9 years	99 (2.8%)

Continued

10 - 19 years	446 (12.7%)
20- 29 years	768 (21.8%)
30 -39 years	607 (17.3%)
40 - 49 years	520 (14.8%)
50 - 59 years	557 (15.8%)
60 - 69 years	396 (11.3%)
≥70 years	124 (3.5%)
Gender	
Male	2472 (70.3%)
Female	1045 (29.7%)
Profession	
Informal sector	1864 (53%)
Private sector	703 (20%)
Students	633 (18%)
Public sector	235 (6.7%)
Retired	77 (2.2%)
Mechanism of traumatic emergency	2589 (73.6%)
Road traffic accident	1938 (74.8)
Brawl	360 (12.6)
Domestic accident	151 (5.8)
Accident at work	139 (5.4)

Table 2. Diagnostic surgical emergencies.

Diagnostic	Effective (N = 3517)	Proportion (%)
Trauma to limbs	1088	30.9
Cranial and facial trauma	1065	30.3
Acute abdominal	344	9.8
Soft tissue infection	229	6.5
Neoplasia	209	5.9
Polytrauma	160	4.5
Vertebro-medullary trauma	137	3.9
Acute retention of urine	115	3.3
Thoracic trauma	57	1.6
Abdominal trauma	59	1.7
Vascular wounds	34	1.0

Table 3. Distribution of causes of death.

Causes of death	Effective (N = 246)	Proportion (%)
Haemorrhagic shock	102	41.5
Septic shock	60	24.4
Hypovolaemic shock	45	18.3
Respiratory distress	28	11.3
Cerebroencephalic death	11	4.5

Table 4. Factors associated with patient mortality.

Factors	Effective (%) N = 3517	Death (%) N = 246	P-value
Age			
20 - 29 years	768 (21.8%)	89 (36.2%)	0.02
30 - 39 years	607 (17.3%)	72 (29.3%)	0.03
Sex			
Men	2472 (70.3%)	189 (76.8%)	0.01
Women	1045 (29.7%)	57 (23.2%)	0.83
Profession			
Informal sector	1864 (53%)	165 (67%)	0.04
Students	633 (18%)	36 (14.6%)	0.05
Mechanism of injury			
Road traffic accident	1938 (74.8)	183 (74.4%)	0.01
Diagnostic			
Cranial and facial trauma	1065 (30.3%)	74 (30%)	0.04
Acute abdominal	344 (9.8)	68 (27.6%)	0.05
Polytrauma	160 (4.5%)	76 (30.1%)	0.04

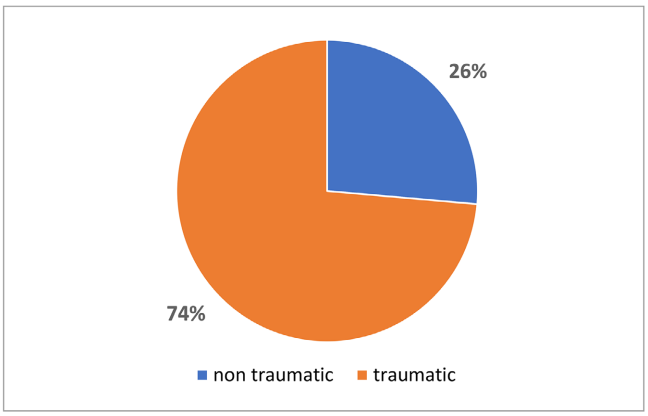

Figure 1. Type of surgical emergencies.

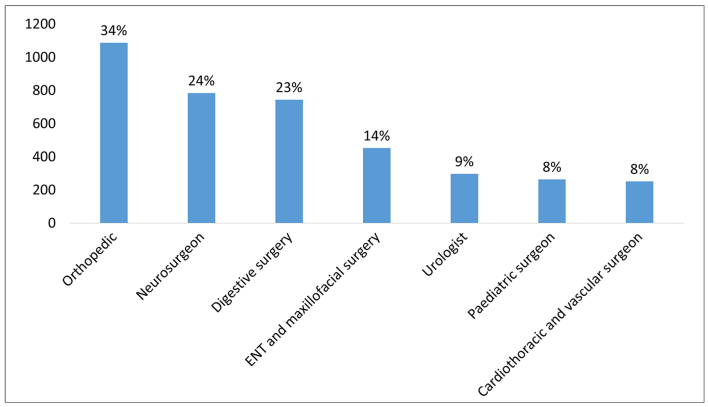

Figure 2. Distribution of requests for surgical specialties in emergency departments.

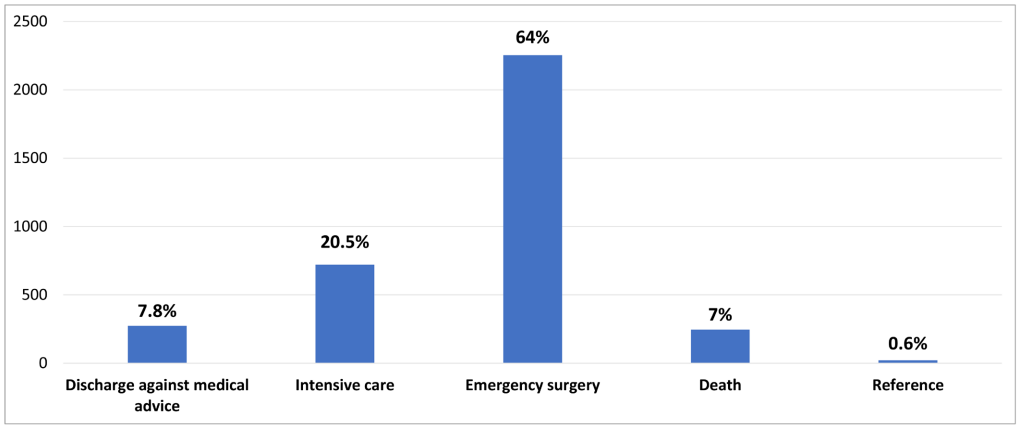

Figure 3. Outcomes of patients admitted for emergency surgery.

4. Discussion

The epidemiological profile of surgical emergencies in hospitals in sub-Saharan Africa is characterised by a preponderance of traumatic injuries, the majority of which are attributable to high-energy accidents. Indeed, African capitals are often subjected to the phenomenon of rural exodus, which results in their rapid demographic expansion and the subsequent emergence of major urban road traffic, with two-wheeled vehicles being the most prevalent [8] [9].

The findings of this study indicate that the annual prevalence of surgical emergencies is estimated to be 31% of all emergencies. This figure constitutes almost a third of emergency room activity. This finding aligns with the results reported by Kimona *et al.* [10] in Congo, who observed a prevalence of 32% among a comparable population of 10,616 patients. This finding underscores the critical need for adequate staffing and technical resources to effectively manage cases that are present in a multi-injury context.

In this study, 70% of patients were male. Indeed, males are more exposed to the risk of accidents in cities with strong demographic and economic expansion [8]. Furthermore, there is a higher probability of men engaging in activities such as operating heavy machinery or two-wheeled vehicles, and working at elevated heights, which increases their susceptibility to accidents and traumatic injuries [11] [12].

The mean age of patients was found to be 38.74 years (±18.7 years), with the most prevalent age groups comprising those between the second and fourth decades of life. This demographic trend has been identified in numerous studies conducted in the context of black Africa [13]-[15]. This segment of the Black African population is notably active in both academic and professional pursuits. Consequently, this demographic is subject to a significant degree of travel, utilising the conventional modes of transportation, particularly the two-wheeled vehicles that are predominant in African capital cities.

The most prevalent reasons for consultation pertained to the most common diagnoses, including limb segment pain accompanied by functional impairment

in limb injuries, loss of consciousness in cases of head injuries, and abdominal pain in cases of acute abdominal injuries. In the study by Béavoqui *et al*., head injuries were attributed to two-wheeled machines, while limb injuries and polytrauma were attributed to four-wheeled machines [13].

In comparison with the study conducted by Wade *et al*. [16] in Senegal, which documented a mortality rate of 0.5% across a series of 219 cases in 2018, the mortality rate observed in the present study was nearly 7% higher. A notable disparity was also identified in the rate of emergency surgery, with 12% reported in the study by Wade *et al*. contrasted with 64% in the present study. This discrepancy could be attributed to the prohibition of public transport using two-wheeled vehicles in Dakar, along with the development of the road network, which has led to a reduction in traffic accidents. Nevertheless, in comparison with the study by Zoumenou *et al*. [17] in Benin, which found a death rate of 11.30% in 7318 admissions, this elevated rate in the latter study may be explained by the fact that medical emergencies were included in its statistics. The predominant cause of death in the present study was identified as haemorrhagic shock, accounting for nearly 37% of cases. These were primarily attributable to cranial trauma and polytrauma, aligning with established data in the literature [14] [18]. In the study by Zoumenou *et al*. [17], polytrauma was identified as a significant factor in mortality, ranking first among surgical emergencies. This observation is consistent with the results of our own study. In a subsequent study by Magagi *et al*. [19] in Niger, the aetiology of peritonitis in acute abdomens was the main cause of admission in 54.5% of cases, with a mortality rate of 15.4%. Compared with the results of the aforementioned study, this mortality rate appears to be slightly lower, as it includes all deaths from acute abdominal surgery, whereas the analysis conducted focuses specifically on cases of peritonitis.

This study is subject to certain methodological limitations. Although the total number of patients was not calculated on the basis of an existing prevalence rate, it was obtained by taking a census of patients over the study period. This method may introduce a bias when extrapolating results to the general population. Nevertheless, the large number of participants and the significant associations identified during the analyses, which are consistent with the results reported in the scientific literature, lend a certain reliability to the results obtained.

5. Conclusion

Surgical emergencies are increasing in prevalence in hospital emergency departments in Cameroon. The prevalence rate of surgical emergencies in university hospitals is 31%. The mortality rate is 7%, with deaths primarily attributable to haemorrhagic shock. The population most affected is the young adults, who are an essential link in the economy, constituting the majority of the active and productive population. The findings of this study offer a valuable resource to decision-makers, providing insights that could inform more effective strategies to prevent and manage the causes of surgical emergencies.

Ethical Approval and Consent to Participate

Studies involving human participants were reviewed and approved by the National Research Ethics Committee for Human Health and the Institutional Research Ethics Committee of the Hospital. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Consent for Publication

The patients who took part in this study were informed that the results might be published. The participants provided consent for the material to be published.

Availability of Data and Hardware

The datasets used and/or analyzed during this study are available from the corresponding author upon reasonable request.

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Authors' Contributions

NMF, ABFS, MEH, NMAS, NBM NE, MFP, BFM, EJP designed the experimental approach and writing plan. NMF, ABFS, MEH and NE recruited participants and performed laboratory analyses. NMF, ABFS, MEH, NMAS, NBM and NE performed the statistical analysis. NMF, ABFS, MEH and NE drew all the figures and wrote the draft. NMF, ABFS, MEH, NMAS, NBM, NE, MFP, BFM and EJP reviewed the manuscript. All the authors cited have made a substantial, direct and intellectual contribution to the work and have approved it for publication.

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Conflicts of Interest

The authors state that the research was conducted in the absence of any commercial or financial relationship that could be interpreted as a potential conflict of interest.

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