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Research Article

Barriers to Surgical Fracture Treatment at a Tertiary Hospital in Eastern DR Congo

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Abstract

Background: Access to surgical treatment of fractures is a challenge in low-income countries. Hospitals with equipment and competence to perform fracture surgery are not always available. Furthermore, as governmental funding of health care systems in many countries is week, the access to adequate fracture treatment may be limited.

Materials and Methods: An observational prospective case series study was conducted at Panzi General Referral Hospital, a tertiary hospital in the eastern part of the Democratic Republic of Congo (DRC). 108 patients with limb fractures needing surgical treatment were included. All patients completed an informed consent. A questionnaire with demographic and socioeconomic data was completed. Clinical data was collected from the medical records at the hospital. Descriptive statistics were presented and analysis of variables influencing the access to surgical treatment was performed.

Results: The group of patients needing surgical fracture treatment was dominated by healthy males of young or middle age with diaphyseal fractures after road traffic accidents. The majority had open fractures. 41.7% (45/108) of the patients were discharged without having undergone surgery, 38 of them due to an inability to pay for the suggested operation. 6 patients preferred to be discharged to get fracture treatment by a traditional bone setter.

Conclusion: The study reveals significant barriers to surgical treatment of fractures in an urban area of the eastern DRC. The main reason for being discharged from the hospital without having undergone the suggested surgery was the inability to pay for the operation. Preference for traditional fracture treatment was another reason for refusing surgery.

Keywords: Access to treatment; Barriers to treatment; Limb fractures; Low-income countries; Surgical fracture treatment

Introduction

Access to surgical care is a challenge for patients in Low-Income Countries (LIC) [1]. The Democratic Republic of Congo (DRC) is one of the sub-Saharan countries with limited access to evidence-based treatment of fractures due to weakness of the health care system, and different barriers can be identified [2,3]. According to international evaluation of essential surgery, fixation of long-bone fractures is one of the "Bellwether" procedures [4]. Surgical care has not been a priority in sub-Saharan countries, and when planning for global surgery in 2030 focus should be on the development of broad-based health-systems solutions [5]. The provision of safe and affordable surgical care will reduce disability and contribute to long-term development. However, the barriers may vary in different countries [2,6]. The surgical care of good quality must be available but also accessible and affordable with an acceptability

from health care providers to assure care for all patients regardless of background. Patients must also have confidence in the care they are offered.

The access to surgical care of fractures is also influenced by the delay of admission to hospital and delay to perform the surgical procedure. However, the delay may be the consequence of a barrier to get health care due to long distances and lack of access to transport to available health institutions with trauma expertise [6-8]. Hospital care in DRC is mainly financed by the patients and their families as the governmental financial support to health institutions is very weak and about 2/3 of the population live with a daily income below the limit of "absolute poverty" [9-11]. Health care is organized in primary, secondary and tertiary level [11]. Panzi General Referral Hospital (PGRH) is a tertiary hospital, the referral hospital of the Ibanda zone of Bukavu with a population of about 500 000 people in the health zone. The urban area of Bukavu, the province capital of South-Kivu, has approximately 1.3 million inhabitants and there are two other hospitals that treat fractures operatively on a regular basis.

At PGRH there is one specialist in traumatology and 5-10 surgeons capable of treating fractures surgically. According to the routines, when patients with trauma injuries are admitted to the hospital a debridement of skin and soft tissue lesions is carried out without delay and a temporary fracture immobilization is done with a splint or cast, but the operative fracture stabilization has to wait until the patient has paid for the surgery. The price for osteosynthesis has been 365 US dollars during the period of this study. The aim was to determine barriers to access surgical treatment of fractures in the urban area of Bukavu in South Kivu in the DRC and reasons for the delay of admission and surgical treatment.

Methods

Study Design and Setting

The present study was a sub-study of an observational prospective consecutive case series study conducted from July 1, 2021, to October 31, 2022, of patients admitted at Panzi General Referral Hospital (PGRH) with limb fractures needing surgical treatment [12]. Epidemiological and clinical data from the observational study are presented in a regional scientific journal [13]. However, the data focusing on the barriers to surgical treatment and reasons of delay have not yet been published.

Data Collection

All patients, 18 years of age or older, admitted with fractures requiring surgical treatment as determined by the attending traumatologist or surgeon, were invited to participate by answering questions about demographics, socioeconomic background and health status. The paper questionnaires were completed by one of the doctors at the Surgical Department. Clinical data from the hospitalization was collected from the medical records of the hospital. The findings were manually entered into an electronic database. Complete data was obtained from 108 patients. 7 patients with incomplete data were excluded. Written informed consent was given from all.

Data Analysis

Statistical analyses were made by using the SPSS version 23 software. The numbers and frequencies were used in the descriptive analyses of the studied variables. In the analysis of qualitative variables, and their influence on completed surgery, the chi-square test was used. For quantitative variables the student t-test was used to determine if significant differences existed between the group with completed surgery and the group discharged without having undergone surgical treatment. If the p-value was smaller than 0.05 the result was considered as statistically significant.

Ethical Considerations

The study was conducted according to the ethical principles of Helsinki declaration (14) and the regional ethical committee was consulted. All participants signed an informed consent.

Results

Data on patient characteristics are presented in Table 1. Most patients were middle-aged or young healthy men, very few were older than 60 years. About 30% came from the rural area outside the urban area. Of the fracture patients, 75% had studied at least in secondary school and 25 % had no higher education than primary school, some of them incomplete primary school. About 50 % of the patients were working with transport, most of them as drivers of motor vehicles. The monthly income was less than 100 US dollars in 63.9 % of the patients. Only 5.6 % of the patients had a monthly income of 500 US dollars or more.

Table 1: Demographics and socioeconomic patient characteristics.

Variable	Definition	Number	Percentage
Study population	Patients with complete data	108	
Age	Median age Range	40 20-71	
Sex	Male Female	76 32	70.4 29.6
Area of origin	Urban Rural	75 33	69.4 30.6
Education level	Primary school Secondary school University	28 58 22	25.9 53.7 20.4
Profession	Driver or motorcyclist	51	47.2
Income	< 100 USD/month 101-500 USD/month > 500 USD/month	69 33 6	63.9 30.6 5.6
Health status	No previous comorbidity Comorbidity	88 20	81.5 18.5

The dominating trauma mechanism was road traffic accident (68.5%). More than half of the patients were admitted directly to the hospital by taxi. A large proportion of the fractures were open fractures (57.4%) mostly in the lower extremity, especially the lower leg. More information is given in Table 2.

Table 2: Trauma, Admission and Fracture characteristics

Variable	Definition	Number	Percentage
Trauma mechanism	Road traffic accident Fall Sport Other	74 18 10 6	68.5 16.7 9.3 5.6
Admission	Direct admission Transfer from health institution	59 49	54.6 45.4
Mode of transport	Ambulance Taxi Other	11 57 40	10.2 52.8 37.0
Fracture localisation	Lower leg Femur Humerus Forearm Ankle Wrist	34 25 22 14 8 5	31.5 23.1 20.4 13.0 7.4 4.6
Fracture characteristics	Open Closed	62 46	57.4 42.6

Classification of open fractures	Gustilo 1 Gustilo 2 Gustilo 3A	25 28 9	40.3 45.2 14.5
Fracture displacement	Minimal Moderate Severe	38 45 25	35.2 41.7 23.1
Polytrauma	Yes No	19 89	17.6 82.4

The fracture displacement was classified subjectively by the attending traumatologist or surgeon into the categories of minimal, moderate or severe displacement. One of the research questions was the influence on the access to surgical treatment, as one of the main inclusion criteria was the indication of surgical fracture treatment according to the recommendation from the traumatologist. In fact, 45 of 108 patients (41.7%) were discharged from the hospital without undergoing surgery. The reasons for not accepting surgical intervention are presented in Table 3.

Table 3: Reason for discharge from the hospital.

Reason for discharge	Number	Percentage
Surgery completed and rehabilitation initiated	63	58.3%
Inability to pay for the surgery which was recommended	38	35.2%
Prefer treatment by a traditional bone setter	6	5.6%
Wants transfer to another hospital for surgery	1	0.9%
TOTAL	108	100%

In addition, potential influencing factors on the access to surgery were analyzed by comparing the groups who accepted surgery and not. The Pearson's chi-squared test was used, and p-values calculated. The results are presented in Table 4. According to this it was more likely to accept surgery if you were a male patient with severe fracture displacement from a road traffic accident. In our study patients from the rural areas were more willing to undergo surgery. Patients who reported that they had already consulted a traditional bone setter before admission were mostly negative to surgical treatment.

Table 4: Influence on the acceptance of surgical treatment.

Variable	Surgery completed	Discharge without surgery	Percentage	p-value
Have consulted a traditional bone setter before hospital admission.	1	12	7.7	< 0.05
Have not consulted a traditional bone setter before hospital admission.	62	33	65.3	
Female gender	13	19	40.6	< 0.05
Male gender	50	26	65.8	
Origin urban area	37	38	49.3	< 0.05
Origin rural area	26	7	78.8	
Admission directly	31	28	52.5	
Transfer from other health institution	32	17	65.3	0.18
Severe fracture displacement	25	0	100	< 0.05
Minimal/Moderate displacement	38	45	45.8	

Road traffic accident	50	24	67.6	< 0.05
Other trauma mechanism	13	21	38.2	

No significant influence on the acceptance of surgery was noticed regarding income, profession, marital status, education level or comorbidity.

The delay in admission and the delay of surgery varied a lot, but about half of the patients were admitted and treated according to international recommendations. More details are given in Table 5.

Table 5: Delay of admission and delay of surgery.

Variable	Definition	Hours	Number	Percentage
Delay of hospital admission after injury, direct admission	Median Range	3 0.5-288	59	54.6
Delay of hospital admission after injury, transfer from other health institution	Median Range	20 1-315	49	45.4
Delay of hospital admission, Patients with open fracture	Hours after injury	< 2 2-24 > 72	31 26 5	50 41.9 8.1
Delay of hospital admission after injury, Patients with closed fracture	Hours after injury	< 24 24-72 > 72	25 20 1	54.3 43.5 2.2
Delay of fracture surgery after injury, Patients with open fracture	Hours after injury	< 6 6-12 12-24 > 24 No surgery	0 20 5 13 24	0 32.3 8.1 21.0 38.7
Delay of fracture surgery after injury, Patients with closed fracture	Hours after injury	< 24 24-72 > 72 No surgery	11 11 3 21	23.9 23.9 6.5 45.7

Discussion

The study population in this case series was dominated by quite healthy males of young or middle age with diaphyseal fractures after road traffic accidents. The majority had open fractures (Tables 1-2). The epidemiological characteristics of fracture patients are similar to the pattern reported from other countries in the sub-Saharan area [15-17]. The majority of the population in DRC belongs to the category of people living in poverty according to international criteria, as 63.9% report a monthly income of less than 100 USD. This is an important fact as the patients and their families need to pay before the definitive surgical intervention. Only six patients of 108 reported an income monthly of 500 USD or more. 49 of the 108 patients were transferred from another health institution, where a primary assessment had been done. Even if there was a shortage of ambulances, taxis were easily available and could in most cases transport the patient to the hospital. Thus, only 10% of the patients came to PGRH by ambulance and 53% by taxi. The most striking finding was the high number of patients who chose to be discharged from the hospital without having undergone surgery (Table 3). 38 of the patients answered that the main reason was the inability to pay, as the operation could not be performed for free. Thus, they were discharged with a cast splint or without adequate stabilization of the fracture against the doctor's advice. Six patients, who did not accept the proposed surgery, answered that the reason for their discharge was thar they preferred to consult a traditional bone setter.

Variables that had a high influence on the acceptance of surgical treatment were male gender, road traffic accident and severe fracture displacement according to the statistical analysis (Table 4). Few patients of origin from rural areas were discharged without having undergone surgery. These patients may have made an active choice of hospital for fracture treatment, as they were not living in the health zone of Panzi Hospital and were prepared to pay for the operation. Only one at 13 patients, who had already consulted a traditional bone setter before the hospital admission, accepted surgery. This finding was statistically significant, but as the numbers were small, we must be careful with conclusions. There is great trust in the population of Bukavu for traditional bone setters. In a retrospective cross-sectional study from Bukavu in 2013 more than 40% of limb fracture patients had consulted the traditional medicine [18]. Similar attitudes are reported from Nigeria [19] and Tanzania [20], where patients with fractures prefer to consult traditional bone setters instead of relying on hospital fracture care. According to a study from Nigeria [21], patients with fractures treated according to the principles of traditional medicine are at great risk of long-term complications as malunion, non-union and secondary osteoarthritis, which may result in permanent disability.

As most patients had been injured in the urban area of Bukavu, the delay of admission was limited, even if quite many patients were transferred from another health institution after initial assessment (Table 5). The delay of surgery was also limited for the patients who accepted to undergo surgery and paid for it without delay. Our study does not point out the delay of admission and surgery as a main obstacle to getting adequate fracture treatment, which has been discussed in other publications [6].

Strengths and Limitations

This observational study reflects the actual situation at a tertiary hospital in Bukavu DRC with a high level of data completeness in the group of patients admitted to the hospital, which serves a big part of the city. However, the knowledge of the epidemiology of fractures, treatment routines at other health institutions and long-term outcomes for fracture patients in the urban area of Bukavu is limited. The study design has methodological limitations and the findings concerning influencing variables must be interpreted with caution.

Conclusion

This observational prospective case series study of patients with limb fractures admitted to the Panzi hospital highlights the barriers to surgical treatment of fractures in a low-income country like the DRC. The main barrier according to our study was patients' inability to pay for the operation, as most patients have a very low income, and there is no health insurance system in practice nor external funding of health care. Preferring traditional medicine over modern hospital care can also contribute to refraining from essential surgical care of fractures. To conclude, people must have confidence in the care that hospitals offer, and the financial barriers must be overcome.

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