

Maxillofacial fractures in patients treated at the Princess Marina Hospital, Gaborone

Juan Carlos Quintana Díaz^{1*}, Carlos Alberto Botella Suarez¹, Evis Johnson Montero¹, Raquel Rojas Bruzón²

1. Princess Marina Hospital, Gaborone, Botswana

2. Hospital General Docente Vladimir Ilich Lenin, Holguín, Cuba

*Corresponding author.

Email address: jcarlosquintanadgiralto@gmail.com

Abstract: Background: Fractures of the maxillofacial complex constitute about half of all fractures, and in a large number of patients they are associated with other fractures and injuries. The etiology is varied, and requires fast, accurate, and timely diagnosis and treatment. The study of this entity is relevant to know its characteristics as part of emergency care; as well as its clinical and social implications. Objective: to describe the behavior of maxillofacial fractures in patients treated at the Maxillofacial Surgery service of Princess Marina Hospital, Gaborone, Botswana. Methods: a descriptive and retrospective study was carried out in the Maxillofacial Surgery service of the Princess Marina Hospital, in Gaborone, Botswana, from June 2018 to June 2020. All patients (N = 423) with diagnosis were included of maxillofacial trauma, and consequently, of some type of fracture of this part of the body. Absolute and relative frequency tables were used to show the information. Results: 423 patients with maxillofacial fractures were attended, among which the male sex predominated. The age group most affected was 26-35 years old; interpersonal violence, the most frequent cause; and skull injuries and fractures, the most common associated injuries. Conclusion: Results were similar to other published studies. Interpersonal violence exceeded traffic accidents as the most common cause of maxillofacial fractures.

Key words: maxillofacial injuries; jaw fractures; emergency medical services

1 Introduction

Fractures of the maxillofacial complex account for approximately 50% of all fractures, and in a large number of patients, they are associated with other fractures and injuries to the body, which complicates their treatment. They represent a significant health problem due to their high incidence today [1,2,3,4,5,6].

Most studies identify traffic accidents, falls, workplace accidents, sports injuries, domestic accidents, assaults, and physical attacks as the most common causes; the most frequently affected age group is between 20 and 40 years old; and males are the most commonly affected [6,7,8,9,10,11,12,13,14,15].

Maxillofacial fractures require rapid, accurate, and timely diagnosis and treatment. Treatment will depend on the patient's age, the type of fracture, and associated complications; such injuries are associated with high morbidity, loss of function and aesthetics, and, in certain cases, death due to associated injuries [6,9,11]. Generally, immediate emergency treatment is required to address life-threatening factors, such as controlling bleeding, maintaining a patent airway, and managing pain and infection, among other aspects [6,10,15,16,17].

Facial injuries can affect appearance and have serious psychological and social consequences. Treatment should focus first on life-threatening conditions, but long-term function and appearance are important secondary considerations [3,6,7,18,19,20].

Given the importance of understanding the characteristics of maxillofacial fractures managed in the emergency department and their clinical, social, research, and organizational implications for the care of these patients, the objective of this study was to describe the patterns of maxillofacial fractures treated in the Maxillofacial Surgery Department at Princess Marina Hospital in Gaborone, Botswana.

2 Methods

A descriptive, retrospective study was conducted in the Maxillofacial Surgery Department at Princess Marina Hospital in Gaborone, Botswana, during the period from June 2018 to June 2020.

The study population and the sample were identical (N=423), consisting of all patients diagnosed in this department with maxillofacial trauma and, consequently, some type of fracture in this part of the body.

A data collection form was developed to facilitate data processing and was placed in the outpatient clinic and the emergency department. It included general patient information, age, sex, type and causes of the fractures, and associated injuries.

The variables analyzed were: sex (female, male); age groups (in years: ≤ 15 , 16–25, 26–35, 36–45, 46–55, and ≥ 56); etiology (interpersonal violence, traffic accident, work-related or sports-related accident, fall, gunshot wound); type of injuries [hard tissue: mandibular, nasal, dentoalveolar, frontal, supraorbital, Le-Fort type, and zygomatic complex (maxillomalar) fractures; multiple (when more than one facial bone was affected), and soft tissue (wounds ≤ 2 cm or >2 cm, facial and from other body sites, involvement of the parotid duct, and injuries and fractures of other body parts, including the skull and upper and lower extremities].

The data obtained were entered into a database and then processed using SPSS 11.5 statistical software. Tables of absolute and relative frequencies were used to present the information.

The specialty team ensured adequate doctor-patient communication regarding initial management, provided the patient was conscious and cooperative; or doctor-family communication, if a family member was present at the time of emergency care, involving them in the process. The information collected from the patients' medical records was treated confidentially and was used solely for research purposes.

3 Results

Regarding the distribution of patients by age and sex, males predominated (344/81.3%). It was found that those aged 56 and older and those aged 15 and younger were the least affected. The highest percentage was found in the 26-35 age group (39.2%), followed by the 16-25 age group at 25.2% and the 36-45 age group at 22.5%. (Table 1).

Table 1. Distribution of patients with maxillofacial fractures according to age-groups and sex

Age-groups	Male		Female		Total	
	No.	%	No.	%	No.	%
≤15	13	3.1	8	1.9	21	5
16-25	85	20	22	5.2	107	25.2
26-35	133	31.4	33	7.8	166	39.2
36-45	87	20.5	8	1.9	95	22.5
46-55	19	4.5	5	1.2	24	5.7
≥56	7	1.7	3	0.7	10	2.4
Total	344	81.3	79	18.7	423	100

The most frequent fractures were mandibular fractures, involving 255 patients (60.2 %), followed by maxillomalar (13.5 %), dentoalveolar (9.5 %), and nasal (6.1 %) fractures, respectively (Table 2).

Table 2. Distribution of patients according to type of maxillofacial fracture and sex

Type of fracture	Male		Female		Total	
	No.	%	No.	%	No.	%
Mandibular	215	50.7	40	9.6	255	60.2
Maxillomalar	51	12.1	6	1.4	57	13.5
Dentoalveolar	25	5.9	15	3.6	40	9.5
Nasal	18	4.3	7	1.8	25	6.1
Le-Fort	12	2.8	3	0.8	15	3.6
Multiple	9	2.1	3	0.8	17	2.9
Frontal	8	1.9	3	0.8	11	2.7
Supraorbital	8	1.5	2	0.6	8	2.1
Total	344	81.3	79	18.7	423	100

Regarding the causes of fractures, interpersonal violence ranked first with 127 cases (30 %), followed by traffic accidents (27.7 %) and assaults (24.6 %); other causes accounted for less than 10 % (Table 3).

Table 3. Distribution of patients according to cause of fractures

Causes	No.	%
Interpersonal violence	127	30
Traffic accidents	117	27.7
Assaults	104	24.6
Falls	33	7.8
Sports-related accidents	14	3.3
Domestic violence	10	2.4
Occupational accidents	9	2.1
Vehicle-pedestrian collisions	6	1.4
Firearm wounds	3	0.7
Total	423	100

A total of 76 patients presented with associated injuries, including lacerations, fractures and pneumothorax. The most common were lacerations, both facial and involving other body regions, followed by skull fractures (25 %), and fractures of the upper and lower extremities (Table 4).

Table 4. Distribution of patients with maxillofacial fractures according to associated injuries

Associated injuries	No.	%
Facial lacerations	28	36.9
Skull fractures	19	25
Upper-extremity fractures	9	11.9
Lower-extremity fractures	7	9.2
Upper-extremity lacerations	5	6.6
Abdominal lacerations	2	2.6
Parotid- gland lacerations	2	2.6
Pneumothorax	2	2.6
Pelvic fractures	2	2.6
Total	76	100

4 Discussion

When analyzing gender patterns, the observed male-to-female ratio matches that found by most of the authors consulted [1,3,5,6,7,8,9,11,12,13,14,15]. Men are much likely to engage in high-risk activities, such as riding motorcycles and more participating in incidents of interpersonal violence—whether or not associated with alcohol consumption, a common way of expressing masculinity among men throughout the world, and consequently, the likelihood of sustaining injuries is increased. Some authors report sex ratios with high disparity: Lee et al. report 5.9:1 [9]; Agarwal et al. [7], who conducted a retrospective study in the state of Uttar Pradesh (India) involving 1,000 patients, found a ratio of 8:1. However, others report ratios of 3.3:1 [8], 3.4:1 [10], and 3:1 [11]. Other studies [12,13,14,15], although they calculated the sex ratio, agree that males are in the majority. In this study, the ratio was nearly 5:1 in favor of males.

Regarding the age variable, the results were also similar to those of authors such as Satpathy et al.[16]; and Oginni et al. [12], who report a peak incidence in the 21-30 age group; Samieirad et al.[15], in the 20-30 age group; Al-Bokhamseen et al.[13] in the 18-34 age group; while Singaram et al.[11] found a higher incidence in the 20-40 age group. Similarly, other studies [5,7,14] report a higher number of cases in the third decade of life. A similar pattern was observed in the present series, where the number of patients decreased as age increased. This is explained by the fact that, with advancing age, people tend to avoid more intense activities, as they have gained experience and a greater awareness of danger and its consequences.

Mandibular fractures were found to be the most common, far outnumbering other types, occurring in more than half of the patients studied; these were followed by maxillomalar fractures. Findings from several authors are similar to these [1,6,10,12], reporting that mandibular fractures were the most frequently observed, followed by injuries to the zygomatic complex. Others, such as Bokhamseen et al.[13] and Samieirad et al.[15], also report the mandible as the most commonly fractured bone. However, Singaram et al.[11] report zygomatic complex fractures as the most frequent, followed by Le Fort fractures and mandibular fractures, which differs from the findings of this study. Agarwal et al.[7] and Silveira et al.[14] found, in their respective studies, a predominance of zygomatic complex fractures, followed by mandibular fractures.

The distribution of the most common causes varies depending on multiple factors, but most studies agree that traffic accidents are the most common cause. Rupani et al.[4] believe that the number of maxillofacial injuries is steadily increasing due to rising daily traffic volumes. Most authors suggest that the main causes of maxillofacial trauma worldwide are traffic accidents, interpersonal assaults, falls, sports, and industrial accidents. Generally, cases of maxillofacial trauma in developing countries are due to traffic accidents, in contrast to what occurs in developed nations, where interpersonal assaults have become the leading cause of maxillofacial trauma; in this study, interpersonal assaults also emerged as the leading cause in terms of case frequency, while traffic accidents ranked second. Morales et al.[20] report a predominance of injuries from traffic accidents, followed by interpersonal violence, while Gonzalez et al.[1] agree that violence was the leading cause.

The results obtained regarding associated injuries are consistent with those of several studies [6,7,12,14,19,20], which demonstrate that these injuries are potentially life-threatening and may require emergency care due to the presence of vital structures in the face and other parts of the body. They can be fatal, especially when the injury affects the airways and major blood vessels, a situation that complicates the management of these patients and worsens their prognosis. Furthermore, wounds are, coincidentally, among the most frequently observed soft-tissue injuries. However, unlike this study—in which gunshot wounds were in the minority—Truong [18] reports that there has been an increase in such injuries (nearly 2 million head injuries each year in the United States), which can lead to both bone and soft-tissue injuries. Skull fractures, to a certain extent, complicate the clinical picture for these patients and imply a guarded prognosis as an associated injury; high-incidence fractures of the upper and lower extremities also complicate the prognosis for patients with multiple trauma [19,20].

During the study period, maxillofacial fractures in the analyzed patient cohort primarily affected young men, specifically those between the ages of 26 and 35. Interpersonal violence, followed by traffic accidents, were the main causes of these fractures. These results are consistent with most published studies.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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