Research Article

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Management of Maxillofacial Fractures in a Cameroonian Tertiary Hospital

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Abstract

This is a descriptive study that was carried out at the accident and emergency, Dental, and Ear Nose and throat (ENT) units of the Douala General Hospital between April 2014 to September 2014 on patients with maxillofacial trauma referred to this tertiary hospital. Maxillofacial injuries were found among 7 (23%) female and 24 (77%) males in patients mostly of between 21-31 age groups most of whom are motorcycle bike riders 10 (32.3%). All patients were first resuscitated at the emergency department and 22 (71%) of the patients were referred to the general surgery department. The lips 13 (41.9%), facial trauma 10 (32.3%), facial edema 28 (90.3%), bleeding 25 (80%), dental articulation disorders 23 (74.2%), parasymphiseal fractures 38 (51.6%) were the most clinical signs. Treatment took place between the 5th and 10th day after consultation with anti-inflammatory 15 (48.4%), 24 (77.4%) on mouth washes and more than half were prescribed anti tetanus prophylaxis. The majority 25(81%) of patients were treated using open reduction 6 (48%), closed reduction 20(65%), intermaxillary fixation 26 (84%) and 4 (13%) pterigo-zygomatic suspension for the management of maxillofacial fractures either by the dentist or the ENT surgeons.

Keywords: Management, fractures, maxillofacial injuries, tertiary hospital, Cameroon

Introduction

Fractures of the maxillofacial region are a common occurrence in emergency medicine and are one of the most common facial fractures. Historically, road traffic accidents (RTA) play a leading role as a cause of mandibular fractures [1]. According to the literature, the etiologies of maxillofacial fractures vary from country to country depending on some socio-economic, cultural and environmental factors [2].

Maxillofacial fractures are characterized by facial bone discontinuity which can be open, closed, partial or total. In

developing countries, these maxillofacial fractures present a public health problem as they can affect up to 40% of the traumatized population (1), with the most affected population being young people between 21 to 30 years [2,3]. Other causes include falls, assaults, occupational accidents, domestic accidents and those related to the practice of combat sports [4-8].

In most maxillofacial injuries, early management of maxillofacial trauma emergencies focuses in the maintenance of the freedom of the upper airway, control of bleeding and removing potential sources of

contamination [3],[6-8]. Secondary management focuses to restore functions with a near reconstruction of anatomy. This requires a reduction and compression of the bone fragments to enhance the development of scarring and calcification. Super-infection of the fracture site should also be avoided in the short treatment [3,7]. Two main fracture treatment techniques are usually used each with its variants i.e. surgical techniques and orthopedic techniques both aiming at obtaining a reduction and a stable contact of separated bone [8].

The surgical techniques such as screw fixation with miniaturized metal plates are not common in our environment, because of the limitations of maxillofacial surgery services, lack of materials and the high cost of this treatment. Because of these, this technique which has been a common practice since 1970 is becoming increasingly obsolete [8,9].

The fixation with bone plates does not require the patient to frequent the hospital, improve on the quality of life of the patient and enables rapid reintegration into society. It is rarely used in our environment because it is expensive and because of the lack of expertise of providers to minimize the possible risks of complications [8,9]. The aim of this study was to determine the management of maxillofacial fractures at the Douala General Hospital.

Materials and Methods

Ethical considerations

Ethical clearance was taken from the ethical and research committee of University des Montagnes. Authorization to carry out the study was also taken from the institutional review board of the Hospital General, Douala.

This is a descriptive and prospective study that took place at the accident and emergency, dental, and ENT units of the Douala General Hospital between April 2014 to September 2014 over a period of six months. The Study Population consisted of patients aged 8-57 years with maxillofacial trauma who were referred to the hospital.

Data capture sheets was used to collect information on the patients who presented with maxillofacial trauma at the dentistry services, ENT, accident and emergency units of the hospital. The data collected were the socio-epidemiological data; sex, age, occupation, place of residence, etiology, reference mode and the tetanus vaccination status.

The clinical evaluation was carried out under bright

light by a trained clinician for clinical signs and symptoms involving hard and soft tissue injuries and their associated injuries. Radiographic examinations were used in conjunction with the clinic to confirm the diagnosis of maxillofacial fractures, describe the location of the fracture lines and types of fracture.

Treatment of maxillofacial fractures

The modalities of the management of maxillofacial fractures including administered medication, therapeutic choice, management time, type of anesthesia, type of reduction the type of restraint, restraint technique, the processing time and the contention period were assessed.

Data Analyses

Data was captured into Epi Info 3.5.4. for analysis and results were presented as tables and figures using Microsoft Excel 2010. Bivariate analysis was carried out and p- value was fixed at 0.05.

Results

Out of the 152 patients with maxillofacial trauma who reported in the hospital within the study period, 31 patients were diagnosed to have maxillofacial fracture. The frequency of maxillofacial trauma was 20.3%; with a male/female sex ratio of 3/1. Among patients with maxillofacial fracture 7 (23%) were female and 24 (77%) males (Figure 1).

Figure 1: Gender distribution of maxillofacial patients attending Douala General Hospital.

The age of the patient ranged from 8-57 years. Maxillofacial injuries were least present among patients of the 0 to 11 age group (Table 1).

The age group most affected was 21-31 years, 10(32.3%) followed by the 31-41 age group (25.8%) (Table 1).

Patients working in the informal sector 10 (32.3%) (Motor cycle bike riders) were the most affected (Table 2).

Table 1: Age distribution of patients with maxillofacial injuries.

Age group in years	Frequency(N)	Percentage (%)
0-11	2	6.5
Nov-21	6	16.1
21-31	10	32.3
31-41	8	25.8
41-51	5	16.1
51-60	2	6.5
Total	31	100

Table 2: Distribution of maxillofacial patients according occupations.

Occupational Groups	Frequency(N)	Percentage (%)
Informal sector (motorcycle bike riders)	10	32.3
Students and pupils	9	29
Unemployed	3	9.7
Administration	3	9.7
Other	6	19.4
Total	31	100

Road traffic accidents 22 (71%) was the leading cause of maxillofacial injuries (Table 3).

Table 3: Etiology of maxillofacial injuries.

Etiologies	Frequency(N)	Percentage (%)
RTA	22	71
Assaults	3	9.7
Falls	2	6.5
Sport	2	6.5
Other Etiologies	2	6.5
Total	31	100

All patients 31(100%) were received at the accident and emergency department before being redirected to another service. Two thirds 22 (71%) of the patients consulted in the surgery department (Table 4).

The lips 13 (41.9%) were most the most common trauma (Table 5).

Table 4: Distribution by hospitality services from the arrival at the hospital.

Home services	Frequency (N)	Percentage (%)
Emergency service	31	100
Surgery Department	22	71
ENT services	9	29
Others	1	3.2

Clinical Presentations

Three quarters 23 (74.2%) of patients presented with dental articulation disorder.

Facial edema 28 (90.3%), bleeding 25 (80%), dental articulation disorders 23 (74.2%) were the clinical signs most seen on the patients (Table 6).

Table 5: Distribution by lesions according to soft tissues involvement.

Soft Tissue Injuries	Frequency (N)	Percentage (%)
Lips	13	41.9
cheeks	8	25.8
Nose and ears	7	22.6
Eyeball and appendices	7	22.6

Table 6: Distribution according to clinical presentations.

Clinical presentations	Frequency (N)	Percentage (%)
Edema of the face	28	90.3
Bleeding	25	80.6
Poor articulation	23	74.2
facial deformities	16	51.6
Post traumatic tooth loss	13	41.9
Loss of consciousness	9	29
lockjaw	5	16.1

Trauma of the face was the most common injury associated 10(32.3%) (Table 9).Two thirds 27 (87.1%) of patients were referred to the dental clinic, 12 (38.7%) to ENT and 11 (35.5%) to the neurosurgery department (Table 7).

Table 7: Distribution by associated injuries and patient's referrals.

Associated Lesions	Frequency (N)	Percentage (%)
Facial trauma	10	32.3
Head trauma	6	19.4
Chest trauma	3	9.7
abdominal trauma	2	6.5
Upper and lower limbs	2	6.5
Referral to specialized services		
Stomatology	27	87.1
ENT	12	38.7
Neurosurgery	11	35.5
Ophthalmology	8	25.8
Traumatology	7	22.6

In our study CT scan was requested in 23 (74.2%) patients, followed by dental panoramic radiograph (Table 8).

Table 8: Requested radiographic examination.

Radiographic Examination	Frequency (N)	Percentage (%)
Scan	23	74.2
Dental panoramic	5	16.1
Lateral skull xray	4	12.9
Occipitomenal view	4	12.9
Oblique lateral	3	9.7
standard profile	2	6.4

The parasymphyseal localization was found in 38 patients (51.6%). The distribution depending on the location of the fracture lines is shown in table 9.

In 2 (29%) of patients, the treatment took place between the 5th and the 10th day after consultations (Table 10).

Drug Prescription and Surgical Intervention

All the patients were on antibiotics and analgesics. Almost half 15 (48.4%) were on anti-inflammatory, three quarters 24 (77.4%) on mouth washes and more than half were prescribed anti-tetanus prophylaxis.

Table 9: Distribution by the location of the fracture.

Location of the fracture	Frequency (N)	Percentage (%)
Zygomatic arch	3	9.7
Symphysis fractures	4	12.9
Ramus fracture	1	3.2
Parasymphysial fractures	16	51.6
Nasal bone	4	12.9
Maxillary	3	9.7
Lefort III	2	6.5
Lefort II	6	19.3
Le fort I	6	19.3
Horizontal leg fractures	2	6.5
Fractures of the upper and middle floor	22	71
Fractures of angle of mandible	2	6.5
Fractures body of mandible	27	87.1
Condylar fractures	2	6.5

Patient's management

More than three quarters 25 (81%) patients were treated under general anesthesia, with nasotracheal intubation 22 (71%).

More than three quarters 25 (81%) of patients were treated with manually, closed reduction in 16 (48%) and an elastic reduction in 6 (19%). Closed reduction was performed in 20 (65%). Intermaxillary fixation with arch wires was performed in 26 (84%) patients.

More than three quarters 26 (84%) used intermaxillary fixation and 4 (13%) used pterigozygomatic suspension in the management of maxillofacial fractures.

Duration of maxillary reduction

A third of the fractures 11 (35.5%) were reduced for an average of 6 weeks, Fractures of the nasal bones are those whose duration of contention was the shorter (1-2 weeks) and accounted for 4 (12.9%).

Table 10: Duration in hospital before surgery and Surgical approaches in fracture managements.

Time management in days	Frequency(N)	Percentage (%)
[0-5]	4	12.9
[5-10]	9	29
[10-15]	8	25.8
[15-20]	6	19.4
[20-25]	2	6.5
>25	2	6.5
Surgical approach		
IMF with restraining arc	26	84
ptérisygomatique suspension	4	13
external fixation	3	10
Internal fixation	2	6

Post surgical nutrition

Almost three quarters of patients 22 (71%) took liquid food, 19% semi solid, and 10% normal after surgery.

Discussion

Since the inceptions of the use of motorbikes for transport in Cameroon, maxillofacial injuries have been on the rise thus posing a serious public health problem especially in urban areas [6]. This is because of shortage of an efficient transport system; most people have resorted to commercial motorbikes. This increase in maxillofacial injuries has been accompanied with some challenges including management of these injuries.

In the current study, there was a predominance of males with maxillofacial trauma with a high male-female ratio. This corresponds to the same proportion in a similar study carried out in Cameroon [6]. This is because the major cause of trauma resulting from road traffic accidents could be attributed to predominance of males in this profession. It has been reported most women involved were mostly commercial motorbike passengers [6].

The mean age of the patients in this study was 30.1 ± 12 and the most affected age group was that of 21-30 years which coincides with findings of Francisco et al. (2013) in Colombia and Agbor et al. (2014) in Cameroon. This is because most of the patients involved in road traffic accidents are in the active independent life where they travel from one

Place to another for economic reasons. Maxillofacial injuries have also been reported to affect the quality of life and the socio-economy of this youth populations in Nigeria and Cambodia [3,4].

In the current study, the major cause of maxillofacial injuries remains the RTA (71%), followed by VIP and falls. Reports from other African countries like Tanzania [8] and Uganda [9]. The trend of RTA has evolved or reduced over the years in developed countries because of preventive measures such as good road infrastructures, the compulsory wearing of seat belts, helmets, breathalyzers, radar systems, airbags that help to prevent and limit the damage [5], whereas in countries like Switzerland, Finland and the United States are the interpersonal violence are the leading cause [10].

Pathologies associated to injuries and management of patients

All patients with injuries who presented at the general hospital of Douala were received at the accident and emergency unit of the hospital. These patients presented with soft tissue lesions of the orofacial region, some with sutured wounds as they were first handled in the emergency departments of district hospitals before referral. It was also noticed that internal referrals were made mostly to the ENT department because of the absence of a maxillofacial unit in the hospital. The most common associated or contagious lesions seen in this study were limb trauma [11], in Nigeria also reported limb trauma as the common lesion mostly associated with the lower limbs.

In contemporary dentistry, the dental or CT scanners are the best diagnostic tools over conventional radiographs in confirming the diagnosis of the middle floor of fractures of the face [12]. In the current study, skull x-rays were mostly used. Dental CT scans and panoramic dental x-rays are rarely used in Cameroon because they are expensive. Because these investigations are expensive for an average Cameroonian, they are rarely prescribed though there are centres that offer these services. In sub-Saharan Africa, CT scans are rarely used for diagnosing dental pathologies. In the whole of sub-Saharan Africa, only one case has been reported in Nigeria where the CT scan has been used to diagnosed facial tumors [13].

In the current study, the majority of patients presented with fracture in the mandible either in the parasymphysal

region mostly affected [14]. Reported a similar finding in a study carried out in Nigeria.

The waiting time for surgical intervention was too long as the surgical intervention time (i.e the interval between patients arrival to the hospital and surgical intervention) was between 5-10 days. This is as a result of hospital congestion due to the

Inadequate number of operating rooms in the hospital and in some cases as a result of financial constraints, most patients faces the problem of not being able to pay for their treatment on time. This is because most patients were not covered by insurance in Cameroon [15,16], observed in their study in Cameroon that household income influences the use of insurance for dental treatment and subsequently dental visiting. This is because only those of high income and the employed in Cameroon can afford health insurance.

General anesthesia was the choice for a majority of patients with maxillofacial injuries. This is because only general anesthesia provides deep sedation for better reduction without the patient requiring cooperation during surgery. Though general surgery is needed for the management of most orofacial fracture reduction, simple facial lacerations can be sutured under local anaesthesia. In India, it has been reported that mandibular reduction has been carried out using local anaesthesia in parasymphiseal reduction in children [17] and in immune- compromised patients [18].

In the current study intermaxillary fixation (imf) using wires was mostly used, no plate or wire osteosynthesis was used in patients. This is because the hospital lacks skilled professionals who are apt in this area. Reported that in the United Arab Emirates, bone plates were placed in less than a quarter of the patients they studied [19]. Post surgical complications in our study were low and included infections on the surgical site and mal-union. Infectious complications were treated with systemic antibiotics. Other complications which included articulations of the teeth upper and lower jaws were common as most of the reductions were done without the assistance of oral health care personnel.

Conclusion

Amid the high cost of treatment, the rate of maxillofacial injuries presenting at the Douala general hospital is high. There is shortage of trained personnel, or a multidisciplinary team in the management of patients. Management

of maxillofacial injuries are not done by maxillofacial surgeon and the method reduction is still obsolete. Better management could be achieved if a maxillofacial surgeon is employed to work in this hospital.

Competing Interests

The authors declare that they have no competing interests.

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