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ABSTRACT

Objective: **To determine the pattern of zygomatic complex fractures in a Nigerian population.**
Design: **A prospective study of cases managed.**
Setting: **University College Hospital, Ibadan, Nigeria.**
Subjects: **Seventy six patients seen and managed between 1995 and 1999.**
Results: **The most common aetiological factor was road traffic accidents (81.6%). The male/female ratio was 5.3:1. Most of the fractures occurred in the age group 21-30 years (51.3%). The most common fracture type was type 3 (32.5%) while open reduction and transosseous wiring was the most commonly performed surgical procedure for the management of zygomatic complex fractures in this study (46.25%).**
Conclusion: **There is a need to pay attention to the improvement in automobile safety devices, compliance by motor vehicle occupants and improvement in rules and regulations guiding sporting activities.**

INTRODUCTION

The zygomatic bone occupies a prominent position in the middle third of the face. Thus, because of the solid nature of the body of the bone and its shape, the adjacent articulating parts with the maxillary, frontal, temporal and sphenoid bones are usually fractured with the zygomatic bone when trauma occurs(1,2). The term zygomatic complex fractures is used to describe this combination of fractures. Fractures of the zygomatic complex are always due to direct violence; therefore the direction of impact on the parts of the zygomatic bone determines the displacement. These injuries are associated with considerable degrees of contusion of the surrounding tissues(1,2). Although there is abundant literature on the pattern of maxillofacial injuries all over the world(1-5), reports are scanty on zygomatic complex fractures especially, in the developing world. In most of the earlier published reports, zygomatic complex fractures were not analysed separately but were included among mid-facial fractures. This study was undertaken to provide information on the incidence, pattern and treatment of zygomatic complex fractures seen at the University College Hospital, Ibadan over a five- year period.

MATERIALS AND METHODS

This was a prospective study of all radiographically confirmed zygomatic complex fractures seen in 76 patients and were treated at the department of Oral and Maxillofacial Surgery, University College Hospital, Ibadan between January 1, 1995 and December 31, 1999. Patients who died preoperatively were excluded from the study. Parameters that were recorded included the sex, age, aetiology and sites of zygomatic complex fractures. Other features were the group of fractures, time interval between injury and presentation for treatment and the methods of treatment of zygomatic complex fractures.

Zygomatic complex fractures were classified into six groups according to the type of displacement seen on Water's view radiographs thus: Group 1 - undisplaced fractures; Group 2 - arch fractures. The classical three fracture lines, producing a V-shaped inward deformity of the arch are present; Group 3 - unrotated body fractures; Group 4 - medially rotated body fractures; Group 5 - laterally rotated body fractures and; Group 6 - complex fractures.

RESULTS

One hundred and twenty nine middle third fractures were treated between January, 1995 and December 1999. Eighty zygomatic complex fractures representing 62.0% of the total number of middle third fractures were seen within the period. The age distribution is shown in Table 1. The most susceptible age group was 21 - 30 years (51.3%). Of the 76 patients, 64 were males and 12 were females giving a ratio of 5.3:1. Road traffic accidents were responsible for majority of the fractures (81.6%). This was followed by sports (7.9%). Falls, industrial accidents and miscellaneous causes accounted for 3.9% of the cases. Other aetiological factors are presented in Table 2. Of the patients, 72 had unilateral fractures while four had bilateral fractures. Thirty nine patients (51.3%) with unilateral fractures sustained injuries on the left side while 33 (43.4%) sustained injuries on the right side. There were nine cases of fractures of the zygomatic arch alone. The pattern of fracture types is presented in Table 3.

Table 1

Age distribution of 76 patients with zygomatic complex fractures

Age range (years) .	No. of patients	%
0-10	3	4.0
11-20	11	14.5
21-30	39	51.3
31-40	15	19.7
41-50	5	6.6
51-60	2	2.6
>60	1	1.3
Total	76	100

Table 2

Aetiology of zygomatic complex fractures

Aetiology	No. of patients	%
Road traffic accidents	62	81.6
Sports	6	7.9
Assaults	5	6.6
Falls	1	1.3
Industrial	1	1.3
Miscellaneous	1	1.3
Total	76	100

Table 3

Types of zygomatic complex fractures (Knight and North's classification)(6)

Type	No. of fractures	Total (%) of fractures
1	8	10.00
2	9	11.25
3	29	32.50
4	8	10.00
5	16	20.00
6	10	16.25
Total	80	100

Table 4

Treatment methods for 80 zygomatic complex fractures

Fracture type	No. of fractures	%
Type 1		
Conservative treatment (no reduction)	8	10.00
Type 2		
Gillie's lift	7	8.75
Refused treatment	2	2.50
Type 3		
Gillie's lift	26	32.50
Open reduction and transosseous wiring	3	3.75
Type 4		
Open reduction and transosseous wiring	8	10.00
Type 5		
Open reduction and transosseous wiring	16	20.00
Type 6		
Open reduction and transosseous wiring	10	12.50
Total	80	100

Twenty (26.3%) of the patients presented within the first 24 hours of injury, 15 (19.8%) within 24 - 48 hours while 16 (21.0%) patients came for treatment within 48 - 96 hours. Seventeen (22.4%) patients presented within 4 - 7 days while eight (10.5%) patients came more than a week after injury. Seventy patients underwent surgical intervention. Local anaesthesia with intravenous sedation was employed in seven (10.0%) patients while general anaesthesia through the nasotracheal route was used in 40 (57.1 %) patients. General anaesthesia through orotracheal route was utilised in 23 (32.9%) patients. Thirty three (41.25%) zygomatic complex fractures were elevated via the Gillie's lift operation while 37 (46.25%) fractures were treated using open reduction and transosseous wiring across suture lines. Conservative treatment was employed in eight (10.0%) fractures and two (2.5%) patients with zygomatic complex fractures refused treatment (Table 4).

DISCUSSION

Zygomatic complex fractures are common facial injuries that follow maxillofacial trauma(7). The incidence of zygomatic complex fractures has a proportionate increase with the rise in the increase of facial bone fractures associated with the ever escalating hazards of modern transportation(8). We found that zygomatic complex fractures accounted for 62.0% of all middle third fractures in this study. This rate is similar to 64.0%, 65.0% and 69.0% reported in previous studies (9-11). However, it is lower than 22.2% and 33.0% recorded by Schuchardt *et al*(12) and Ugboko *et al*(4), respectively. The reason for the high rate in this study might be as a result of exclusion of dentoalveolar fractures from our study.

The male/ female ratio seen in this study was 5.3:1. This sex ratio is similar to the 5.35:1 recorded by Haidar(1) but differs greatly from 23.1:1 reported by Adekeye(13) in Northern Nigeria. Adekeye(13) attributed the very small number of females in his study to the fact that the number of women who own motorcars, motorcycles and bicycles is negligible compared to that of men which exposes them to road traffic accidents which was the leading cause of zygomatic complex fractures in his study. It was also stated that most Nigerian women are house-wives and small scale traders and farmers and thus are less susceptible to accidents in assaults, industrial work and sports. The sex ratio noted in our study has, however, shown that the worsening economic conditions in Nigeria may have forced more women to be involved in commercial activities thus exposing them to accidents in road mishaps, industries and assaults.

Most of the patients seen in this study were in the age group of 21 - 30 years (51.3%). This is consistent with the findings of previous authors, being 21- 30 years(1,2,13). This age group as explained by Haidar(1) shows most activity in industry, sports, fights and high speed transportation. Road traffic accidents were the commonest cause of zygomatic complex fractures in our study (Table 2). This represents 81.6% of the total number of

cases. This is similar to studies done in Nigeria(13), Scotland(2) and Britain(14) but differs from Haidar's study(1) where assault was the commonest cause. It was observed that the percentage recorded in this study was greater than 33.5% by Hutchin and Shuker(2) and 35.6% by Rowe and Killey(14). The reasons for this high value are careless driving, poor road conditions and insufficient vehicle care. In other parts of the world(1) increase in fist fights which have been attributed to the prevalence of violence in today's society has placed assaults as a leading cause of zygomatic complex fractures. Of all the sports associated injuries, soccer was responsible for all the cases in this study. This is not surprising as soccer is the most popular game in Nigeria. The enormous monetary rewards attached to soccer competitions has made the game very competitive. During soccer competitions, the heading of the ball could lead to a side clash of players' heads resulting in zygomatic complex fractures.

Assaults accounted for only 6.6% of cases in our study. This is lower than 30.6% and 36.1% recorded in Eastern(2) and South East(1) regions of Scotland respectively. Many assaulted patients in this environment usually reported that their injuries were due to other causes because of the attendant criminal and social implications. Attackers have been known to bribe or intimidate the attacked person to lie about the cause of their injuries. Therefore the under-reporting of assault cases in our environment cannot be ruled out.

The left zygomatic complex was more involved (51.3%) in fractures than the right side in this study. In assaults-related zygomatic complex fractures, four (80%) occurred on the left. This is similar to the findings of previous authors(2,13). Hitchin and Shuker(2) stated that most people are right handed having a more effective punch with the right fist and hitting the left cheek of the opponent. The most common anatomic type of zygomatic complex fractures was type 3. This is in agreement with previous studies(2,13,15). This is due to the fact that the majority of zygomatic complex fractures were due to road traffic accidents.

Only 26.3% of patients presented within the first day of injury. This is lower than the values of between 40.1% to 50.0% recorded in developed countries. It is very important that zygomatic complex fractures are treated early and correctly to prevent disfigurement and masticatory disability. The majority of our patients were treated under general anaesthesia (90.0%). However, in seven (10.0%) patients with minute displacements of zygomatic complex fractures, treatment was achieved under local anaesthesia with sedation of parenteral pentazocine and diazepam. This relatively cheap procedure was used in cooperative adult patients. The treatment of zygomatic complex fractures depends on the type and severity of injury, facilities available, time of presentation and the surgeon's personal experience(17). Simple methods of treatment were employed in this study. Thirty three (41.25%) of the fractures were treated by the Gillie's lift operation since most of the fractures were of types 2and 3. The operation offers the advantage of being fast (reducing the time of anaesthesia), decreasing the possibility of facial nerve damage and not being associated with a visible scar(18). It also allows further fixation to be performed if necessary.

Since the fractured zygomatic complex could lead to facial distortion and severe disability due to interference with vision and mastication, attention should be paid to improvement in automobile safety devices and compliance by motor vehicle occupants in addition to the improvements of the rules and regulations in sporting activities.

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