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Pattern of maxillofacial fractures arising from road traffic accident in University of Abuja Teaching Hospital, Nigeria

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ABSTRACT

Background. The prevalence, etiology and pattern of maxillofacial fractures vary in different parts of the world. While the incidence of maxillofacial fractures due to road traffic accident (RTA) in the industrialized countries of the world has gradually fallen, RTA still account for majority of maxillofacial injuries in most developing countries. This study aimed to provide a pattern of maxillofacial fractures following RTA as seen in our hospital over a period of seven years.

Methods. Information about age, gender, specific RTA etiology and site/pattern of injuries of patients that presented with maxillofacial fractures between January 2013 to December 2017 were obtained from Medical Records department. Data were analyzed using SPSS version 22 and values were presented in frequencies and percentages.

Results. One hundred and fifty eight (158) patients presented with 315 maxillofacial fractures. Males (73.9%) and patients in 21-30 years group (28.3%) were most frequently affected with a mean age of 28.42 years (SD 15.44) and a male to female ratio of 2.8:1. Motorcycle accidents accounted for the highest incidence 58, (42.0%). 154 (48.9%) of the fractures occurred in the mandible with the body as the commonest site 38, (24.7%). The 161 (51.1%) midfacial fractures had 74 (46.0 %) maxillary fractures (Le fort I, II, III) as the commonest site.

Conclusion: Motorcycle accidents were responsible for most maxillofacial fracture and maxilla was mostly affected.

Key words: Maxillofacial fractures, RTA, Pattern

I. INTRODUCTION

Road traffic accident remains the leading cause of maxillofacial fractures in developing countries of the world. [1,2,3] The face being the most exposed part of the body is particularly vulnerable to injuries, with 20 - 60% of all those involved in automobile accidents having one form of fracture or the other. [4,5] Studies have shown that most of the fractures are due to failure of tension, not compression and that in general, facial bones have low tolerance to impact forces; the nasal bone being the least resistant, followed by zygomatic bone. [5,6,7]

The incidence of facial fractures caused by road traffic accidents in comparison to other causes varies from one country to the other according to the country's population, volume of vehicular traffic, legislation of road traffic safety measures (and its enforcement) and time of study. Studies from the literature in Nigeria, Europe, Libya, Saudi Arabia and United States show that road traffic accident is the leading cause of facial fractures. [8,9,10,11] Recent studies however agree that the incidence of maxillofacial fractures due to road traffic accident in the industrialized countries of the world has gradually fallen and has been replaced by violence in form of fights, assaults and gunshot injuries. [12,13] In Nigeria and most of the developing countries, a review of the literature shows that despite increases reported by other causes like assaults, sport injuries, and industrial accidents, road traffic accidents still account for majority of maxillofacial injuries, a significant proportion of which is motorcycle related. [2,3,4] In Nigeria, motorcycles have become a prominent form of transportation in both the urban and suburban cities due mainly to traffic congestion and poorly maintained roads with most of the motorcyclists unlicensed, only very few wear crash helmets, and often do not follow traffic rules and regulations. [13] In developing countries such as Nigeria, the number of pedestrians involved in maxillofacial injuries following road traffic accidents has been on the increase especially in urban centers, unlike reports elsewhere. [14] This has been attributed to over speeding, refusal to use the pedestrian bridge, children street hawking and lack of adequate playground. [15]

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Reports have it that young men in the second and third decades of life are the most affected in maxillofacial fractures due to their frequent engagement in activities that can predispose them to trauma.[16,17]

Most studies in Nigeria have shown mandible to be the commonest site of maxillofacial fractures followed by the zygomatic complex, maxilla and alveolar process. [2,17] In the mandible while some authors reported the body as the most common site of injury, others reported the ramus as the commonest site and the coronoid as the least affected.[18,19,20]

Most studies on maxillofacial injuries were carried out in the southern parts of Nigeria, with scarcity of data in the north, especially in the north central region where our hospital is located.

The aim of this study was to provide a pattern of maxillofacial fractures following road traffic accident as seen in our hospital over a period of seven years.

II. MATERIALS AND METHODS

This was a descriptive seven (7) year retrospective study of patients with maxillofacial fractures following road traffic accident (RTA) seen in the University of Abuja Teaching Hospital Gwagwalada, Federal Capital Territory (FCT) Abuja between January 2007 and December 2013. University of Abuja Teaching Hospital (UATH) is located in Gwagwalada, one of the six (6) Area Councils that form the FCT. It has amongst other departments, a well established Accident and Emergency unit as well as a Dental & Maxillofacial Department. It is a 500 bed hospital that renders health care services to patients within the FCT and the neighboring states of Kogi, Nassarawa, Niger and Kaduna.

The sample size included the entire patients with maxillofacial fractures resulting from RTA brought to the accident and emergency unit as well as the Dental and maxillofacial Surgery department of the hospital between January 2007 and December 2013. Also included were all referred cases of maxillofacial fractures to UATH within the same period. Case notes of all patients with all types of maxillofacial fractures due to RTA were retrieved from the medical record department of the hospital (UATH). Excluded were cases of facial fractures that were not due to RTA, and cases that were outside the study period.

Data were collected on a designed proforma which included biodata; age, gender and specific aetiology of RTA (vehicle/motor accidents, motorcycle accidents, tricycle accidents. pedestrians hit by motor vehicles or motorcycles), types of maxillofacial fractures/ anatomical sites of maxillofacial fractures. The mandibular fractures were broadly categorized into fractures of the condyle, ramus, angle, body, parasymphysis, symphysis, and lower alveolar bones. Midfacial fractures were also classified into maxillary (Le Fort I, II and III) fractures, zygomatic complex fractures, nasal bone fractures and upper alveolar bone fractures. Data were analyzed using SPSS version 22 and values were presented in frequencies and percentages.

Approval for the study was sought and obtained from the Ethics committee of the University of Abuja Teaching Hospital Gwagwalada.

III. RESULTS

A total number of 47,460 patients were seen at the accident and emergency/Dental and Maxillofacial Department of University Teaching Hospital with 138 patients that sustained 315 maxillofacial fractures within the study period. The number of males was 102 (73.9%), while females were 36 (26.1%), with male to female ratio of 2.8:1 and significant male preponderance across different age groups and various specific etiology. The age range was 2 to 70 years with a mean age of 28.42 years (SD 15.44). The highest prevalence of facial fractures occurred in the age group of 21-30 years with a total number of 39 (28.3%), followed by 31-40 years, 33 (23.9%) and the lowest seen in the age group of 61-70 years with a total number of 5 (3.6%). (Tables 1 & 2)

Motorcycle accidents accounted for the highest incidence 58, (42.0%) followed by motor vehicle accidents 47 (34.1%) and tricycle accident had the lowest 4 (2.9%). (Table 3)

The 315 maxillofacial fractures comprise of 154 (48.9%) fractures occurring in the mandible and 161 (51.1%) in middle face region. Among the mandibular fracture sites, the highest 38, (24.7%) occurred in the body, followed by 28, (18.2%) in the parasymphyseal, 23, (14.9%) in the symphyseal region, and the least affected sites were the coronoid 3 (1.9%). (Table 4)

The 161 midfacial fractures consist of 74 (46.0 %) maxillary fractures (Le fort I, II, III), 39 (24.2%) zygomatic complex fracture, 25 (15.5%) maxillary dentoalveolar fractures, and 23 (14.3%) nasal bone fractures. (Table 5)

DISCUSSION

Road traffic accident remains the main cause of maxillofacial trauma in developing countries and some developed countries. [1,2,12,13]. This has been attributed to inadequate

road safety awareness, unsuitable road conditions without expansion of the motorway network, violation of speed limit, old vehicles without safety features, not wearing seat belts or helmets, violation of highway code and use of alcohol or other intoxicating agents. [21,22]

In this study motorcycle were responsible for the majority 58 (42.0%) of the accidents leading to maxillofacial injuries. This is in line with most similar studies in other parts of Nigeria and other developing countries. [23,24] Gwagwalada is a sub-urban area of FCT and the prominent means of transportation is motorcycle. In addition to its versatility, the motorcycle is an affordable means of transport for many people. However, many of the motorcycle riders are self-trained with hardly any knowledge of road traffic rules and do not wear helmets, making a ride on a motorcycle highly prone to crashes. [24,25,26]

The higher frequency of maxillofacial trauma in males is documented in the literature. [2,3] The gender distribution of maxillofacial fractures in this study shows that the males were more frequently affected than the females with a ratio of 2.8:1. This can be explained by the fact that men are more involved in high risk activities and the predominance of males as the motorcycle riders. [4]

This present study showed that the maxillofacial fractures predominantly occurred in the age group of 21-30 years (28%), followed by 31-40 years (24%), and the least in 60-70 years (4%). These findings were in agreement with reports from similar studies. [19,27] The high incidence in the third and forth decades of life might be due to the fact that people belonging to these groups are more active, energetic, take active participation in dangerous activities. This is the time of youthful exuberance and age groups recognized as phase of great personal independence, social excitement, intense mobility, careless driving on the roads, and exposure to road traffic crashes. [28,29] The low incidence in 2-10 years (13%) has been explained by the high elasticity of children's bones, the smaller face relative to head size and a decreased exposure to major trauma. [3,15] An incidence of 4% was noted for geriatric (>60 years) maxillofacial fractures in this study, probably as this age group is less active and less involved in outdoor activities. [10]

The most common site of maxillofacial fractures varies among several authors. Several studies in Nigeria sited the mandible as the most common site and this was justified by being the most prominent and mobile bone of the face, hence often fractured more than the strongly supported and rigid middle third of the face. [2,17] However the report of this study showed that 48.9 % of the maxillofacial fractures involved the mandible while 51.1% involved the middle face. Our finding agrees with the reports of other authors that reported mandible fractures were less frequent than middle face fractures. [27,28].

In the present study, among the mandible fracture sites, the body (25%) was the most common fracture site. This agreed with the reports of most studies in Nigeria and other parts of the world. 1,2,29] However our studies contradicted the reports of Alves et al that had the ramus and King et al. who had the parasymphyseal region as the most frequently fractured part of the mandible. [30,31]. Most previous studies in Nigeria on maxillofacial fractures reported zygomatic complex as the most frequently fractured bone of the mid facial area. [32,33] This was due to its projection and multiple articulations with other facial skeletons making it very vulnerable to fractures on impact. [34] Contrary to this however, this study reported maxillary fractures (Le Forte 1, 11, and 111 fractures) to be the commonest fractures (46%), followed by zygomatic complex fractures (24%).

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Tables

Table 1. Distribution of maxillofacial fractures according to gender and age.

Age	Male n=102 (%)	Female n=36 (%)	Total n=138 (%)
0-10	14 (13.7)	4 (11.1)	18 (13.0)
11-20	16 (15.7)	8 (22.2)	24 (17.4)
21-30	31 (30.4)	8 (22.2)	39 (28.3)
31-40	23 (22.5)	10 (28.8)	33 (23.4)
41-50	7 (6.9)	3 (8.3)	10 (7.2)
51-60	7 (6.9)	2 (5.6)	9 (6.5)
61-70	4 (3.9)	1 (2.8)	5 (3.6)

Table 2 Distribution of maxillofacial fractures according to etiology and age.

Etiology	Age							Total
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	
Motor vehicles	3	10	13	12	5	3	1	**47(34.1)**
Motorcycles	8	9	18	13	4	4	2	58(42.0)
Tricycles	0	1	3	0	0	0	0	4(2.9%)
Pedestrian hit by motor or motorcycle	7	4	5	8	1	2	2	29(21.0)
Total	18 (13)	24 (17)	39 (28)	33 (24)	10 (7)	9 (7)	5 (4)	138 (100)

Table 3: Distribution of maxillofacial fractures according to etiology and gender.

	Male	Female	Total
Aetiology			
Motor vehicle	31	16	47
Motorcycle	46	12	58
Tricycle	2	2	4
Pedestrians	23	6	29
Total	102	36	138

Table 4: Types/Sites of Mandibular Fractures

Sites of mandibular fractures	Frequency	Percentage
Symphyseal	23	15
Parasymphyseal	28	18
Body	38	25
Angle	15	10
Ramus	10	6
Condyle	19	12

Coronoid	3	2
Dento-alveolar	18	12
Total	154	100

Table 5: Type/Site of Mid Facial Fracture

Type/site of midfacial fractures	Frequency fractures	Percentage
Zygomatic complex fractures	39	24
Nasal bone fractures	23	14
sssDento-alveolar fractures	25	16
Lefort I fractures	23	14
Lefort II fractures	34	21
Lefort III fractures	17	11
Total	161	100