FREQUENCY AND COMMON PATTERNS OF MANDIBULAR FRACTURE: A CROSS-SECTIONAL STUDY AT TERTIARY CARE HOSPITAL AT PESHAWAR.

Muhammad Mushtaq[1], Saima Gul[2], Yasir Rehman Khattak[3],

[1] Associate Professor and Head Department of Dentistry and Maxillofacial Surgery, Khyber Girls Medical College, Hayatabad Medical Complex Peshawar Pakistan

[2] Postgraduate trainee FCPS. Hayatabad Medical Complex Peshawar

[3] Registrar Department of Dentistry and Maxillofacial Surgery Hayatabad Medical Complex Peshawar.

ABSTRACT

Objective: *To determine the frequency and pattern of mandible fractures in acute trauma patients.*

Materials and methods: *A cross-sectional was conducted at Oral & maxillofacial surgery Department Hayatabad Medical Complex and Akbar Medical centre Peshawar from April 29th, 2015 to October 28th, 2015 by non-probability convenient sampling. Acute trauma Patients of adult age group with age 19-60 years were included in the study while patients with isolated cases of dentoalveolar, pathological fracture, and iatrogenic fractures were excluded from this study. SPSS version 19 was used for analysing the data.*

Results: *A total of 168 patients with mandibular fractures were included in the study. Male patients n= 125(69.4%) were more as compared to female n=43(28.6%), and the overall mean age was 29.71 ± 9.55 years. Most of the patients were from age group A(19-40 years) n=147(87.5%). The most common site was body fracture n=57(33.93%) followed in frequency by condylar fractures n=46(27.38%), angle n= 29(17.26%) and parasymphysis n=22(13.09%). The parasymphyseal fracture was more common in older age group (41-60 years).*

Conclusion: *Mandibular fractures are the fairly common site of injury in severe trauma. The main victims of this kind of trauma are involvement of young males. There is an abundance of mandibular body fractures which are followed by fractures of the angle and the condyle. Symphyseal and parasymphyseal fractures are the rare one.*

Keywords: *Pattern, mandible fracture, trauma, Peshawar*

INTRODUCTION

The fast and steep pace of present day with the high-speed automobile as well as an increasingly brutal and intemperate community has made facial trauma a form of social disease from which no one is immune. Maxillofacial trauma is usually associated with facial disfigurement, functional deficit and sometimes even leading to morbidity.[1] Mandible is the strong bone of facial frame and main functions are speech, mastication and deglutition but due to anatomical position it fractures very easily.[2] The mandible is the second most commonly fractured facial bone next to nasal bone.[3, 4] The incidence of mandibular fracture is reported higher in male gender than female, and the peak incidence is during the third decade of life.[5, 6, 7]

Mandible has increased resistance to compressive forces but little resistance to tensile forces due to which it usually fractures at the area of tensile stress. There are three most common weak areas of the mandible, i.e., the condylar neck, the angle of the mandible especially when the third molar is present and the area around the mental foramen.[6,8] Frequency of different anatomic sites of mandible shows that body is most commonly fractured followed by angle, parasymphysis, condyle, symphysis and both sides have equal distri-

Correspondence:
Dr Muhammad Mushtaq
House no 431, street- 14, Sector E5, phase 7 Hayatabad
Peshawar Pakistan.
Cell: +923005669116
Email meetmeshi@yahoo.com

bution [3, 4]. The anatomic site of fracture reflects the cause of interpersonal violence usually results in angle fracture, road traffic accident and fall cause condylar and parasymphysis fracture while blast trauma leads to comminution of mandible at several points [7, 9]. The differences observed in fracture pattern between age groups and gender likely reflects the different activities that each group predominantly engages [10, 11]. In addition to age and gender the incidence of facial fractures have also been influenced by the geographical, cultural and socio-economical features of a population.[3]

OBJECTIVES

The purpose of this study is to determine the pattern of mandible fracture and its commonest site involved in population in Khyber Pakhtunkhwa, as limited local information is available regarding the incidence as well as the pattern of mandible fracture in any tertiary care hospital of this region. This study will also find out any age or gender-related variability in fracture pattern and will help us in future for planning different preventive measures by providing data to researchers.

MATERIALS AND METHODS

This cross-sectional was conducted at Oral & maxillofacial surgery Department Hayatabad Medical Complex, Peshawar and Akbar Medical centre Peshawar from April 29th, 2015 to October 28th, 2015 by non-probability convenient sampling. Acute trauma patients of adult age group, 19-60 years were included in the study. Approval was obtained from research and ethics committee of the hospital. Informed written consent was obtained from all patients. After the detailed history and thorough clinical examination, necessary radiographs like orthopantomogram (OPG), open mouth reverse towne's view and computed tomography scan were done if required. Diagnoses of the mandibular fracture were established on history, detailed clinical examination and necessary radiographs.

Data were entered and analysed using Statistical Package for Social Scientists (SPSS) version 19. Means ± standard deviation were calculated for numeric variables like age. Frequency and percentages were calculated for categorical variables like gender (male, female), site of fracture (para-symphysis, condyle, body, angle, symphysis) and some fractures in the mandible (single, double or multiple). Pattern outcome was stratified by age, gender and number of fractures to see effect modifiers. Poststratification was done through chi-square test keeping the p-value at ≤ 0.05. The results are presented in tables & charts.

RESULTS

A total of 168 patients with mandibular fractures fulfilled the inclusion criteria and were included in the study. Male patients (n= 125, 69.4%) were more as compared to female (n=43, 28.6%). (Figure 1). The overall mean age was 29.71 ± 9.55 years. All patients were placed in two age groups. Age group A comprised patients with age range of 19-40 years while age group B comprised of patients with age range of 41-60 years. Most of the patients were from age group A n= 147 (87.5%) as compared to older age group n=21(12.5%). The gender distribution across the two age groups was statistically not significant (p = 0.38, .42) (Table 1).

The most common was body fracture n= 57 (33.93%) followed in frequency by condylar fractures (n=46, 27.38%) , angle (n= 29,17.26%) and parasymphysis n=22, 13.09%). The least common was symphysis fracture which occurred in about n= 13 (7.7%) (Table 2). A total of 107 patients presented with a single fracture to the mandible, 31 patients with fractures at two simultaneous sites and 30 patients with fractures at multiple sites.

Fracture types were stratified according to age groups and gender along with the application of chi-square test to look for the significance of the association. Overall, age group A (19-40-year age) patients equally presented with left parasymphyseal fracture as their older group B (41-60 years age) counterparts and this association was statistically significant ($p < 0.0001$). (Table 3and 4). For gender we noted that younger males presented in a significantly higher number (n = 12, 7.1%) with right parasymphyseal fractures as compared to their female counterparts (n = 0, 0%) (p = 0.035) (Table 5 & 6).

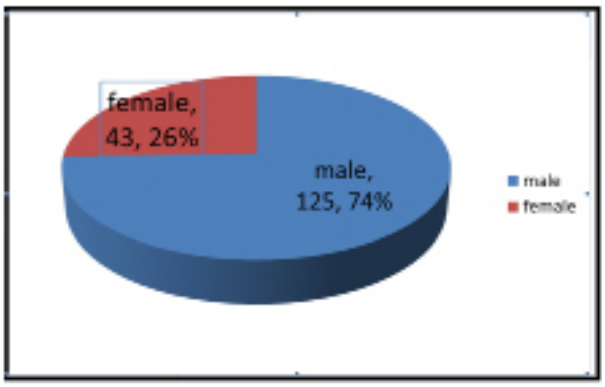

Fig 1. Gender Distribution

Table-1: Gender composition of two age group

Age group	Gender		P value
	Male	Female	
Age group A	N= 111 (61.1 %)	N= 36 (24.4 %)	.38
Age group B	N= 14 (8.3 %)	N= 7 (4.2 %)	.42

Table-2: Overall fracture site statistics

Fracture Type	Frequency	Percentage
Symphasis	13	7.73%
Parasymphysis	22	13.09%
Right	12	7.1%
Left	10	6%
Body	57	33.93%
Right	31	18.5%
Left	26	15.5%
Angle	29	17.26%
Right	10	6%
Left	19	11.3%
Condyle	46	27.38%
Right	21	12.5%
Left	25	14.9%

Table-3: Fracture stratification according to age groups with their Chi-square significance

Fracture site			Age Group		P value
			A (19-40 years)	B (41-60 years)	
Symphysis	Yes	N (%age)	11 (6.5%)	2 (1.2%)	0.74
	No	N (%age)	136 (81%)	19 (11.3%)	
Right parasymphsysis	Yes	N (%age)	9 (5.4%)	3 (1.8%)	0.17
	No	N (%age)	138 (82.1%)	18 (10.7%)	
Left parasymphysis	Yes	N (%age)	5 (3%)	5 (3%)	< 0.0001
	No	N (%age)	142 (84.5%)	16 (9.5%)	
Right body	Yes	N (%age)	29 (17.3%)	2 (1.2%)	0.26
	No	N (%age)	118 (70.2%)	19 (11.3%)	
Left body	Yes	N (%age)	25 (14.9%)	1 (0.6%)	0.15
	No	N (%age)	122 (72.6%)	20 (11.9%)	

Table-5: Fracture site stratification according to gender with their Chi-square significance

Fracture site			Gender		P value
			male	female	
Symphysis	Yes	N (%age)	8 (4.8%)	5 (3%)	0.26
	No	N (%age)	117 (69.6%)	38 (22.6%)	
Right parasymphsysis	Yes	N (%age)	12 (7.1%)	0 90.0%)	0.03
	No	N (%age)	113 (67.3%)	43 (25.6%)	
Left parasymphysis	Yes	N (%age)	5 (3.0%)	5 (3.0%)	0.07
	No	N (%age)	120 (71.4%)	38 (2.6%)	

Right body	Yes	N (%age)	23 (13.7%)	8 (4.8%)	0.97
	No	N (%age)	102 (60.7%)	35 (20.8%)	
Left body	Yes	N (%age)	22 (13.1%)	4 (2.4%)	0.19
	No	N (%age)	103 (61.3%)	39 (23.2%)	

Table-6: Fracture site stratification according to gender with their Chi-square significance

Fracture site			**Gender**		**P value**
			male	**female**	
Right angle	Yes	N (%age)	8 (4.8%)	2 (1.2%)	0.67
	No	N (%age)	117 (69.6%)	41 (24.4%)	
Left angle	Yes	N (%age)	16 (9.5%)	3 (1.8%)	0.29
	No	N (%age)	109 (64.9%)	40 (23.8%)	
Right condyle	Yes	N (%age)	13 (7.7%)	8 (4.8%)	0.16
	No	N (%age)	112 (66.7%)	35 (20.8%)	
Left condyle	Yes	N (%age)	18 (10.7%)	7 (4.2%)	0.76
	No	N (%age)	107 (63.7%)	36 (21.4%)	

DISCUSSION

Although considered strongest among facial bones, the mandible is vulnerable to fracture due to its prominence, the weaker geometric shape in the form of a U and gradual weakness with time. In our study, the majority of individuals presented from the age range of 19- 40 years. This is in agreement with the previous studies [12, 13, 14, 15]. But this is in contrast with the study reported by Kamali et al. who have reported higher prevalence in males of 11-20-year age group[16]. The possible explanation for the higher number of fractures in the age group 21-40 years is that this age of human life is the most energetic, vital decennium and thus people in this decennary are more endangered to physical trauma. These age people are usually the earning ones in their family, and the whole family depends on him/her especially in developed countries.

Most of our patients were male which is probably due to the higher social involvement of this gender in physically demanding tasks such as motor vehicle operation. This is in agreement with the previous studies [12,13,14,15]. While Mittal et al. in contrast have reported a higher incidence in female patients [17]. There are considerable variations in the gender groups. Some studies have reported male gender incidence in as high as 80% of the studied sample [14, 18].

The aetiology, size, extent and direction of impact force, anatomic position of the mandible and anatomy of sites affect the pattern of presentation of mandible fractures. The mandible has greater resistance to compressive forces and usually liable to fracture at the site of tensile strain. Also, the body and ramus fractures of the mandible are also influenced by laterally applied force. The muscle attached to mandible also influenced the pattern of mandible fractures and made them either favourable or unfavourable. The fracture of the body of the mandible is usually unfavourable due to these muscle attachments at anterior and posterior sites to the fracture. We observed that the abundance of fractures was in the body of the mandible followed in frequency by condyle and angle of the mandible. The findings in our study are in line with the previous studies [19, 20, 21, 22, 23]. However, there are other studies which differ and have described the higher percentage of fracture of the parasymphyseal area followed by angle and then the body [12,13,17,24,25,26]. Aksoy et al. have also described a higher percentage (>30%) for parasymphyseal fractures [27]. This may be due to the presence of primary teeth buds in young children which make increased tooth to bone ratio and make this area more liable to fracture. The difference in the fracture site might be due to the mechanism of injury; the population studied and the age. Our study was conducted on adult patients above 18 years. Study of the site of fracture is very important as it helps in establishing the optimal mode of treatment and it determines resource allocation and expertise development in a particular area of interest.

CONCLUSION

Mandibular fractures are the fairly common site of

injury in severe trauma. The main victims of this kind of trauma are involvement of young males. There is an abundance of mandibular body fractures which are followed by fractures of the angle and the condyle. Symphyseal and parasymphyseal fractures are the rare one. A better explanation of the effect and impact of age and gender on the mechanism of injury and anatomic site is of great clinical importance, and this will help us in future assessment, diagnosis, and treatment of mandibular fractures. There seems to be an urgent need for enhanced monitoring and regulation on motor vehicles especially two-wheeler to reduce the morbidity and mortality associated with RTAs in young adults.

REFERENCES

1. Kapoor P, Kalra N. A retrospective analysis of maxillofacial injuries in patients reporting to a tertiary care hospital in East Delhi. Int J Crit Illn Inj Sci. 2012; 2(1): 6-10.
2. Adhikari R, Karmacharya A, Malla N. Pattern of Mandibular Fractures in Western Region of Nepal. Nepal J Med Sci. 2012; 1(1): 45-8.
3. B. BR. Contemporary Management of Mandibular Fractures. In: Miloro M, Ghali GE, Larsen P, Peter W, editors. Peterson's principles of oral and maxillofacial surgery. 3rd ed; 2011. p. 407-39.
4. Ashraf N, Khan M, Din Qu, Sr. H. Pattern of mandibular fracture resulting from fall. Pak Oral Dent J. 2014;34 (2):245-8.
5. Agnihotri A, Galfat D, D A.. Incidence and pattern of maxillofacial trauma due to RTA –A prospective study. JMOS. 2014;13(2):184-8.
6. Mahdi AGM. Effect of age on the site of the mandibular fracture. Ramus.1:1.92.
7. Rashid A, Eyeson J, Haider D, Van Gijn D, Fan K. Incidence and patterns of mandibular fractures during a 5-year period in a London teaching hospital. Br J Oral Maxillofac Surg. 2013;51(8):794-8.
8. Na. M. Applied surgical anatomy of mandible and classification of mandibular fractures. In: In Malik NA, editor. Textbook of oral and maxillofacial surgery. 3rd ed. New Delhi:: Jaypee Brothers Medical Publishers; 2012. p. 425-32.
9. Breeze J, Gibbons AJ, Hunt NC, Monaghan AM, Gibb I, Hepper A, et al. Mandibular fractures in British military personnel secondary to blast trauma sustained in Iraq and Afghanistan. Br J Oral Maxillofac Surg. 2011;49(8):607-11. 154.
10. Hoppe IC, Kordahi AM, Paik AM, Lee ES, Granick MS. Age and sex-related differences in 431 pediatric facial fractures at a level 1 trauma centre. Journal of Cranio-maxillofacial surgery: official publication of the European Association for Cranio-Maxillo-Facial Surgery. 2014;42(7):1408- 11.
11. Zhou HH, Hu TQ, Liu Q, Ongodia D, Li ZB. Does trauma aetiology affect the pattern of mandibular fracture? J Craniofac Surg. 2012;23(5):e494-7.
12. Khan A, Salam A, Khitab U, Khan MT. The pattern of mandibular fractures — A study. PODJ 2009; 29(2): 221-224.
13. Giri KY, Singh AP, Dandriyal R, Indra N, Rastogi S, Mall SK, et al. Incidence and pattern of mandibular fractures in Rohilkhand region, Uttar Pradesh state, India: A retrospective study. J Oral Biol Craniofac Res. 2015;5(3):140-145.
14. Bereket C, Sener I, Senel E, Ozkan N, Yilmaz N. Incidence of mandibular fractures in black sea region of Turkey. J Clin Exp Dent. 2015;7(3):e410-3.
15. Hussain S, Ahmad M, Khan I, Anwar M, Amin M, Ajmal S, et al. Maxillofacial trauma: current practice in management at Pakistan Institute of Medical Sciences. J Ayub Med Coll Abbottabad 2003; 15: 8-11
16. Kamali U, A. P. Mandibular fracture at HUSM: A 5-year retrospective study. Arch Orofacial Sci. 2009;4:33-5.
17. Mittal G, Mittal S. Mandibular fractures at veer Chandra Singh garhwali government medical science and research institute, Garhwal region, Uttarakhand, India: a retrospective study. Ann Med Health Sci Res. 2013;3(2):161-5.
18. Bither S, Mahindra U, Halli R, Kini Y. Incidence and pattern of mandibular fractures in a rural population: a review of 324 patients at a tertiary hospital in Loni, Maharashtra, India. Dent Traumatol. 2008;24(4):468-70.
19. Shah A, Shah AA, Salam A. Pattern and management of mandibular fractures: a study conducted on 264 patients. PODJ ; 27(1): 103-106.
20. Khan SU, Khan M, Khan AA, Murtaza B, Maqsood A, Ibrahim W et al. Etiology and pattern of maxillofacial injuries in the armed forces of Pakistan. JCPSP 2007; 17 (2): 94-97.
21. Naomi G, Galvan. Evaluation of Mandibular Fractures in a Tertiary Military Hospital: A 10-Year Retrospective Study. Philipp J Otolaryngol Head Neck Surg 2011; 26 (1): 16-20.
22. Ellis E 3rd, Moos KF, el-Attar A. Ten years of mandibular fractures: an analysis of 2,137 cases. Oral Surg Oral Med Oral Pathol. 1985;59:120–9.
23. Olson RA, Fonseca RJ, Zeitler DL, Osbon DB. Fractures of the mandible: a review of 580 cases. J Oral Maxillofac Surg. 1982;40:23–8.
24. Natu SS, Pradhan H, Gupta H, Alam S Gupta S et al. An Epidemiological Study on Pattern and Incidence of Mandibular Fractures Plastic Surgery International. 2012.
25. Ajmal S, Khan MA, Jadoon H, Malik SA. Management protocol of mandibular fractures at Pakistan Institute of

medical sciences, Islamabad, Pakistan. J Ayub Med Coll Abbottabad 2007; 19(3): 51-55.

26. Barde D, Mudhol A, Madan R. Prevalence and pattern of mandibular fracture in Central India. Natl J Maxillofac Surg. 2014;5(2):153-6.

27. Aksoy E, Unlu E, Sensoz O. A retrospective study on epidemiology and treatment of maxillofacial fractures. J Craniofac Surg. 2002;13(6):772- 5.