Original Article

PATTERNS AND RISK FACTORS FOR CONDYLAR FRACTURE AND THEIR ASSOCIATION WITH CONCOMITANT MANDIBULAR FRACTURE

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ABSTRACT

Objective: *The aim of this study was to determine the patterns and risk factors of condylar fracture and association of condylar fracture with related mandibular fractures.*

Material and Methods: *This descriptive cross-sectional study was carried out from July 2015 to June 2017. A total of 90 patients through convenience sampling technique were included in this study. The exclusion criteria of this study were malunion, maltreated and pathological fractures. Patients were examined clinically, and data were collected in well-documented proforma. Orthopantomogram was done in all patients who met the inclusion criteria. CT scan was carried out if required. Data were analyzed using SPSS 22.0.*

Results: *The predominant age group involved was 11-20 years. Male to female ratio was 1.8:1. The most frequent risk factor resulting in condylar fracture was road traffic accident n=45 (50.2%) followed by fall n=27 (30.2%). The most common fracture was sub-condylar n=39 (43.3%), followed by condylar head n=33 (36.7%). Condylar fractures were mostly associated with parasymphysis fracture (15.6%). Statistically, no significant association was found between condylar fractures with a concomitant mandibular fracture.*

Conclusion: *The most common risk factor for condylar fracture was road traffic accident, and sub-condylar fracture is the predominant pattern of condylar fracture*

Keywords: *Patterns, condylar Fracture, mandibular fractures*

INTRODUCTION

Mandibular fractures are the most common fractures amongst facial fractures and account approximately 23.8–81.3% of all maxillofacial fractures.[1,2] Finite element analysis studies have investigated the biomechanical character of mandibular fracture after trauma and reported the allocation of compressive forces and tensile stresses, as well as weak areas in the mandible.[3,4] Fractures, more frequently occurs in tension regions than in compressions area.[5] The compressive forces are mainly located in the angle of mandible and posterior side of condyle and whenever there is a frontal bow, the impact point on the jaw with a fracture act as a lever.[6] The most common cause of mandibular fracture is interpersonal violence or road traffic accident.[7] Mandibular angle fracture (31.5%) is the most frequent site in low-velocity blunt trauma, while condylar fracture (24.5%) followed by symphyseal fracture (22.8%) is the result of high-velocity blunt injuries.[8] Mandibular condylar fractures increased from 9.64 to 9.17 folds due to falls at ground level than from height.[9] Unilateral condylar fracture occurs most frequently than in bilateral with children to adult ratio is 5:3, predominantly intracapsular and high neck condylar fracture.[10] Most of the condylar fracture exist in association with fracture of the body of the mandible and are usually unilateral, displaced and subcondylar.[7,11] Condylar fracture is associated with a considerable morbidity of malocclusion, temporomandibular joint dysfunction particularly with intracapsular fracture, limitation of the mouth opening, slowing and changes in the pattern of chewing cycle.[12]

The objective of this study was to identify the

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patterns and risk factors of condylar fracture and association condylar fracture with concomitant mandibular fractures.

MATERIAL AND METHODS

A descriptive cross-sectional study was carried out in the Department of Oral and Maxillofacial Surgery, Sardar Begum Dental College and Hospital, Peshawar from July 2015 to June 2017. A total of 90 patients coming to the department with condylar fracture through convenience sampling technique were included in the study. Malunion, maltreated and pathological fractures of condyle were excluded from the study. After taking informed consent from the patient, a well-documented proforma having demography and history of the complaint were elicited. Before going to clinical examination, the face was thoroughly cleaned with warm water or swabs . Inspection and palpation were carried out to figure out condylar fracture and other mandibular fractures clinically. Radiographically, orthopantomograph was carried out to see fracture line. In case of difficulty in visualization, CT scan was performed. The data were analyzed using SPSS 22.0. Mean, and standard deviation was computed for a quantitative variable like age. Frequency and percentage were calculated for qualitative variables like gender, site of condylar fractures, displacement, risk factors and other anatomical sites of mandibular fracture. Pearson chi-square statistics were applied to show an association of condylar fracture with patterns of a mandibular fracture. P value ≤ 0.05 was considered significant.

RESULTS

The mean age presentation was 40.0 ± 10.6 years. The most frequent age involved in this study were of 2nd decade life (11-20years) n=31(34.4%)), followed by 3rd decade (21-30years) of life n=20 (22.2%) as shown in Table 1. Male to female ratio was 1.8:1. Males were n=58(64.4%) and females were n=32(35.6%). The most common risk factor of condylar fracture was road traffic accident n=45(50%) followed by fall n=27(30%), fight n=10(11.1%), sports n=8(8.8%) as shown in Figure 1. The most frequent fracture level was sub-condylar n=39(43.3%), followed by condylar head n=33(36.7%) and condylar neck n=18(20%). Amongst these n=38(42.2%) were displaced fractures and n=52(57.8%) were undisplaced fractures. Condylar fracture with a concomitant mandibular fracture is shown in Figure 2. Condylar fractures mostly occur with parasymphysis fracture (15.6%) as shown in the Figure 2. Chi-square statistics showed no significant association of condylar fracture with other mandibular fracture sites (p=0.215).

DISCUSSION

This study demonstrates that the predominant age group was 11-20 years which is in consistent with other studies done in Pakistan.[13] This may be due to that this age group is actively involved in sports, fights,

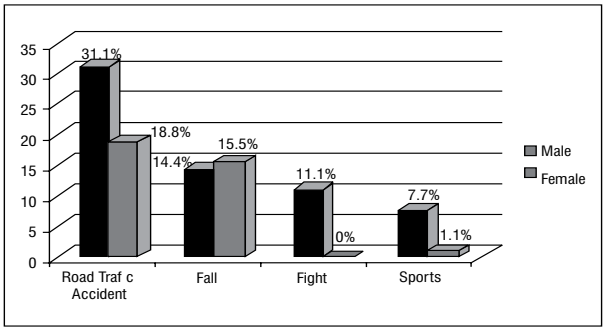

Fig 1. Gender distribution of risk factors of a condylar fracture.

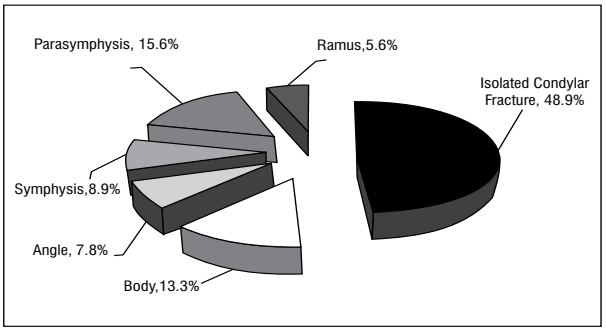

Fig 2. Condylar fracture with concomitant mandibular fracture

Table 1: Age and gender distribution of condylar fracture.

	Age Groups years N(%)								
Gender	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	Total
Male	6(6.7%)	19(21.1%)	15(16.6%)	9(10%)	5(5.6%)	3(3.3%)	0	1(1.1%)	58(64.4%)
Female	9(10%)	12(13.3%)	5(5.6%)	3(3.3%)	1(1.1%)	0	2(2.2%)	0	32(35.6%)
Total	15(16.7%)	31(34.4%)	20(22.2%)	12(13.3%)	6(6.7%)	3(3.3%)	2(2.2%)	1(1.1%)	90(100%)

violent activities and high-speed transportation and are more vulnerable to trauma. Other studies that were done in the United States and Turkey, [14] Bahrain[15] and Scotland[16] showed similiar age group of 21-30 having higher rate of condylar fracture. The low frequencies of fractures at old age groups might be due to the low activities in everyday life.

The male to female ratio in this study was 1.8:1 elaborating condylar fractures are more common in the male population. These findings are in agreement with the results of previous studies conducted in Pakistan[17] and Australia.[18] However, the study done by Yoffe[19] et al. concluded that condylar fractures are more common in females than males which contradict this study.

The most common risk factor for condylar fracture in this study was road traffic accident n=45(50%) which contradict the study done by James[20] et al. in which they mentioned interpersonal violence to be the leading cause of mandibular fracture. The higher number of condylar fracture due to road traffic accident here may be due to the lack of seat belt law obligation, over speeding, overloading, underage driving and also due to poor condition of roads and vehicles. However, Zakia [21] et al. and Erol [22] et al. showed that road traffic accident is the most frequent risk factor for a condylar fracture in underdeveloped and developing countries. Fall was the second most common risk factor in this study n=27(30%) which is in accordance with study done by Shahim et al.[23]

The most frequent fracture site of the condyle in this study was sub-condylar n=39(43.3%) followed by condylar head n=33(36.7%) and condylar neck n=18(20%). These findings are in agreement with the study done by Kim[24] et al., Thoren [25] et al. and Zachariades et al.[7] The study had done by Melmed[26] et al. and Valiati [27] et al. found that condylar head and condylar neck fractures to be the most common fractures of all condylar fractures which contradict this study. This study revealed that 42.2% fractures were displaced and undisplaced fractures were 57.8%, however, other studies such as Yamaoka[28] et al. and Zachariades [7] et al. showed that displaced condylar fractures are more common than undisplaced.

This study manifest that 48.9% were isolated condylar fractures. Most of the condylar fractures (15.6%) were associated with fractures of parasymphysis followed by the body, symphysis angle, and ramus of the mandible. This study contradicts the study of Escot[29] et al. and Sawazaki[30] et al., in which they demonstrate that incidence of isolated condylar fracture 68% which is higher than our study and that condylar fracture was most frequently seen with a concomitant symphyseal fracture. However, statistically, no significant association was shown in their study[29,30] which braces this study. Subhashraj[31] et al. exhibit that condylar fracture is closely related to parasymphysis fracture which reinforces this study.

The limitation of the study is taking few risk factors for condylar fracture in the study and radiographic assessment as most of the patients were unwilling to take CT scan. Apart from this, our study thoroughly elaborates the condylar fracture: risks and patterns. The difference may be due to geography, socioeconomic trends, road traffic legislation and seasons which differ from one country to another. Therefore, the results may not be anticipated for the entire population. The future study may comprise of each risk factor responsible for respective condylar fracture as well as their displacement.

CONCLUSION

The findings of the study concluded that the most frequent risk factor and patterns of condylar fracture involved the road traffic accident and sub-condylar fracture respectively. Condylar fracture is mostly related to parasymphysis fracture. There is no statistically significant association between condylar fractures with concomitant mandibular fractures exist.

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