IMPACTED THIRD MOLARS AND ASSOCIATED RISK OF MANDIBULAR ANGLE FRACTURE - A CROSS SECTIONAL STUDY

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ABSTRACT

Objective: *To determine frequency of impacted third molar in mandibular angle fracture.*

Materials and Methods: *This descriptive, cross sectional study was carried out in the Oral & Maxillofacial Surgery Department, Khyber College of Dentistry Peshawar from April 2016 to March 2017. 216 patients with mandible angle fractures were included in the study. Data regarding gender, age, angle fracture and impacted mandibular third molar were collected through history, clinical examination and was confirmed by orthopentomogram (OPG). Impacted third molar in mandibular angle fracture was stratified using chi square test among gender and age. P<0.05 was considered significant.*

Results: *Among 216 patients presenting with angle fractures , impacted lower third molar was present in 179 patients (82.9%) and absent in 37 patients (17.1%).Amongst them 181 (83.8%) were males and 35 (16.2%) females. Mandibular angle fracture was predominant in male gender with male to female ratio of 5.17:1. The mean age was 24.69 SD± 6.61. Most of the patients were in third decade (44.9%) followed by second decade (39.3%).*

Conclusion: *The results of current study support that the frequency of impacted third molar was high in patients presenting with fractures of mandibular angle region and males were more commonly involved in than females. Third decade of life was the commonest age group for mandibular angle fractures.*

Keywords: *Mandibular angle fracture, third molar, impacted 3rd molar*

INTRODUCTION

The strength of the mandible depends upon its active and strong musculature, shape and thickness of the bone and whether teeth are present or absent[1]. Mandibular fractures are common than other facial bones because of its more prominent position and exposed situation[2].

There are various factors which are responsible for fracture mandible such as amount, severity, direction and surface area of force, soft tissue consistency, density of bone and abnormal or normal anatomic structures creating weak areas within bone[3].

Mandibular fracture occurs in 11.5 cases per 100,000 individuals per year. About half of these fractures occur in people with age range of 16-30 years and mandibular angle fractures accounts for about 40% of these fractures. This is affected by many factors such as age, gender, socioeconomic status and etiology of trauma[4].

According to Retzius hypothesis, angle is the weakest area as sharp angulation concentrates stress and some injuries distort the mandible beyond its yield point[3]. There is also 1.73 fold increase in risk of mandibular angle fracture when third molar is present as compared to absent third molar[5]. Third

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molar presence contributes to increased mandibular fragility because the mandible loses part of its bone structure to harbor an organ (tooth) that decreases its strength[4]. This risk increases further if third molar is impacted as impacted tooth occupies more osseous space[5]. Third molars are most vulnerable to be impacted as they are last to erupt. Latest studies have also shown that risk of condylar fractures is increased in the absence of third molar as force is transmitted to a more fragile area, the condyle[6]. Some authors have also proposed prophylactic removal of third molar in order to prevent mandibular angle fractures in patients with greater risk of facial trauma such as those involved in sports, athletics[1].

The aim of this study is to determine impacted lower third molar as a risk factor for angle fracture. There has been very few studies in our region on presence of 3rd molars as risk factors for angle fractures. A significant relationship between angle fracture and impacted 3rd molars may help in modifying guidelines of prophylactic removal of 3rd molars to avoid angle fracture in such cases.

MATERIALS AND METHODS

A descriptive cross sectional study was done in the Oral & Maxillofacial Surgery Department, KCD Peshawar from April 2016 to March 2017. A number of 216 patients presented with mandibular angle fractures were included. Informed consent and detailed history was taken. After that, clinical along with radiographic examination of the patients was performed. Site of fracture mandible was confirmed by Orthopentomogram(OPG). The purpose, procedure, risks and benefits were explained to the patients and informed consent was taken regarding their willingness and participation in the study. The collected data was stored and analyzed in SPSS version 17 for windows. Means ± SD were calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, impacted third molar. Impacted third molar associated with angle fracture was stratified among age and gender using chi square test to see the effect modifications. All results were presented as tables and figures. All the patients of either gender and above 17 years of age who presented with mandibular angle fracture were included in the study. Mandibular angle fracture associated with gunshot wounds and bomb blast injury was excluded from the study. Patients who were 17 years of age or below, were excluded from the study because mandibular third molar usually erupts after this age.

RESULTS

In the present study 216 patients with mandibular angle fracture were recruited. Among these, 181(83.8%) were males and 35(16.2%) were females. The male to female ratio was 5.17:1. The detail is given in figure 1.

The age of patients with angle fracture had range from 18-60 years with mean age of 24.69 SD± 6.61. The frequency of angle fractures was high in the 3rd decade i.e. out of 216 patients, 97 (44.9%) had an age range of 21-30 years. This was followed by patients in their 2nd decade i.e. 85 (39.3%) patients. Only 1 (0.5%) patient was older than 50 years of age. The detail of age distribution is given in Table 1.

Among 216 patients presenting with angle fracture, impacted third molar was present in 179 patients (82.9%) and absent in 37 patients (17.1%). The details are shown in Table 2.

In the present study impacted lower third molar associated with angle fracture was stratified using chi square test among gender and age. Significance level was chosen to be 0.05 meaning statistically significant difference when $P \leq 0.05$.

Gender stratification of impacted third molar showed that out of 179 patients having impacted third molar in mandibular angle fractures, 150 (69.4%) were males and 29 (13.4%) females. Age stratification of impacted tooth showed that majority of the patients having impacted tooth in angle fracture were in third decade of life i.e. 77 (35.6%) patients followed by second decade i.e. 68 (31.5%) patients. No significant relationship was found between gen-

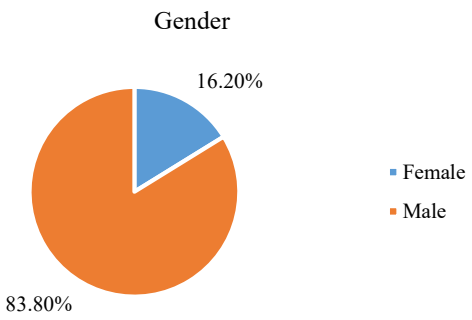

Fig 1: Gender distribution of angle fracture

Table 1: Age Distribution of patients with mandibular angle fracture

S. No	Age in years	Frequency	Percentage
1	18-20	85	39.3%
2	21-30	97	44.9%
3	31-40	29	13.4%
4	41-50	4	1.9%
5	51-60	1	0.5%
	Total	216	100%

Table 2: Frequency of third molar impaction in mandibular angle fractures

S. No	Impacted third molar	Frequency	Percentage
1	Yes	179	82.9%
2	No	37	17.1%
	Total	216	100%

Table 3: Gender stratification of third molar impaction in mandibular angle fractures

Gender	Impacted tooth n		P value
	Yes	No	
Male	150 (69.4%)	31 (14.4%)	0.998
Female	29 (13.4%)	6 (2.8%)	
Total	179 (82.9%)	37 (17.1%)	

Table 4: Age stratification of third molar impaction in mandibular angle fractures

S. No	Age in years	Impacted tooth n		P value
		Yes	no	
1	18-20	68 (31.5%)	17 (7.9%)	0.079
2	21-30	77 (35.6%)	20 (9.3%)	
3	31-40	29 (13.4%)	0 (0%)	
4	41-50	4 (1.9%)	0 (0%)	
5	51-60	1 (0.5%)	0 (0%)	
	Total	179 (82.9%)	37 (17.1%)	

der and impacted tooth (P value= 0.998) and age and impacted tooth (p value= 0.079).The details are shown in Table 3 and 4.

DISCUSSION

Angle is considered the weak area of mandible because it is the transition zone between dentate and non-dentate part of mandible. The sharp angulation at angle concentrates stress and the direction of bony trabeculae changes at the junction of horizontal body and ascending ramus[7, 8].

According to results of the current study, angle fracture was more common in males (83.8%) in comparison females (16.2%). This finding is in consistence with previous research done all over the world. The results of the study conducted by Naghipur et al on mandibular angle fractures associated with impacted third molar showed similar results having 84.5% male and 15.5% females, with male to female ratio to be 5.46:1[9]. The results of local study conducted by Abbasi et al on mandibular angle

fractures showed similar results with male to female ratio of 5.8:1[10].

The predominance of males in the present study is because males are engaged more in outdoor activities while females are usually confined to home. In underdeveloped and developing countries there is a higher level of physical activity among men due to male dominant society and majority of the injuries occurs due to road traffic accidents.

The results of present study shows that frequency of mandibular angle fracture was high in third decade (44.9%) followed by second decade i.e. 39.3%. People of this age group experience more personal independence, social activities, reckless driving and exposure to assault. Therefore the chances of maxillofacial injuries are more .Most important factor is that mandibular third molar is mostly impacted in this age group rendering weakness to mandibular angle region.

Results of present study showed that frequency of impacted third molar in angle fractures was higher as compared to erupted or absent third molar. Similar results were also shown in studies conducted by Abbasi et al, Duan et al and Rajkumar et al[10,11,12]. The presence of mandibular third molar makes the mandibular angle region more fragile because mandible loses volume of its bone to occupy a structure that does not provide strength[13]. According to previous studies, relative risk of mandibular angle fracture is increased when mandibular third molar is unerupted as compared to erupted third molars because mandibular angle region containing unerupted tooth has decreased cross sectional area of bone[14]. When a strong force is applied on the lateral surface of the mandible, the bone bends inside and produces compressive forces on the lateral surface and tensile forces on the lingual surface. Thus, fractures results when the tensile strain beginning on the medial surface of the mandible and progresses through the bone to the point of impact, and overcomes the resistance of the bone. The presence of impacted third molars in the region of the mandibular angle encourages the propagation of the fracture along the least resistant path by diminishing the tensile strength of the bone[15].

The impacted third molar has been considered a risk factor for mandibular angle fracture therefore many authors has proposed its prophylactic removal to prevent mandibular angle fracture especially adolescents and young adults who frequently play contact sports because of the associated high incidence of mandibular angle fracture[16,17]. However prophylactic extraction is questioned by many authors in the past as it can lead to many complications like alveolar osteitis, damage to inferior alveolar and lingual nerve, increased chances of condylar fracture and even mandibular fracture which can occur during extraction or post operative[18]. Kober et al proposed a biomechanical model, which suggested that the possibility of condylar fractures would be decreased, if the angle was weakened by incompletely erupted third molars as impact forces would be dissipated by the angle fractures[19].

Prophylactic removal of mandibular impacted third molar renders strength to the angle of the mandible and is made more resistant to fracture as traumatic force is transmitted to weak region particularly condyle. The treatment of condylar fracture is difficult due to surgical access, poor visibility of the operative field, difficult hemostasis, accurate placement of plates and screws and chances of postoperative complications like Frey syndrome, salivary fistula and postoperative malocclusion and temporomandibular joint problems. Excellent reduction and stable fixation for angle fractures are easily performed because the access and visibility for plating is much better. Thus it might not be appropriate to make the mandible more vulnerable to condylar fractures by removing the impacted or unerupted third molars because the treatment of condylar fractures is more challenging than that of angle[20,21,22].

CONCLUSION

This study revealed that frequency of impacted tooth was high in mandibular angle fractures so it acts as risk factor for angle fractures. Mandibular angle fractures were more prevalent in males and in third decade of life.

RECOMMENDATIONS

1. People should be educated about third molar impacted tooth and its consequences.
2. Persons involved in active sports should be educated about use of different safety measures like mouth guards and protectors during sports activities.
3. Further research work should be carried

out to formulate guidelines for prophylactic removal of impacted third molar.

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