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Evaluation of demographic and clinical features related to brain and neck injuries in patients with maxillofacial fractures

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ABSTRACT

Introduction: The aim of this study was to investigate some of the demographic and clinical features related to brain and neck injuries in patients with maxillofacial fractures in educational hospitals of Rasht in 2016.

Methods and Materials: The present study was a retrospective analytical study. A total of 361 patients who were diagnosed with maxillofacial fractures in Rasht city were entered into this study. The data were collected through a questionnaire and by examining the existing files from patients referring to the emergency department of Pursina and Velayat Hospitals who had maxillofacial fractures. A variety of brain and cervical spine injuries were investigated on them. The diagnosis of the type of fracture and the type of brain and neck injury were separately written in the patient file by the relevant specialists based on clinical examinations, age, sex and plain radiography and CT scan. The measurments were analyzed after data collection. Data were analyzed using SPSS and an independent sample T-test.

Results: The results showed that men (286) had more maxillofacial fractures than women (75). The fractures in the maxillofacial area occur more often in the third period of life (21-30). Mandible was the most common fracture site in the patients (185). Men were more injuredthan women in both cervical spine and brain, and this difference wassignificant (p = 0.001). Finally, the highest percentage of brain (45.16%) (p = 0.0001) and cervical spine (55.56%) (p = 0.264) injuries were observed in the age range of 21-30 years old.

Conclusion: The men had more maxillofacial fractures with brain and cervical spine injuries in third decayed of their lives.

Key words: Brain Injury, Neck Injury, Maxillofacial fractures, Demographic features.

Introduction

Though technological advances have improved human life in the last century, but due to violence, and the phenomena such as crash accidents, occupational accidents and martial arts especially in recent years, there has been a significant increase in the number of physical injuries, including maxillofacial inju-

During the last 20 years, fracture of facial bones is one of the most common injuries in patients referred to emergency departments [2]. Face is one of the most vulnerable parts of the body, so that it can, in the case of any accident,result in important and dangerous complications for the patient due to its proximity to vital organs such as brain and its curves, spine, spinal cord and eye, and also due to physiological, cosmetic and psychological problems [3]. Long-term studies of demographic data and fracture patterns are necessary for all countries, because the collection of information about trauma and its complications helps to plan and create some solutions such as the establishment of laws and public health initiatives. There are several studies that have examined some of the demographic and clinical features associated with brain and spinal injuries in patients with maxillofacial fractures. For example, Scheyerer et al. [4] examined 67 patients with maxillofacial fracture in terms of side injury. an average age of82% of male patients was 44 years. Falling from height was the most common (37%) cause of fracture in the studied patients. Internal cerebral hemorrhage was the most commonly reported side injury, seen in 72% (48 cases) [4]. In a study by Shazia et al. [5], 115 patients with maxillofacial fracture were studied. In this study ,74% of the patients were male and the age range of 15 to 30 years old had the highest frequency (51%) amongthe patients. In all patients, driving accidents were the cause of fracture. Brain injury was reported in 76% of patients [5]. In the study ofDeliverskaet al. [6], 276 patients with maxillofacial fractures were investigated and sideinjury was reported for 87 patients (32%). Traumatic brain injury was reported for 13% and cervical spine injury for 5% of the patients. In this study, the prevalence of men was 72% and the age range of 20-30 years had the highest frequency. Also, in a study by Obuekweet al. [7], 312 cases of maxillofacial fractures in road accidents were investigated for side injury. The male to female ratio was 2/1:7, and the most common age was the age group of 21-30 years old.

A total of 138 patients (44.2%) had side injury and the most commonly side injury in these patients was head injury (55.8%). In a study by Zhang et al. [8], 645 patients were examined. The results of this study showed that the proportion of facial fractures in men was triple compared to women and was more common in the 21 to 30 years age group. Also, it was more common in the summer and autumn than the other seasons. Traffic accident was reported as the greatest cause of fracture.

Materials and Methods

This research was a retrospective descriptive-analytic research. The population of this study was all patients referring to educational centers of Rasht city in 2016 who were referred to these centers due to maxillofacial fractures; of these, base on statistic consulter decision, by sampling 361 people were selected as the sample and examined. The data was collected through a questionnaire and by examining existing files from the patients referred to the emergency departments of Pursina and Velayat Hospitals who had maxillofacial fractures; and a variety of cervical spine and brain injuries were investigated on them. The diagnosis of the type of fracture and the type of brain and neck injury were separately written in the patient's file by the relevant specialists based on clinical examinations and plain radiography and CT scan. Files that were incomplete and lacking comprehensive information for various reasons were excluded from the study. The collected data were analyzed by SPSS software. Descriptive tests were used in order to describe the data.

Findings

In the first section, the frequency of gender was studied in the patients by sample T test, the results of which are presented in Table 1. As we can see, a total of 361 patients with maxillofacial injuries were studied in this research, of whom 286 (79%) were male and 75 (21%) were female (Tables 1-4). In the next step, the average age of the patients was evaluated and the results are presented in Table 2. The mean age of the patients under study was 33.50 ± 19.29 years with a minimum of 2 and a maximum of 90 years. The age group of 21-30 years old was the most frequent (129 patients, 35.73%) among the patients. Then, the age groups of 31-40 years (24 93.2%), 11-20 years (62 (16.1%), 51-41 years (11.91%), 1-10 years (54.5%), and over 50 years (5. 26%) were in the next rank in terms of frequency. In Table 3, the location of maxillofacial fractures and its comparison in two sexes are addressed. The maxillofacial fracture pattern wasclassified into six classes of mandibular (51%), maxilla (4%), zygomatic (6%), frontal (10%), nose (10%) and combined fractures (8%). Therefore, mandible was the most common fracture site in the patients. In all fracture sites, the prevalence was higher in men than in women. Considering the fracture site, there was a significant difference between the patients ($p = 0.0001$) and also the two sexes of males and females. Table 4 examines spinal injuries and brain injuries in men and women.

	Number	Percent (%)	P value
Men	286	79	
Women	75	21	0.001
Total	361	100	

Table 1. Frequency of gender in the studied patients.

Age (years)	Number	Percent (%)
1-10	20	5/54
11-20	60	16/62
21-30	129	35/73
31-40	90	93/24
41-50	43	91/11
Over 50	19	26/5
Total	361	100

Table 2. The frequency of the patients in different age groups.

	Men		Women		Total	P value
	Percent (%)	Number	Percent (%)	Number	Percent (%)	Number
Mandibular	44	158	7	27	51	185	0.0001
Maxilla	4	13	4	3	4	16	0.01
Zygomatic	5	17	1	3	6	20	0.01
Frontal	8	30	2	6	10	36	0.01
Nose	8	29	2	8	10	37	0.01
Combined fracture	4	15	4	13	8	28	0.2

Table 3. Maxillofacial fracture in the studied patients.

		Number	Percent (%)	P value
Cervical spine injuries	Men	7	1.93	0.09
	Women	2	0.55	
	Total	9	2.47	0.004
Brain injuries	Men	168	46.53	0.001
	Women	49	13.57	
	Total	217	60.11	0.001
All patients		361	100	

Table 4. Brain and cervical spinal injuries in the studied patients based on gender.

	1-10	11-20	21-30	31-40	41-50	Over 50	P value
Brain injuries	2 (%92/0)	34 (%7/15)	98 (%16/45)	73 (%7/33)	6 (%8/2)	4 (%9/1)	0.0001
Cervical spine injuries	1 (%11/11)	3 (%33/33)	5 (%55/55)	-	-	-	0.264

Table 5. Brain and cervical spine injuries in the studied patients in terms of the age of the patients.

The highest percentage of brain injuries (45.16%) (p = 0.0001) and cervical spine (55.56%) (p = 0.264) was observed in the age range of 21-30 years old.

Discussion and Conclusion

The aim of this study was to investigate some of the demographic and clinical features related to brain and cervical injuries in patients with maxillofacial fractures. The first finding of this study was that maxillofacial fractures in the studied subjects were more common in men than in women, since among the 361 patients with maxillofacial fractures, 286 (79%) patients were male and 75 (21%) were female. The ratio of men to women in this study was 4 to 1. Therefore, the results of this study show that trauma is mainly a male problem. The results of previous studies also confirm this conclusion (Champion et al [9], Clark et al [10], Bouillon et al. [11]). This can be due to the higher inclusion of men in the works related to such accidents (such as driving and physical jobs). According to al-Ahmed et al. [12], in relation to trauma, the overall ratio of men to women varies between 3 to 1 and 5.4 to 1. The ratio obtained in the present study is comparable to those of other studies in the world. As there has been reported the ratios of 3 to 1, 2.5 to 1, 1 to 1 in surveys conducted in Canada and New Zealand, in Australia, and Jordan respectively [13]. However, lower ratios have been seen in Greece, and much higher in Nigeria (16.9 to 1), Turkey (25 to 1) and Pakistan (32 to 1) [14]. The difference between these ratios from one country to another can be due to the differences in societies in terms of social, cultural and economic contexts. More men's involvement, especially in developing countries, is due to the social nature of societies and the main role of men in providing family livelihoods and the wider presence of them outside home and their hard working. Therefore, men are at higher risk of car accidents, conflicts and occupational accidents. Given the view and the availability of suitable conditions for out-of-home job for women in developed countries such as Canada, New Zealand and Australia, this ratio is far lower in these countries. The second finding of the present study was that the average age of the patients as well as the age frequency washigher in the patients in the third decade of life. The mean age of the patients in this study was 33.59 ± 19.29 years with a minimum of 2 and a maximum of 90 years. The highest frequency was observed in the age group of 21-30 years old (129, 35.73%) and the lowest frequencieswere observed in the age ranges of 1-10 years (5.54%) and over 50 years (5.26%). The mean age of the patients as well as the age frequency in the third decade of life is similar to previous studies (15, 16, 17, 18, 19, 20, 21). The higher frequency of maxillofacial fractures in the third decade of life may be due to the fact that people in this period of life are more involved than in other age groups in sporting activities and physicaloccupations, or they use high-speed vehicles [20]. In general, the high barotraumain this age group plays a major role both in the lost years of life and in the cost of mortality and disability. This group is also representing a population that is economically active in the community. Lowerfrequencies in the teenage group or the old age group are due to less activity in these age groups [20].

In this study, Mandible (51%) was the most common fracture site in the patients. In mandible fracture, condyle (34%) and the trunk of mandible (22%) were the most common sites of fracture. AkramiAbarqoi et al. [22], in the study of patients with maxillofacial fractures, nasal bone (67.4%) and then mandible (18.7%) as the most common involved sites. In this study, the most common involved sites of mandible were condyle (31.47%) and trunk of mandible (26.73%). In a study by Comuliga et al. [14], mandible is the most common bone affected by single fractures. In this study, the symphysis was the most frequent place of conflict and then parasymphicwas the next with asmall difference. In the study of Maliska et al. [13], mandibular involvement was more common (54.6%), which is similar to those of Brasileiroand Passeri [23] and Chrcanovicet al. [24]. However, these results are different from the findings of the Dongasand Hall study [25], in which the middle-third facial fractures is the most common site of conflict. It seems that the etiologic factor effective in the occurrence of fractures plays a role in these differences.

According to the results of this study, cervical spine injury was seen in 9 (2.49%) patients, where 7 were male and 2 were female. The prevalence of cervical spine injury in patients with maxillofacial fractures was 2.2% in the study of Mukherjee et al. [26], 5%in the study by Deliverskaet al [6], 1.8% in the study by Merrittet al [27], 1.04% in the study of Beirne et al. [28], 0.8% in the study by Roccia et al. [29], and 6.7% in Wolfgang et al. [30]. Similar to the results of this study, in the study of Rossa et al. [29], the prevalence of cervical spine injury in patients with maxillofacial fractures was higher in men (17 cases) than in women (4 cases).

The results of this study showed that 217 (60.11%) patients suffered from brain injuries, of whom 168 were male and 49 were female. The results of previous stud-

ies also indicated the prevalence of brain injury as a sideinjury in patients with maxillofacial fractures. For example, the prevalence of brain injurywas estimated 48% in Scheyerer et al. [31], 76% in Shazia [32], 23.3%, in Zandi and Hoseini [33], 13% in Deliverska et al. [6], , 17.5% in Hauget al. [34].

Overall, according to this study, maxillofacial fractures and associated injuries such as brain and neck spinal injuries are more occurred in men and in their third decade of life which is in the wake of the role of men in Family and more participation in social activities. Also, this study showed that brain injury is associated with a high prevalence (60.11%) in patients with maxillofacial fractures, which these involvements should be considered in order to properly treat and rehabilitate the patient with traumatic face to prevent causing irreparable damages to such patient.

Conflict of Interest

There is no conflict of interest to declare.

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