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The Review of Factors Affecting the Hospitalization Period of Patients with Fractures under the Age of 10

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Abstract: The present research intends to review the frequency of diverse types of fractures the causes and locations of fractures the relationship between demographic features of patients and these factors as well as the factors affecting the hospitalization period of patients with fractures. To this end, patients, 10 years and younger, suffering from maxillofacial trauma injured during August 2011 to Agust 2014 were studied. For the purpose of the present research, 182 hospitalized patients suffering from fractures to the different parts of the face participated in this study. The mean of the age of the patients in this study, was 6.32±2.64 years and the mean of the hospitalization period for these patients equaled 3.21±2.24 days. Amongst the 182 participants, 116 (63.7%) and 66 (36.3%) patients were respectively male and female. Nevertheless, of these patients, 160 (87.9%) with nasal fracture, 9 (4.9%) with mandible fracture, 3 (1.6%) with maxilla and 10 (5.5%) with orbital fracture were examined. The most frequent cause of fracture was related to falls. The results of the current research indicated that there is not any statistically significant relationship between the type and the cause of fractures and the sex of the patients. Further more the hospitalization period was longer in ENT ward for patient who were fractured due to motor vehicle accident than patients fractured due to other causes.

Key words: Demographic features, suffering, hospitalization period, maxilla, ENT

INTRODUCTION

In maxillofacial trauma (face and jaw), the mostly injured parts are mainly the bones of nose, cheek, lower jaw and upper jaw. The external nose is composed of two structures, bone and cartilage. The former, nasal bone is composed of two nasal bones (nose bridge) the frontal process of the upper jaw the frontal bone of the nose (nose root) and nasal spine. The nasal bones are supported by the frontal process of the upper jaw and due to their prominent position on the middle of the face these bones are the most prevalent fractures of the body. The cheek bones (zygomatic bones) are located on the face such that their posterolateral processes are attached to temporal bones to which mastication (chewing) muscles are attached. The upper internal appendages of the cheek bones compose the external and lower walls of the eye socket (orbits); its lower internal parts compose the lower walls of the orbits and are attached to the upper jaw. Drooping eyes is a common complication of unrepaired or partially repaired fractures of the cheek bones.

The bone of the upper jaw are externally attached to the cheek bones and internally attached to nasal bones; mean while they compose the internal part of the lower walls as well as the anterior floor of the orbits (eye sockets); nevertheless they support the nasal bones. The upper jaw includes maxillary sinus and is an infra orbital branch of nerve 5 which can be injured by the fractures to this bone. The lower jaw is located in one-third of the lower parts of the face, having two branches which are symmetrically attached to the skull base. The horse-shoe shape of the lower jaw and its bilateral attachment to the skull enable it to attract the incoming forces well. Hence, multiple fractures to the lower jaw are caused by an unusual single force. The inferior alveolar nerve is a branch of trigeminal nerve which passes through the bone of lower jaw; thus, it is necessary to take enough caution not to damage this nerve while repairing the fracture of this bone.

In terms of diagnosis and management, nasal bone fractures in children is very different from the same fractures in adults. In children, nose has more mobility since it is mostly make of cartilage; for this reason the incoming forces from any stroke to the nose can easily damage the surrounding structures. Since, the structure of nose is mostly made of cartilage and has incomplete

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ossification in children, nasal fractures in children is limited to cartilage and green stick fractures (Pollock, 1992).

In a study of maxillofacial fractures, nasal fractures accounted for (95.2%) (Shohreh *et al*., 2014). The mean of the age of children with maxillofacial (face and jaw) was 5-6 years among which male children were most susceptible cases of fractures (Collao-Gonzalez *et al*., 2014). Most vulnerable cases of fractures in children aged 0-12 years have been due to the fall from height and subsequently caused by accident (Collao-Gonzalez *et al*., 2014). The most occurring fractures in children are nasal and mandible fracture. Mandible fracture occur mostly in the area of mandibular condyle (Collao-Gonzalez *et al*., 2014). On the contrary in some other studies, mandible fractures had the highest percentage in maxillofacial (face and jaw) amongst children (Gassner *et al*., 2004).

Since, epidemiological studies can be effective in reducing the human and financial costs by identifying the prevalent causes and types of fractures the present research intends to review the frequency of diverse types of fractures the causes and locations of fractures the relationship between demographic features of patients and these factors as well as the factors affecting the hospitalization period of patients with fractures.

MATERIALS AND METHODS

This cross-sectional study was a descriptive and retrospective research. 182 patients, 10 years and younger, with maxillofacial trauma during August 2011-2014, who were hospitalized in Imam Khomeini Hospital, participated in this study. The information related to the types, causes and locations of the fractures in these patients together with their hospitalization period and demographic information were prepared in a checklist and derived from their dossiers. The results of the data including the frequency of types, causes and locations of fractures as well as the hospitalization period and demographic data were analyzed by SPSS Statistical Software and their relationships to one another were investigated. The criterion for the significance level in this study was 0.05%. The aforementioned data were subsequently analyzed after being collected.

RESULTS

Patients, 10 years and younger injured by various fractures to different parts of the face due to maxillofacial trauma for 3 years during August 2011-2014 were studied. The results of the study are presented here under.

The mean of the age of the patients in this study, was 6.32±2.64 years and the mean of the hospitalization period for these patients equaled 3.21±2.24 days. Amongst the 182 participants, 116 (63.7%) and 66 (36.3%) patients were respectively male and female. Nevertheless, of these patients, 160 (87.9%) with nasal fracture, 9 (4.9%) with mandible fracture, 3 (1.6%) with maxilla and 10 (5.5%) with orbital fracture, who referred to Imam Khomeini Hospital and hospitalized at ENT ward were examined.

Table 1 thoroughly presents the frequency of the causes of fractures in 182 patients under study; accordingly the most frequent cause of fracture has been reported to be related to falls from height and the least frequency was associated with accident with bus.

Furthermore, Table 2 shows the frequency distribution of the causes of fractures for both male and

Table 1: The frequency of the causes of fractures in studied patients

Causes of fracture	Frequency	Percentage
Pedestrian	8	4.5
Cyclist	1	0.6
Driver	9	5.1
Falls	110	61.8
Fight	1	0.6
Collision	14	7.9
Not recorded	25	14.0
Other	2	1.1
Damages by animals	4	2.2
Total	182	100.0

Table 2: The frequency of the causes of fractures for both male and female groups

	Sex		
Causes of fractures	Male	Female	Total
Pedestrian			
No.	4	4	8
Percentage	50.0	50.0	100.0
Cyclist			
No.	0	1	1
Percentage	0.0	100.0	100.0
Driver			
No.	4	5	9
Percentage	44.4	55.6	100.0
Falls			
No.	65	45	110
Percentage	59.1	40.9	100.0
Fight			
No.	1	0.0	1
Percentage	100.0	0.0	100.0
Collision			
No.	10	4	14
Percentage	71.4	28.6	100.0
Not recorded			
No.	21	4	25
Percentage	84.0	16.0	100.0
10 explosion			
No.	4	0	4
Percentage	100.0	0.0	100.0
Other			
No.	2	0	2
Percentage	100.0	0.0	100.0
Damages by animals			
No.	3	1	4
Percentage	75.0	25.0	100.0
Total			
No.	114	64	178
Percentage	64.0	36.0	100.0

Table 3: The frequency of the types of fractures for both male and female groups

	Sex		
Types of fractures	Male	Female	Total
Nasal			
No.	100	50	150
Percentage	66.7	33.3	100.0
Mandibular			
No.	6	3	9
Percentage	66.7	33.3	100.0
Maxilla			
No.	0	1	1
Percentage	0.0	100.0	100.0
Orbital			
No.	1	3	4
Percentage	25.0	75.0	100.0
Nasal+other fractures			
No.	7	3	10
Percentage	70.0	30.0	100.0
Maxilla+other fractures			
No.	1	1	2
Percentage	50.0	50.0	100.0
Orbital+other fractures			
No.	1	5	6
Percentage	16.7	83.3	100.0
Total			
No.	116	66	182
Percentage	63.7	36.3	100.0

Table 4: COX PH Model for the mean of hospitalization period in ENT ward

Variable	{%95 Conf. interval}	p>z	z	Std. Err.	Haz. ratio
Cause of fractures	2.955302 1.098193	0.020	2.33	0.4549554	1.801525

female groups in which the frequencies were different according to the Chi-square statistics; hence, sex does not have any statistically significant effect on the cause of the fracture ($p = 0.125$).

Table 3 here under presents the frequency of the types of the fractures for both male and female groups. The significance level for each type of fracture has been reported separately ($p = 0.87$).

The results obtained from COX PH (Proportional Hazards) Model are presented in Table 4. Accordingly the value of HR for the 'cause of fractures' which was divided into fractures by vehicle accident and other causes, i.e. non-accident causes were reported; the ratio of the risk of non-accident causes of fractures to the risk of fractures by vehicle accident equals 1.801525. However, other variables including age, sex and the location of fracture did not have any statistically significant effect on the period of hospitalization.

DISCUSSION

In the present research, the mean of the age of the patients was 6.32±2.64 years. Reported the mean of the age as 7±4.4 years. In a study by Tanweer Karim *et al.* (2010) 89% of patients with maxillofacial trauma aged above 5 years. Like wise, for Kambalimath *et al.* (2013) only 8.93% of the patients aged under 5 years.

Further more in the current study, 63.7% of patients were male while 36.6% were female; thus the ratio of male to female patients was 1.75:1. On the contrary, the ratio of male to female patients was 1.8:1 in the study by Kambalimath *et al.* (2013) and Karim *et al.* (2010). This ratio was 2:1. Joshi *et al.* (2013) reported that male patients were 70% of the all patients.

The results of the present research showed that there is not any statistically significant relationship between the sex of the patients and the type of the fractures. More the most prevalent location of the fractures was nasal bone, while mandibular and maxilla fractures were respectively the subsequent fractures. On the contrary, Karim *et al.* (2010) found that mandibular fracture was the most frequent fractures. Kambalimath *et al.* (2013) found that the most prevalent locations of fractures were related to maxilla and mandible. Additionally, Joshi *et al.* (2013) reported that mandibular fractures were more prevalent amongst patients while nasal fractures were the least frequent cases of fractures.

Nonetheless there was not any statistically significant relationship between the sex of the patients and the cause of the fractures. Further more the most frequent cause of maxillofacial trauma was falls from height. Similarly in other studies the most prevalent cause of maxillofacial trauma was related to falls from height (Karim *et al.*, 2010; Kambalimath *et al.*, 2013). Although, there was not any statistically significant relationship between the sex of the patients and the cause of the fractures, Allareddy *et al.* (2014) who studied adults, found that there was a statistically significant relationship between the sex of the patients and the cause of fractures; they reported that a majority of male patients injured by maxillofacial trauma because of using firearms as well as physical fights. Equally, Carvalho *et al.* (2010) found that male patients suffered from maxillofacial trauma caused by physical fights. On the contrary, Kamath *et al.* (2012) found that the most frequent cause of maxillofacial trauma was due to road accident. This difference in the causes of maxillofacial trauma is because the patients are prone to some causes of trauma more than the other in different ages.

Besides the mean of the period of hospitalization in this study was 3.21±2.24 days; additionally the results of the COX PH (Proportional Hazards) Model showed that the hospitalization period was longer in ENT ward for patient who were fractured due to motor vehicle

accident than patients fractured due to other causes. For Zelken *et al.* (2014), the hospitalization period was longer for patients fractured by vehicle accidents than by other causes of maxillofacial trauma. Likewise, Junior *et al.* (2012) concluded that the period of hospitalization was longer for patients fractured by motorcycle accident than by bicycle accidents. These findings indicate that the more forceful and owerful the causes of trauma the more harmful and sever the injuries and the longer the hospitalization period will be.

CONCLUSION

It seems that since childlike playoffs and activities are more done by children and these activities increase the risk of falls while playing the most frequent mechanisms of the maxillofacial trauma are mainly caused by falls within this age range. On the other hand, with regards to the fact that the type of childlike activities are not specifically related to any particular sex and that both girls and boys can perform these activities, it can be concluded that there is not any statistically significant relationship between the sex of patients and the cause of fractures. As a final remark, since the most developmental changes in the structure of bones in terms of their resistance to powerful forces occur typically after puberty, it can be concluded that there is not any statistically significant relationship between the sex of the patients and the type of the fracture.

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