SHORT REPORT

Association between type of fixation and a length of stay amongst maxillofacial fracture patients: A retrospective charts review

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Abstract

We aimed to explore the predictors of hospital length of stay for patients admitted and with maxillofacial injuries. Patients presenting with maxillofacial trauma were included. Poly-trauma involving neurosurgery and/ or needing orthopaedics intervention were excluded. Logistic regression was applied to explore the predictors associated with the hospital stay of > 4 days. There were 241 patients with mean age 29.35 ± 12.5 years (age range 12-80 years). Mandibular fracture was the commonest observation 121(50.2%), followed by maxillary 48(19.9%), and zygomatic bone fracture 9 (3.7%). Road traffic accident 196 (81.3%) appears to be the most common etiology of maxillofacial injuries in the studied sample. The mean length of hospital stay among bone plating patients was 5.96 ±6.8 days compared to 4.15±6.2 days for ones treated without bone plating; p-value 0.05. It was concluded that longer length of stay is required in patients with more complex management including bone plates.

Keywords: Maxillofacial injury, Road traffic accident, Bone plating, Length of stay.

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Introduction

Maxillofacial injuries contribute as some of the major world health problem and continue to be a grave clinical concern due to the sensitivity of this aesthetically important region.[1] It is commonly associated with substantial loss of function, morbidity, facial deformity, and high treatment cost. Population density, lifestyle, traffic regulations, reinforcement of law, general literacy and socioeconomic status can affect the prevalence of maxillofacial injuries.[2]

An understanding of the severity, etiology and prevalence of facial trauma may dictate health priorities to be implemented once the findings are examined.[3,4] Characteristics of facial injuries observed include surgical interventions, intubation, and other outcomes such as ventilator days, ICU days, length of stay and mortality.

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The various methods of management include various bone plates and screws for open reduction and internal fixation or other conservative methods of splinting that is maxillary-mandibular fixation (MMF).[4] The objectives of our study were to determine the frequency of different fixation methods employed in patients with maxillofacial fractures and to determine the factors affecting the mean length of stay (LOS).

Methodology and Results

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The study was conducted at the dental section, Aga Khan University Hospital, Karachi. Medical record of 241 patients, male and female in the age range of 12-80 years who were admitted in our centre from January 2015 to December 2020 for the treatment of maxillofacial injuries, were included. Patients with poly-trauma involving neurosurgery and/ or orthopaedics intervention, completely edentulous, craniofacial anomalies, Paget's disease, and incomplete records were excluded. Main exposure was type of fixation method employed and the outcome was length of stay (LOS). Covariates were age, gender, presence of diabetes, presence of infection, presence of osteoporosis. Descriptive statistics for qualitative variables such as age, gender, type of trauma, type of fixation method and length of stay were reported as frequency and percentages were computed. The

Table-1: Type of fracture with decision of bone plating versus no plating.

Classification	Fixation method		Total
	No bone plating (n)	Bone plating (n)	
Maxillary fractures	15	33	48
Zygomatic bone fracture	8	1	9
Mandible fractures	30	91	121
Panfacial fracture with involvement of frontal sinus	0	3	3
Isolated mandibular condyle fracture	8	1	9
Zygomatico-maxillary complex fractures	1	15	16
Combined maxillary and mandibular fractures	4	26	30
Isolated orbital fractures	0	4	4
Nasal fractures	1	0	1
Total count	67	174	241
Outcome variable	Mean ±SD	Mean ± SD	p-value
Length of stay in days*	4.15±6.2	5.96±6.8	0.05

*Independent sample t test was applied at 0.05 level of significance.

Table-2: Distribution of fractures and type of fixation.

Etiology of fracture	Type of Fixation					Total
	MMF alone	Bone plating alone	MMF plus bone plating	Gillies approach	Orbital floor repair	
RTA	46	58	85	6	1	196
Fall injury	4	3	9	2	0	18
Interpersonal violence	0	1	1	0	0	2
Missile injury	6	6	8	3	1	24
Sports injury	0	1	0	0	0	1
Total	56	69	103	11	2	241

MMF= Maxillomandibular fixation. RTA = Road Traffic Accident.

Table-3: Logistic Regression Analysis on variables influencing length of stay (> 4 days).

Variables	B	S.E.	Wald	df	p-value	Exp(B)
Bone plating	0.58	0.32	3.35	1	0.06	1.80
Age	0.03	0.01	7.12	1	0.008	1.03
Sex (1)	0.03	0.39	0.007	1	0.93	1.03
Aetiology	-0.03	0.14	0.06	1	0.79	0.96
Classification	0.11	0.06	2.77	1	0.09	1.11
Constant	-2.70	0.71	14.23	1	0.00	0.06

Outcome: length of stay > 4 days.

quantitative variables were reported as mean ± SD or median with IQR. Chi square test/Fisher exact (as appropriate) were employed for determining the association between the types of fixation method employed and the LOS. All plausible interactions and confounder were assessed. A p-value of < 0.05 was considered as statistically significant. In the sample, male to female ratio was 6.2:1and only 13.7% participants were females.

Table-1 describes the classification of fractures and the bone plating decision made for the patients. Table-2 shows the aetiological distribution of MF fractures and the type of fixation method employed for the cases. A total of 174 (72.1%) patients received bone plating and 67 (27.8%) patients were treated without bone plates. The mean length of stay in hospital among patients managed with bone plating was 5.96±6.8 days compared to 4.15±6.2 days among subject treated without bone plating, p-value 0.05. The logistic regression revealed that the age of patients and use of bone plates are the significant predictors of LOS (of more than 4 days) in maxillofacial trauma (Table-3).

Discussion

Like other studies, males in their third decade were the common affectee of maxillofacial injuries. Road traffic accidents (RTA), falls and interpersonal violence were the common etiologies. Majority of studies showed maxillofacial trauma is common in the age range of 21-30 years which too is reflected in our study.

Studies on facial fractures have also confirmed that RTA was the commonest etiology which is also evident in our study. In one study by Abbas et al., RTA was the most common (38.9%) followed by fall (27%).[6] The main outcome was taken as LOS in the present study. MF fractures had the mean LOS of 4.15±6.2 days without bone plating and with bone plating it was 5.96 ±6.8 days. This is comparable to 5- and 7-days' reports by Al-Hassani et al. and Farias et al.,[4] respectively.

Evidence suggests that incidence, patterns, and etiology of facial and associated injuries vary with socioeconomic status and geography of a study population. While many studies, showed orbital trauma as the most common type of maxillofacial fractures, the present study as well as Cheema et al.[5] revealed mandible fractures (17%) were commonest, followed by fractures of mid-face. Compared to other studies, which included patients with multiple injuries, our study sample had few patients with traumatic brain injuries, this has resulted in better outcomes and shorter LOS.

Another study reported increased LOS (16 days) in ORIF patients due to post-operative infections.[6] Another study reported mean LOS in maxillofacial injuries reaching upto 14.8 days.[7] Both of these studies, patients had multiple injuries which required ICU admissions.

In the study by Imahara et al.,[8] LOS and stay in ICU was observed more in patients with facial fractures 5.9±9.6 days compared to patients without facial fractures 3.4±7.9 days. This implies patients with facial fractures are more prone to complex treatment and likely to experience longer LOS, however, in their study the poly trauma patients were also included in the sample. Fazzalari et al.[9] reported similar LOS in both the groups regardless of the financial backgrounds they had. However, the study was conducted in another country and focused on the financial support of the patients.

The present study has given an insight into the epidemiology of maxillofacial injuries and concomitant fractures. Especially the patient care, hospital stay in the

cases treated with known treatment regimens were analyzed. We observed that age was associated with the LOS. Patients with > 4 days LOS had a relatively higher mean age (32.1±13.3 years) compared to ones staying < 4 days (27.5±11.6 years). But this finding has no clinical implications as this difference of age does not have any clinical implications in the management.

The frequency difference of RTA versus other etiologies highlights the difference among study populations and likely the result of contemporary practices and legislation over vehicular traffic implemented in the developed world.[10-12]

The limitations of this study were single center, the retrospective design which has ingrained bias of missing information and likely to get affected by selection bias. Detailed patients' management was not available.

Conclusions

Male preponderance and longer lengths of stay in the hospital (>4 days) were observed in patients affected with complex maxillofacial injuries needing placement of bone plates.

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Conflicts of Interest: None to declare.

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