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ANALYSIS OF 206 CASES OF LE-FORT FRACTURE IN A SINGLE YEAR AT TERTIARY INSTITUTE IN NORTH INDIA

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ABSTRACT:

Background- Maxillofacial trauma is the commonly encountered injury in trauma center in which le-fort fractures are amongst the potentially disfiguring and lethal injuries after road traffic accidents, falls, and sport injuries etc.

Objective- This prospective analytical study assesses the etiology, type of fracture, demographic distribution and approaches to the treatment of le-fort fractures.

Methods- We analyzed all cases of le fort fracture who underwent fracture fixation or treated conservatively at our institute over a period of one year. Our institutional protocol for management of le-fort fracture and results of the management were reviewed.

Result- Total 206 (18.4 %) cases of le-fort fractures out of 1120 cases of maxillofacial trauma were included in this study. In our study there were (67.47%) male patients and (32.5%) female patients. Most common causative factor for injuries was road traffic accidents in all age group. Open reduction and internal fixation was the main modality of treatment used for le-fort fracture. 97% patients included in the study were satisfied with respect to resolution of symptoms, dental occlusion and facial symmetry.

Conclusion- In our study, the most commonly encountered pattern of fracture was combined type of le fort fracture. Early and prompt management of fracture along with post-operative physiotherapy and maintenance of good oral hygiene is the key element used in our institution for the better outcome.

Keywords: accidents, facial trauma, le-fort fracture.

INTRODUCTION:

Ever increasing incidence of road traffic accidents is responsible for maxillofacial fractures being one of the most commonly encountered injuries in trauma center. [1] Although there are other life threatening injuries which are treated initially, an early and effective treatment of maxillofacial trauma is important to get superior aesthetic and functional results. The computerized tomographic (CT) scan with three dimensional reconstruction of the face is the investigation of choice for maxilla-facial trauma to visualize soft tissues and bone.

LE-FORT (1901) explained the area of weakness in midfacial region which he designated “lines of weakness”. Le Fort I fractures, also called Guerin fractures, separate maxilla from palate. Le Fort II fractures, cross nasal bones and orbital rim. Le Fort III fractures, cross the front of the maxilla involving lacrimal bone, lamina papyracea, orbital floor, and often, ethmoid bone, are the most serious. [2]

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The fracture in this region results in reduction of facial height and malocclusion since the maxilla bridges the cranium and dental occlusal plane. Final outcome of the treatment of le-fort fracture depends on proper dental occlusion, restoration of mid facial height, regaining strength of the buttress involved and, finally, the soft tissue contour.

MATERIALS AND METHODS:

In our prospective analytical study, we included the cases of le fort fracture out of total cases of maxillofacial trauma admitted from 01, January 2016 to 31, December 2016 in Sawai Man Singh medical college and hospital which is one of the largest tertiary care referral institute of North India. In our study, we included all patients of le-fort fracture admitted in trauma center regardless of age and sex, who presented within 24 hours of injury. The patients having pathological fracture and those having serious complications for which further treatment from other specialties was required, were excluded from the study. All patients were initially resuscitated and stabilized. All routine investigations were done along with three dimensional reconstruction of face to analyze the fracture pattern. All the patients in this study were operated within 24 hours of admission. Fiber optic nasal intubation was done with all the patients, and head was placed in slight extended position. Oral cavity was irrigated with copious amount of normal saline and 2% xylocaine with adrenaline was infiltrated in all the incision sites. Maxillo-mandibular fixation was used in patients who presented with disturbed occlusion or maxillary mobility. We prefer upper gingivo-buccal sulcus incision and lateral eyebrow incision for approaching maxilla and zygomatic fracture. In case of lacerated wound over face, the same site was used to approach for fracture fixation.

All fracture sites were opened and the fracture stabilized with mini plates and screws. Incision sites was re-irrigated with normal saline and instilled with vancomycin before closure. All incisions were closed in double layer after achieving proper hemostasis. Liquid diet was started from post-operative evening and slight propped up position of bed was maintained for relieving edema. All patients were advised post-operative physiotherapy and mouth opening exercise. A 10% povidone iodine solution was provided to all patients to maintain good oral hygiene by regular mouth wash for 4-5 times in a day. For follow up, patients were advised to visit OPD for skin suture removal on post-operative day 5, and again after 4 weeks for removal of maxilla- mandibular fixation. The patients' outcome was evaluated during follow up with a questionnaire which included subjective parameters like resolution of symptoms, dental occlusion (ability to chew) and facial symmetry.

RESULTS:

The study included 206 (18.4%) patients of Le fort fracture, out of total 1120 cases of maxillofacial trauma admitted in trauma center in duration of one year. In this study, 139 patients were males (67.47%), whereas only 67 patients were females (32.5%), with clear male predominance. Patients with maxillofacial fracture were divided into 4 groups according to age ranging from 2 to 70 years (mean age of 30.05 years). The most common age group was 16-30 years (57.3%) followed by 31-50 years (32.5%).

Road traffic accident was found to be the most common cause of Le fort fracture (81.5%).

Combined type of le-fort fracture was most commonly encountered in our study (32.5%) followed by le fort I fracture (24.7%).

Malocclusion and maxillary mobility were seen in 100 cases of Le fort fracture (48%) at the time of presentation. It was seen most commonly in patients with combined type of Le fort fractures (76%). Arch bar and MMF were used in these patients for maintenance of occlusal plane before rigid fixation.

Treatment modalities used in our study were maxillo-mandibular fixation (MMF), open reduction and internal fixation (ORIF). ORIF was the main modality of treatment used in 39% of patients with Le fort fracture. It was also the main modality of treatment for Le fort II and Le fort III fractures (56.4% and 71.4% respectively). MMF plus ORIF was used in patients with Le-fort I and combined Le-fort fractures (51% and 74% respectively). Total 25 patients of Le-fort fracture were managed conservatively in our study. Average length of hospital stay for patients in our study was 3.2 days. Overall, 200 patients (97%) were satisfied with respect to resolution of symptoms, dental occlusion, and facial symmetry; as evaluated in the follow up period through questionnaire. Post - operative restricted mouth opening was seen in one patient of le-fort I and two patients of le-fort II fracture, who were advised to perform mouth opening exercises. One patient with combined le-fort fracture complained of paresthesia that was present since the time of injury and persisted post-operatively. Exposed plate was visible in a patient with combined type of le-fort fracture during follow up at 4th week which was removed under local anesthesia.

DISCUSSION:

The Results of our study were, in general, concordant with previous studies. Male predominance was seen [1,2], showing that men were more prone to facial trauma owing to their involvement in outdoor activities and interpersonal violence. The most common age group was 16-30 years which shows that young adults are more prone to severe trauma. These finding are similar to the previous studies [3, 4, 5].

The most common etiological factor for Le-fort fracture in our study was road traffic accidents (81.5%) [13,14] followed by fall (13.1%) and assault (3.9%) [1,6,7]. Road

traffic accident is one of the major problem faced in India due to violation of safety laws, unawareness in public and poor condition of roads in India. This can be emphasized by the fact the total 5,01,423 road traffic accidents occurred in India in year 2015 and the percentage is increasing as per ministry of road transport and high way transport research wing, government of India, report published on 23-05-2016 [8]. It was also the most common cause of Le fort fracture in two age groups between 16-50 years which further emphasizes about the high frequency of road traffic accidents in young population and its hazardous outcome in our region while fall was more commonly seen in children of 1-15 years age and older patients >50 years. This can be explained by the fact that these age groups are more involved in indoor activities rather than outdoor and are more prone to fall either from height as seen in young children or due to postural imbalance as seen in older individuals.

Le-fort fracture was found in 18.4% of total facial trauma patients. These results are similar to previous studies in India [1], Pakistan [5], Jordan [2], Brazil [6] and Turkey [7]. In our study combination of Le-fort fractures was more commonly encountered (in 32.5%) followed by Le fort I (24.8%) and Le-fort III (23.8%). More than one facial bone fracture have been commonly encountered in other studies from Brazil [6] and Iran [9]. Reports like those from Abiose [12] and guvin [11] and one from U.A.E. showed that most common mid face fracture was Le fort I. A study of Bali et al [1] reported zygomatico-maxillary complex being most common mid face fracture and Le-fort II being most common type of Le-fort fracture encountered.

In our study, malocclusion was reported in 76.1% patients of combined Le-fort fracture at the time of presentation & in 80.4% patients with Le-fort I fracture. Such high incidence underscores the importance of meticulous examination of such patients and appropriate treatment to restore occlusion for proper functional and aesthetic results.

The treatment was accomplished in all the patients within 24 hours of admission which prevented complications like edema, infection, in hospital morbidity and shortens the duration of stay in hospital. Patients in our study mostly belonged to low socioeconomic group and an additional financial burden was thus avoided by this measure. Rigid fixation was used in 75% patients which has advantage of rapid improvement and stability with biomechanical compatibility. In this study, 12% patients were managed conservatively who had undisplaced fracture and did not having functional deformity.

The main limitation of the study was the short follow up period. Moreover, maintenance of good oral hygiene and early physiotherapy were patient dependent parameters in this study. Future studies of longer duration and larger study group can be done to address the limitations and also to statistically analyze the relation between the treatment modality and the age group of patient.

CONCLUSION:

Le-fort fractures are amongst the commonly encountered injuries in trauma center in our region, occurring primarily in young males and the main etiological factor being road traffic accident. Though mostly not life threatening, early and prompt treatment of such fracture with an insight into the epidemiology and type of fracture is important for rapid recovery, reducing rate of complication and financial burden on the patients.

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TABLES :

Table 1. Age and sex wise distribution of le-fort fractures.

Age (years)	Le-fort I #		Le-fort II #		Le-fort III #		Combined type of Le-fort #		Total (n)
	M	F	M	F	M	F	M	F	
0-15	02	00	01	01	01	00	02	01	08
16-30	15	12	28	11	20	10	21	12	118
31-50	12	03	07	02	12	05	16	08	67
>50	06	01	00	00	01	00	04	01	13
TOTAL	35	16	25	14	34	15	45	22	206

M = Male, F = Female, # = fracture

Table 2. Etiology of Le-forte fractures

Cause	Le-fort I #	Le-fort II #	Le-fort III #	Combined Le-fort #	Total (n)
RTA	39	33	38	58	168
Assault	03	01	02	02	08
Fall	08	05	08	06	27
Sports	01	00	01	01	03
others	00	00	00	00	00

= fracture, RTA = Road traffic accident

Table 3. Etiology according to age

Age (years)	RTA	Assault	Fall	Sports	Others
0-15	02	00	05	01	00
16-30	98	06	12	02	00
31-50	62	02	03	00	00
>50	06	00	07	00	00

RTA = Road traffic accident

Table 4. Procedures done in various Le fort fractures.

Procedure	Le-fort I fracture	Le-fort II fracture	Le-fort III fracture	Combined type of Le-fort fracture
MMF	15	03	00	08
MMF with ORIF	26	06	00	42
ORIF	08	22	35	16
Conservative	02	08	14	01

MMF = Maxillo-mandibular fixation, ORIF = Open reduction and internal fixation