ISSN No:-2456-2165

Assessment of Change in Patterns of Mid Face Fractures by Using Computed Tomography Scans

Dr. Ankita Raj
Professor, Department of OMFS,
Rama Dental College Hospital & Research Centre,
Rama University, Kanpur, Utter Pradesh

Dr. Saket Nigam
Head of the Department,
Department of Radiodiagnosis,
Regency Hospital, Kanpur, Uttar Pradesh.

Dr. Amit Pandey
Professor, Department of Periodontics,
Rama Dental College Hospital & Research Centre,
Kanpur, Uttar Pradesh.

Dr. Vivek Singh Chauhan
Post Graduate Resident, Department of OMFS,
Rama Dental College Hospital & Research Centre,
Rama University Kanpur, Utter Pradesh.

Dr. V. Santhosh Kumar
Post Graduate Resident, Department of OMFS, Rama Dental College Hospital & Research Centre, Rama University Kanpur, Utter Pradesh.

Dr. Sonali Soumya
BDS Graduate,
Kalinga Institute of Dental Sciences,
Odisha.

Corresponding Author
Dr. Ankita Raj – Professor, Department of OMFS,
Rama Dental College Hospital & Research Centre, Rama University, Kanpur, Utter Pradesh.

Abstract:-

- ***Background***

Rene Le Fort, in 1901, carried out a series of experiments on cadaver heads to understand fracture patterns in upper jaw and classified mid face fractures into few distinct categories, Le Fort I, II and III. The primary goal of his research was to evaluate the diverse midface fractures in order to comprehend the response of mid face to various wounding agents having varying velocities and masses at a particular time.

- ***Aim***

The aim of the study is to assess changing patterns of mid face fractures using computed tomography scans.

- ***Material And Methods***

The study was carried out on the 100 patients who reported to the OPD Of Rama Dental College, Hospital And Research Centre, Kanpur And Regency Hospital Kanpur. Patients diagnosed with mid face fracture who were 15 years and above were selected. All the patients were advised to undergo computed tomography scan and the films were analyzed to study the exact nature of mid face. The fractures were further studied intra-operatively and compared with standard le fort lines. The data collected was segregated in terms of age, sex and etiology of trauma and categorized into three broad groups.

- ***Results***

In our study, we observed that most of the cases the fracture lines do not coincide with traditional le fort lines(69%). In the 69 cases that were deviated from the standard Le Fort lines, a total of 80 variations were found either on same or both sides.

- ***Conclusion***

The study shows, CT as a useful tool in the diagnosis of the midface fractures. There is a need for new studies and research in this area because variations from the traditional Le Fort patterns are occurring rather regularly and necessitating extra places of fixation.

I. INTRODUCTION

Rene Le Fort, in 1901, carried out a series of experiments on cadaver heads to understand fracture patterns in upper jaw and classified mid face fractures into few distinct categories , Le Fort I,II,and III. His nomenclature is still relevant today (1).

The primary goal of his research was to evaluate the diverse midface fractures in order to comprehend the response of mid face to various wounding agents having varying velocities and masses at a particular time.

Over the years the mass and velocity of wounding agents have changed and it is observed by several radiologist and maxillofacial surgeons that certain fracture patterns do not follow the traditional Le Fort lines(2)but is usually an amalgamation of all three categories or are comminuted.

Therefore, this study intends to assess changing patterns of mid face fractures using computed tomography scans.

ISSN No:-2456-2165

II. MATERIEALS AND METHOD

The study was carried out on the 100 patients who reported to the OPD Of Rama Dental College, Hospital And Research Centre, Kanpur And Regency Hospital Kanpur . Patients diagnosed with mid face fracture who were 15 years and above were selected. Patients belonging to pediatric group or those having fractures resulting from pathologies were excluded. Patient were informed and explained about the procedure and a written consent was obtained.

All the patients were advised to undergo computed tomography scan and the films were analyzed to study the exact nature of mid face. The fractures were further studied intraoperatively and compared with standard le fort lines. The data collected was segregated in terms of age, sex and etiology of trauma and categorized into three broad groups . Group A consisted fracture pattern that resemble le fort lines, group B had fracture pattern that partially resembled le fort lines and group C having fracture patterns that doesn't resemble the le fort lines.

The fracture lines that did not fit into le fort's classification scheme were further divides into five categories based on common deviations observed while studying the CT scans as D1: an additional line from piriform aperture to infra orbital rim on same side, D2 : an additional line connecting the le fort line to infra orbital rim, D3: additional line connecting piriform aperture to orbital's lateral wall without crossing infra orbital rim on same side, D4 : additional line involving the fractured segment, running from infra orbital rim across canine fossa and finishing on the dentoalvoelar segment on same side, D5: pterygoid plates not fractured.

III. RESULTS

The study included 100 patients who were diagnosed with mid face fracture presented in the outpatient and emergency Of Rama Dental College and Regency Hospital between 2020 to 2022. age, gender, etiology of trauma and treatment received by the patient was noted . The trend of mid face fracture showed male predominance with overwhelming 79% (n=79) compared to females which included only 21% (n=21) cases. Road traffic accidents were the most frequent cause (89%), followed by assault (8%) and fall (3%).

Table 1 : Distribution of Patients According to Category of Fracture

Classification	No. of patients
Isolated le fort fracture	19
Combination of various le fort fractures	20
Le fort fracture with ZMC	23
Combination of various le fort fractures with ZMC	5
Le fort fracture with cranial bone involvement	21
Pan facial fractures	12
Total	100

Table 2 : Classification of Patient Based on Fracture Pattern

Pattern	Frequency of patients
Similar to le fort lines	21%
Combination of le fort lines	10%
Deviation from le fort lines	69%
Total	100 %

It was found that in most of the cases the fracture lines do not coincide with traditional le fort lines(69%). 5 variations were predominant which were categorized as D1, D2, D3, D4 and D5 as D1: an additional line from piriform aperture to infra orbital rim on same side, D2 : an additional line connecting the le fort line to infra orbital rim, D3: additional line connecting piriform aperture to orbital's lateral wall without crossing infra orbital rim on same side, D4 : additional line involving the fractured segment, running from infra orbital rim across canine fossa and finishing on the dentoalvoelar segment on same side, D5: pterygoid plates not fractured.

Table 3 : Distribution of Deviation According to Site

Deviation	Right	Left	Total
D1	12	18	30
D2	16	16	32
D3	3	7	10
D4	2	2	4
D5	2	2	4
total	35(43.75%)	45(56.25%)	80(100%)

In the 69 cases that were deviated from the standard Le Fort lines, a total of 80 variations were found either on same or both sides

IV. DISCUSSION

The midface region is the facial skeleton that that extends from maxillary occlusal plane to the base of skull. Apart from supporting globes, sinuses, muscles of mastication and facial expression anatomically it also supports physiologic operation of respiratory , digestive ,olfactory and ocular system (3). There are certain broad trends that can be observed in the pattern of midface fracture when age distribution, gender predilection and etiology is taken into consideration, even though several such epidemiological studies of facial fractures of facial fractures have been analyzed in several institutes and communities.

This was even observed in our study where frequency of mid face fractures was predominant in male population(79% ,n=79) whereas female consisted of only about 21% (n=21) of sample size. The cause of trauma was road traffic accident (RTA) in 89% cases , followed by assault (8%) and fall (3%).these results were similar to study conducted by in as Elfiky (2017) where in 76.7 % were males and 23.3% were females.

Road traffic accidents was the common cause presented in 53.3 % cases followed by fall in 26.7% patients and assault in 13.3 % patients (4).study done by Punit S Dikhit et al (2019) showed 72.1 % patients to be males. The primary cause

ISSN No:-2456-2165

of trauma (68.11%) was traffic collision followed by assault (18.11%) and fall from height (13.76%) (5).

It has been observed that impact to the face are rarely exactly centered allowing for the range of midface fracture patterns which was not present in le fort's experiment where the impact simulated were centered and were of low velocity in nature. Therefore, there is a need for classification that would classify midface fractures that occur due to high velocity (6). In our study, It was found that in 69% of the cases the fracture lines do not coincide with traditional Le Fort lines. There were few cases in our study where we encountered that more than one type of variation was present.

V. CONCLUSION

With the advent of rapid urbanization, industrialization and ever increasing immigration of people from rural to urban areas, fast paced life and faster moving vehicles we are experiencing rapid increase in prevalence of motor vehicle accidents. although the convenience and use of le fort classification remains undisputed there are few short comings to this classification.

The experiments that were carried out by Le Fort were based on low velocity trauma which was more or less confined to inflicting trauma centrally but that is hardly ideal in present scenario. In our study we have tried to study the common deviations which we encountered.

The drawback of the study is that the limited sample size. In order to accurately determine the fracture patterns, it is necessary to review the sectional pictures of the scans coupled with 3D reconstructed images.

CT is a useful tool in the diagnosis of the midface fractures. There is a need for new studies and research in this area because variations from the traditional Le Fort patterns are occurring rather regularly and necessitating extra places of fixation

REFERENCES

[1]. Gart Shore L. A Brief Account Of The Life Of Rene Le Fort. British Journal Of Oral And Maxillofacial Surgery.2010 Apr I;48(3):173-5
[2]. Satish P , Prasad K, Lalitha R M , Ranganath K, Sagar P. Analysis Of The Changing Patterns Of Midface Fractures Using 3Dcomputed Tomography: An Observational Study. Craniomaxillofacial Trauma & Reconstruction. B2018 Dec;11(4):265-72
[3]. Fonseca R J, Barber H D , Powers M P , Frost D E . Oral And Maxillofacial Trauma. Elsevier Health Sciences: 2013 Dec 1
[4]. E L Finsky, E L Sammak D A, El Sammak A, Abdelhady M . Diagnostic Performance Of Multi – Slice Computed Tomography Using 2d And 3d Images In The Assessment Of Le Fort Fractures. The Egyptian Journal Of Radiology And Nuclear Medicine. 2017 Jun ;48(2):415-24
[5]. Dikhit Ps , Mohapatra M , Jena A K, SRIASTAVA A . Emerging Trends Of Zygomaticomaxillary Complex Fracturesand Their Etiological Analysis In A Tertiary Health Centre From Eastern India: A Retrospective Study. Journal Of Maxillofacialand Oral Surgery.2021 March ; 20(1)70-5
[6]. Mc Rae M , Frodelj. Midface Fractures. Facial Plastic Surgery.2000;16(02)107-14