ORIGINAL ARTICLE

EVALUATION OF OCULAR INJURIES ASSOCIATED WITH MID-FACIAL TRAUMA

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ABSTRACT

The aim of this study was to evaluate frequency, etiology and association of ocular injuries with fractures in the middle third region of face. 129 patients with mid-face fracture were included in the study. An elaborated history was taken regarding trauma, followed by assessment of patients clinically and characteristics of fracture and associated ocular injuries noted.

Out of 129 in total 52 patients (40.3%) sustained ocular injuries. Frequencies for gender involvement were 38(73.1%) male & 14 (26.9%) female patients. The most common etiology associated was Road Traffic Accident (RTA) 25 (48.1%) followed by Assault 11(21.2%), Fall 8 (15.4%), sports injury 5 (9.6%) and Firearm injury (FAI) 3(5.8%). Subconjuctival Hemorrhage (71.15%) was the most common ocular injury found to be associated with mid facial fracture in this study. Other ocular complication found in these patients were Diploipa (19.23%), decreased visual acuity (17.3%), Enophthalmous (9.61%), Hyphema (5.76%) and blindness as 3.85%.

Key Words: *Facial trauma, Mid-face fractures, RTA, Blindness.*

INTRODUCTION

Globally trauma is generally more prevalent and more than one third of these cases sustained trauma to fractured maxillofacial (MF) region.[1] Maxillofacial injuries are reported either as a part of polytrauma or as isolated injuries. Eye is one of most vital structure of face and is susceptible to injury in facial traumas; especially of the midface.[2] These injuries have a high risk of threatening vision. Even minor eye injuries can cause considerable morbidity.[3] Etiology and risk of ocular injuries due to facial fractures is multifactorial.[4,5]

Ocular injuries resulting from midface trauma also involves multidiscipline specialties.[6] While ophthalmologists treat most ocular injuries, maxillofacial surgeons also encounter patients sustaining facial fractures in emergency department. Therefore, they are also responsible for first ophthalmic assessments in such cases.[7] Early diagnosis and treatment of ocular injuries in facial trauma patients can preserve ophthalmic function, structure and vision. Identifying and knowledge of the risk factors related to such injuries can help to take effective measures to create more awareness among population and to reduce the incidence of ocular trauma in community.[8] Paucity of literature exists regarding national data on ocular injuries associated with mid facial trauma. The focus of this study was to evaluate frequency, etiology and association of ocular injuries with fractures in the middle third region of face.

METHODOLOGY

129 trauma patients (over 24 months) sustaining midface fracture (isolated or in combination with upper and lower third of facial bone fractures) were included in the study. Informed consent was taken from the patients. They were assessed clinically and any ocular injury present is recorded. Malunion of fracture or already treated fractures and patients suffering from systemic conditions that can affect ophthalmic function were not included in the study. Along with the medical records, a questionnaire based per-forma was used to collect information and data from the patients. A Demographic data, including patient age, gender, date and time of injury, etiology and site of fracture and associated ocular complication, was recorded and reviewed.

Data were analyzed by using SPSS version-20. Descriptive analysis for frequencies and percentages of data was done. Chi square test was run to evaluate qualitative variables i.e.; ocular injuries and midfacial fractures, for association. A p-value ≤ 0.05 was con-

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sidered statistically significant at confidence interval of 95%.

RESULTS

129 patients were included in the study, among these n=52 (40.3%) sustained ocular injuries (p=0.028). Comprising of 52 patients 38(73.1%) were male and 14 (26.9%) were female (Fig 1) with age range of 2-65 years with mean of 34.2 ±10.07 years. The greatest number of injuries resulted from motor vehicle accidents n=25 (48.1%) followed by assault n=11(21.2%) and other causes as described in Table 1. Mid-facial bone fractures were broadly classified into Zygomatico Maxillary Complex (ZMC), Zygomatic Arch, Lefort I, Lefort II, Lefort III and NOE fracture. The large number of patients with ocular complications sustained ZMC fractures n=34 (65.4%). Frequencies for site of fracture resulting in ocular injuries are tabulated in Table 1.

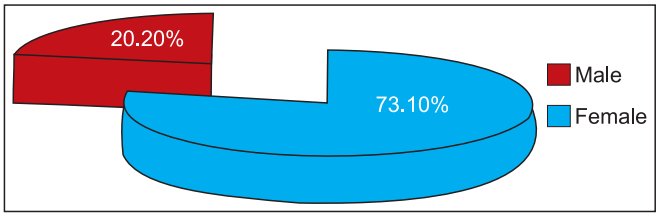

Fig 1: Gender distribution

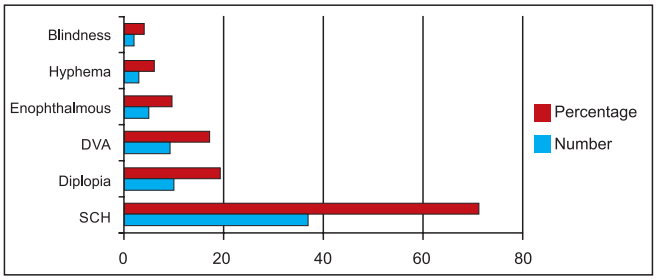

Fig 2: Ocular Injuries Presentation

The most frequent complaint was Subconjuctival Hemorrhage (71.15%, n=37). Frequency of other ocular injuries was Diploipa (19.23%, n=10), decreased visual acuity (17.3%, n=9), Enophthalmous (9.61%, n=5), Hyphema (5.76%, n=3) and blindness as 3.85% (n=2). Characteristics of these injuries in relation to site of fracture are illustrated in Table.2.

DISCUSSION

Ocular complications related to mid facial trauma were mostly resulted due to assaults or injuries involving the orbit and its contents. The overall incidence of ocular injuries in our study is (40.3%), which was found to have statistically significant association (p=0.028) with midface fractures. Numerous studies reported the presence of ocular injuries in facial trauma patients ranging from 2.2%7 to (90%).[9] Al-Qurainy et al reported the highest frequency for the presence of ocular injuries.[10]

On the basis of gender involvement, male patients 73.1% were found to present ocular complications as a result of fracture in midfacial region as compared to females (26.9%). A significant number of studies also established male preponderance in comparison to female patients,[9,11-14] which endorses results of our study. The cause of this male dominant ratio could be due to social and cultural traditions favoring more male involvement in outdoor activities, professional duties and everyday tasks. In contrast, more females spent time in safer environments of home and offices.

Our data reported that these injuries are most commonly caused by road traffic incidents 48.1%. These

TABLE 1: FREQUENCY OF FRACTURE SITE AND ETIOLOGY IN SUSTAINING OCULAR INJURIES

Fracture Site	Number	Percentage	Etiology	Number	Percentage
ZMC+ ARCH	34	65.4%	RTA	25	48.1%
Lefort I	—	—	Assault	11	21.2%
Lefort II	12	23.1%	Fall	8	15.4%
Lefort III	4	7.7%	FAI	3	5.8%
NOE	2	3.8%	Sports Injuries	5	9.6%

TABLE 2: TYPE OF OCULAR INJURIES IN RELATION TO SITE OF FRATCTURE

Variables	ZMC+Arch (n)*	Leforte II (n)*	Leforte III (n)*	NOE (n)*
SubConjuctival Haemorrhage	23	10	2	2
Diplopia	7	2	1	—
Blurred Vision	5	1	2	1
Hyphema	1	1	—	1
Enophthalmus	2	1	—	2
Blindness	1	—	—	1

are in accordance with the study results conducted in India,[15] Iran[16] and UAE.[17] On the contrary, literature from more developed countries, e.g.; USA,[18] Italy[19] and Australia[20] reported assault as major cause. In Pakistan, road structures and not complying traffic rules properly cause more traffic accidents and facial trauma and resultant injuries.

The anatomical structure with higher frequency of involvement in ocular injuries is found to be Zygomatico-maxillary complex. We have found 65.4% of ZMC fracture. Septa et al,[13] Rajkumar et al,[15] and Foroughi and his colleagues[16] also reported greater frequency of ZMC fractures associated to ocular injuries. Greater involvement of ZMC fracture may be anatomical prominence and location of the structure.

The most common ocular injury resulted from facial trauma found in our study is subconjuctival hemorrhage 71.15%. Buttner et al, conducted study involving 1676 trauma patients and reported higher incidence of subconjuctival haemorrhage (90.4%).[21] The other researchers also affirmed subconjuctival haemorrhage as most commonly found ocular injury in facial trauma patients.[13,18,22]

Diplopia was the next highest occurring ocular complication in facial trauma, especially in blow-out fractures.[23] The presence of diplopia in patients sustaining midface fracture was reported to be 10%-40% in various studies.[5,9,13,18,19] In the present study, its frequency is found to be 19.23%.

Fracture to mid-face region also affected the acuity of vision in patients. In our study, 17.3% of patients with ophthalmic injuries presented with the complaint of blurred vision. The incidence of decrease in visual acuity stated by Al-Qurainy and his colleagues was (15.4%) 10 and 12% by Foroughi et al[16] which is comparable to our data inference.

When trauma to face compromises bony structure of orbit and displacing soft tissue content in it, enophthalmos results.[24] It is detected in 9.61% of ocular injury cases in our study. In other studies this incidence is reported to be (8.5%)[13] and (8%)[14] which corresponds to our analysis. Bartoli et al observed the lowest percentage in their study (2.3%).[19] Hyphema, a bleeding in anterior chamber, another complication resulting from fracture of midfacial region was present in 5.76% of cases in the study. Results stated by Soliman and Macky (5.9%)[14] and by Septa et al (3.5%),[13] for occurrence of hyphema in facial fracture cases, support our results.

Blindness is rare but imperative complication in facial trauma patients. Our data comprised 3.85% of cases of vision loss. The other studies stated incidence of blindness as (0.84%)[15] and (1.9%).[9] Jamal et al established the highest percentage of blindness in their study (10%).[18] Lowest frequency of blindness is due to natural protection mechanism and cushioning of orbital contents (fats and muscles), which shields it from damage and injury from extrinsic coercions.

Although the study has provided our local data but it does have some limitations. The sample size was small and included only those patients which were referred to the tertiary care hospital, so these results cannot be applied to general population. Therefore our results must be interpreted in the context of the study design. Further research in this area is needed in a level one trauma center to explore the association of midface fractures with any potential ocular injury.

RECOMMENDATIONS

An early thorough clinical examination should be carried out in every midfacial trauma patient to detect ocular injuries and active treatment should be undertaken. This can prevent from severe ocular complications and loss of vision.

CONCLUSION

Results of this study established significant numbers of ocular injuries are associated with fractures of mid-face region. Ocular sequela of midface fracture ranged from subconjuctival hemorrhage, diplopia, decreased visual acuity, enophthalmus and hyphema to blindness.

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