Section: Ophthalmology

Original Research Article

OCULAR MANIFESTATIONS IN CRANIOFACIAL INJURIES IN PATIENTS ATTENDING TERTIARY CARE CENTRE, PONDICHERRY

Isvarya SriiK[1], Nallamuthu P[2], Sripal A[3]

[1]Senior Resident, Department of Ophthalmology, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry, India
[2]Professor, Department of Ophthalmology, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry, India
[3]Assistant Professor, Department of Ophthalmology, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry, India

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Corresponding Author:
Dr. A. Sripal,
Email: sripal.dr@gmail.com

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Abstract

Background: India has the highest rate of head injury in the world.25% of the head injured patients suffers from the ocular manifestations which will eventually develop blindness. The aim of the study is to find out the proportion and pattern of ocular manifestations in various cranio-facial injuries. **Materials and Methods:** This cross-sectional study was done in Ophthalmology department OPD,in Sri manakulavinayakar College among patients who came with ocular manifestations due to craniofacial injuries.The study participants were recruited based on Inclusion and Exclusion criteria and the final sample arrived was 91. Sociodemographic details, ocular and craniofacial injury related factors were collected using a structured questionnaire. Complete clinical history, anterior and posterior segment examination, extra ocular movements and optic nerve functions were assessed. Diagnostic investigations such as computed tomography scanning/ magnetic resonance imaging of orbit, gonioscopy, diplopia charting, and measurement of intraocular pressure with schiotz or applanation tonometry were performed. The collected data was entered in MS excel and statistics was done in SPSS 16. **Result & Conclusion:** Among the 91 patients, 67.03% belonged to the age group 21-40, majority were male patients. Most of the patients had visual acuity of 6/6 to 6/12 and 1 patient had pl positive, 43.96% of patients had eyelid ecchymosis and oedema and only 7.6% of patients had eyelid laceration. Subconjunctival haemorrhage was seen in 43.96% of patients. Corneal, anterior chamber, and iris injuries were rare. Serious complication like traumatic uveitis was seen in only 3.30% of patients. Only 1.1% of cases had relative apparent pupillary defect, subluxation of lens, retinal detachment, and traumatic optic neuropathy.

INTRODUCTION

Ocular trauma remains one of the significant sight-threatening challenge and is an under-recognized cause for loss of vision. Ophthalmic manifestations are more frequently seen in craniofacial injuries. The injuries can include lid lacerations, abrasions, subconjunctival haemorrhage, corneal abrasions, scleral rupture, lens subluxation/ lens dislocation, cranial nerve palsies, retinal detachment etc. Trauma to the face, especially above the level of the oral cavity, requires ocular examination, including visual acuity of both eyes and fundus examination.[1]Injuries in the eye is more commonly found to be associated with themiddle third of the face injuries. So in order to avoid the ocular dysfunction early diagnosis and management of theocular injuries is important.

Ocular injuries are the major cause of blindness, second only to head trauma whereas in developing nations,[2] road traffic accidents are the most frequent cause and in developed countries,[3] it is assault.[4]Yearly around 200-300 persons per 100,000 population are hospitalised due to head injuries and about 25% of these are associated with ocular and visual defects.[5] As ophthalmologist are not present in the group of treating surgeons who are managing and treating the facial injuries, ocular injuries are not reported together. Some ocular injuries with facial injuries may require concomitant surgical treatment, while in other circumstances the presence of an ocular injury is a contraindication for immediate surgery to repair the facial fractures.[1]

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The purpose of this study was to find the proportion of ophthalmic manifestations in craniofacial injuries in our tertiary hospital and the importance of ocular examination in all cases of craniofacial injuries.

MATERIALS AND METHODS

Hospital based cross sectional study was conducted in the Department of Ophthalmology, Sri Manakulavinayakar Medical College, Pondicherry. The study was done from September 2017 to May 2019. Patients with craniofacial injuries attending the ophthalmology OPDwere included.

Sample Size: Sample size was calculated to be 91 using the formula 4pq/d2, where p is incidence of ocular manifestation in craniofacial injuries, taking the 68.3% proportion ofophthalmic injuries related to maxillofacial trauma in Indian population from a previous study by Mittal G et al.

Inclusion Criteria

All trauma cases diagnosed with craniofacial injuries who were referred to or approaching ophthalmology department were included.

Exclusion Criteria

Patients with severe general condition (glasgow coma scale score less than 8)Patients who were contraindicated to undergo radiological assessment

Patients with pre-existing ocular manifestations such as glaucoma, cataract, corneal ulcer or opacity or degenerations, uveitis, retinopathy before trauma

All cases of homicide attempt/assault.

Data collection method: Ethics committee approval [1246(a)/2017] was obtained from the research committee and institutional ethical committee prior to start of the study. Informed consent was obtained from all participants prior to examination and privacy was ensured during examination.

Detailed history of patient regarding name, age, sex, occupation, address, drug history, presenting symptom, duration, associated conditions and past medical history were recorded with special reference to the type of injury. Gross systemic examination was done. visual acuity and refraction were assessed using snellen's chart. Ocular examination was done using torch light to rule out abnormalities in lids, conjunctiva, cornea, anterior chamber, iris, pupil and lens.

Slit lamp bio-microscopy examination was performed to confirm torch light findings and to rule out conjunctival and corneal pathology and confirm anterior chamber depth. Fundus examination was done with slit lamp with +90d lens. Intraocular pressure was measured with schiotz tonometry (or applanation tonometer). enophthalmos and diplopia were assessed using an exophthalmometer and diplopia charting respectively. All information was coded and stored electronically.

Statistical Methods: The collected data was entered using MS excel. Statistical analysis was done using SPSS 16 version software. Continuous variables were expressed in terms of mean and standard deviation. Categorical variables were expressed in terms ofnumbers and percentages.

RESULTS

The age group of 21-40 years was the most frequently affected (67.3%) [Table 1]. The results showed a male predominance with 93.41% males and 6.59% females [Figure 1].Majority of the patients (89.01%) had a visual acuity in the range of 6/6-6/12 and only 1 (1.10%) had pl positive [Table 2].

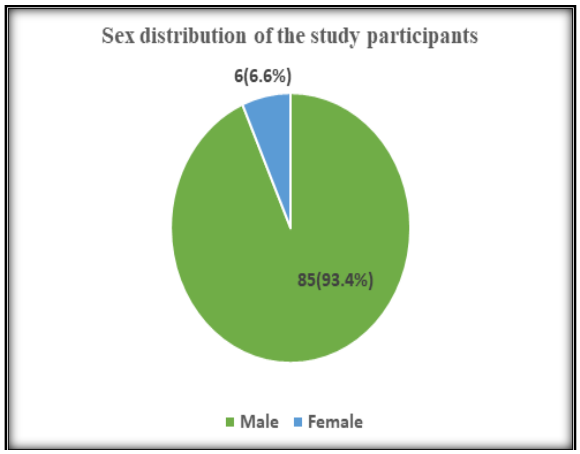

Figure 1: Sex distribution of the study participants (N=91)

Table 1: Distribution of study participants based on age and sex (N=91)

Age category	Frequency(N)	Percentage(%)
<20	6	6.6
21 – 40	61	67
41 – 60	17	18.7
> 60	7	7.7
Total	91	100

Table 2:Distribution of study participants based on visual acuity (N=91)

Visual acuity	Frequency	Percentage
6/6 – 6/12	81	89
6/18 – 6/60	6	6.6
< 6/60	3	3.3
<1/60- pl+	1	1.1
Total	91	100

[Table 3] shows the site and type of injuries sustained. Many of the patients (10.99%) had laceration of the eyebrow and most (32.97%) had no eyelid involvement. 43.96% of the patients had subconjunctival

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haemorrhage, and this was the most common conjunctival injury. Corneal injuries were few and majority (92.31%) had normal cornea.

Anterior chamber injuries were very few: 3.30% had traumatic uveitis and 2.20% had traumatic uveitis with hyphema. Injuries to iris, pupil, and lens were relatively negligible. Fundus was normal in 97.80% of patients (table 4). 96.70% had normal intra ocular pressure in both eyes [Table 4]. [Table 5] shows the different types of fractures involved. Zygomatic complex fracture was the most common (46.1%), followed by skull and maxillary bone fractures (92.31%).

Table 3: Distribution of study participants based on injuries (N= 91)

Site of injury	Type of injury	Frequency	Percentage
Eyebrow	Normal	78	86
	Abrasion	3	3
	Laceration	10	11
Eyelid	Normal	30	33
	Laceration	7	8
	Ecchymosis, edema	40	44
	Laceration, ecchymosis, edema	11	12
	Mechanical ptosis, ecchymosis, edema	1	1
	Traumatic ptosis	1	1
	Traumatic ptosis, ecchymosis, edema	1	1
Conjunctiva	Normal	34	37.4
	Congestion	4	4.4
	Chemosis	11	12
	Subconjunctival haemorrhage	40	44
	Conjunctival tear	1	1.1
	Congestion, chemosis, subconjunctival haemorrhage	1	1.1
Cornea	Normal	84	92.3
	Superficial corneal tear	1	1.1
	Corneal abrasion	5	5.5
	Corneal edema	1	1.1
Anterior chamber	Normal	86	94.5
	Traumatic uveitis	3	3.3
	Traumatic uveitis with hyphema	2	2.2
Iris	Normal colour and pattern	89	97.8
	Medial irido lenticular touch	1	1.1
	Iridodialysis	1	1.1
Pupil	Normal	88	96.7
	Traumatic mydriasis	2	2.2
	Rapd	1	1.1
Lens	Normal	90	98.9
	Subluxation of lens	1	1.1

Table 4: Distribution of study participants based on observed changes (N=91)

Site	Observed change	Frequency	Percentage
Fundus	Normal	89	97.8
	Retinal detachment	1	1.1
	Traumatic optic neuropathy	1	1.1
Intra-ocular pressure	10-21 mm hg	88	96.7
	>20 mm hg	3	3.3

Table 5: Distribution of study participants based on type of fractures (N=91)

Type of fracture	Frequency	Percentage
Zygomatic complex	42	46%
Skull and maxillary	31	34%
Mandible	17	19%
Pan facial	1	1%
Total	91	100

DISCUSSION

This study consisted of 91 patients from all age groups. Increased incidence is seen in younger age groups. Most of the patients (67.03%) were in the age group of 21 to 40 years. Mittal G, Singh N et al. Study shows that most patients were between 10 and 50 years of age, with peak incidence in 20- to 30-years in both sexes. Similarlysharma. B et al. study shows that majority of patients (67.4%) were in the age group of 21 to 40 years.[6-9]

This study shows a predominance of male (93.41%) in road traffic accidents compared to female. There has always been a male preponderance, which could be due to the increased mobility and activity of males and also the incidence of male drivers in India is more than that of femalesMittal G, Singh N et al.

Our study showed that facial fractures in males accounted for 67.7% (n = 92) of total and females,

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32.3% (n = 44).The major cause of trauma in this study was road traffic accident (71.3%). Amrith s et al showed similar results of male predominance in ophthalmic involvement in craniofacial trauma(male 83%and female17%).[10-17]

In our study, out of 91 patients, 81 (89.01%) had visual acuity of 6/6-6/12, 6 (6.59%) were between the range of 6/18-6/60, 3 (3.30%) presented with vision lesser than 6/60 and 1 patient (1.10%) had pl positive. The results of foroughi r et al study showed permanent visual loss in only 3 patients out of 168 patients. But, amrith s et al study reported that 23% of patients were with visual acuity of 6/60 or below at the time of injury and 7% of patients had permanent loss of vision at the time of injury.[18-20]

In our study, 10 patients out of 91 (10.99%) had laceration of the eyebrow and 3 (3.30%) had abrasions over the eyebrow, 7 (7.6%) had eyelid laceration and 11 (12.09%) had laceration, ecchymosis, and edema, 2 were with traumatic ptosis and 1 (1.10%) was with mechanical ptosis at the time of presentation. subconjunctival haemorrhage was seen in majority of patients (43.96%), 4 (4.40%) had congestion, 11 (12.09%) had chemosis, 1 (1.10%) was reported with conjunctival tear and 1 (1.10%) was with congestion along with chemosis and subconjunctivalhaemorrhage.[21-23]

Cornea was found to be normal in 84 patients (92.31%), 5 (5.49%) showed corneal abrasion and 1 had corneal edema.3 (3.30%) were with traumatic uveitis, and 2 (2.20%) were with traumatic uveitis with hyphema. One patient (1.10%) had iridodialysis and 1 patient (1.10%) was with medial iridolenticular touch. 2 patients (2.20%) had traumatic mydriasis and 1 (1.10%) was with the relative afferent pupillary defect.1 patient (1.10%) presented with subluxation of lens. Similarly, in mohanavalli s et al study, the common clinical findings were periorbital edema with ecchymosis (79%) and subconjunctival haemorrhage (76.11%).[24,25]

Other ocular findings such as macular edema (16.93%), reduced visual acuity (13.93 %), anterior chamber injuries (12.3%), enophthalmos (10.94 %) and telecanthus (8.4%) were also present. Abbasik.z. study conducted with 152 head injury individuals, showed that most common injuries were in soft tissues, such as periorbital echymosis in 85 patients, sub conjunctival haemorrhage in 62 patients, lid edema in 52 patients, chemosis in 16 patients, lid laceration in 14 patients, corneal laceration in 6 patients and vitreous haemorrhage in 5 patients. Also, Sharma b et al study reported 51.8% of ecchymosis, 41.4% of lid edema, 44.4% of sch, 22.5% of lid laceration and 6.7% of ptosis, which are similar to our study, except that the 3rd and 4th nerve were the most commonly involved cranial nerves, and also 21% of patients were with pupillary changes, out of which 4.2% were with bilateral dilated fixed pupil, while 3.8% were with bilateral pinpoint fixed pupils.in our study, 1 patient (1.10%) presented with retinal detachment and 1 patient (1.10%) was with traumatic optic neuropathy and 97.80% of patients showed normal fundus.[26-28]

Out of 91 patients, 88 (96.70%) had normal intra ocular pressure in both eyes and 3 (3.30%) were with elevated intraocular pressure. but in cook's study, comprising of 365 patients, 74% were with orbital fractures without the association of ocular or periocular injuries, 22% of them were with ocular injuries, out of which 8 (35%) were traumatic optic neuropathy, 6 (26%) with IOP spikes more than 40 mm hg, 5 (22%) with hyphema, 2 (9%) were with traumatic iritits, and 2 (9%) were with globe rupture.[29]

In our study,42(46.1%) were with zygomatic complex fracture, 31 (34.1%) were with skull and maxillary bone fracture, 18 (19.8%) were with mandible fracture, 1 (1.10%) was withpanfacial fracture.Similarly, mohanavalli s et al. Study reported 62% patients with zygomatic complex fractures, 27% patients with le forte type ii fractures, 11.9% patients with le forte type iii fractures, and 13.9% patients with orbital bone fractures, among which zygomatic complex fracture was the most common. Amrith set al case series included all types of cranio-facial fractures. The observed fractures were: Orbital blow out fractures, le fort type ii and iii fractures, pan-facial and fronto-basilar skull fractures. They found that the most common presenting complaint was diplopia(40%) and that visual acuity was less than 6/60 in 23% of the cases.[30]

Ocular involvement is common with craniofacial trauma. Even though ocular examination does not modify the type of fracture repair,it may affect the indication and timing of the repair, considering the management of certain ophthalmic injuries first, e.g., optic nerve compression must be instituted at once. Trauma to the face above the level of the mouth requires a careful ocular examination. Patients that sustained eye injuries along with facial fractures should be treated appropriately to avoid complications, which may even lead to blindness.

CONCLUSION

Our study concludes by stressing on the complete ophthalmological examination earlier in patients with head injury which is important as it affects on the final outcome.Thus through routine ophthalmologic examination done in head injury patients we can start the treatment to the earliest possible which helps in preventing the complication which eventually lead to blindness.

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