RESEARCH

AN OBSERVATIONAL ASSESMENT of VISUAL OUTCOME IN BLUNT OCULAR TRAUMA

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Abstract

Background: Ocular blunt trauma incorporates an essential basis of visual morbidity in the world. It's necessary to look over the aspects influencing terminal visual outcomes in these cases as visual damage in these patients can be interrupted the Early treatment and management hence found an essential part in such patients. The aim is to depict visual prognosis and which are the factors impacting visual outcomes in patients of blunt ocular trauma. **Materials and Methods:** Plenty of retrospective but less prospective studies have been achieved on selected forms of ocular damage after blunt injury to the eye. This is a Retrospective, unintentional case series exercises imposed in patients visiting ophthalmology OPD and casualty at a tertiary care centre in western parts of Maharashtra. **Result:** A total of 112 patients were studied, in which majority of the study population (47%) were between age group26 to 40 years (n= 57). Majority of the affected population (65.7%, n=81) were males with effective unilateral involvement of eyes, with urban population commanding (56%, n=69). The major role of injury was Road Traffic Accident (40.4%, n=49), with poor prognosis resembling with very late appearance to the hospital. **Conclusion:** Road traffic accidents were the most frequent causation of blunt trauma. In urban areas male population were most vitally affected. Initial presentation to the hospital and visual outcome at the time of presentation after trauma impact the prognosis.

INTRODUCTION

Ocular trauma can be a devastating injury, causing visual disability.[1] Ocular trauma is the commonest cause of morbidity and acquired unilateral blindness.[2] Most of the emergencies are due to open-globe injuries and require immediate interventions.[3] Some 55 million ocular injuries restricting activities for more than 24 hours occur each year including some 2 lakh open globe injuries.[3] The eye injuries requiring hospitalization range from 4.9 to 89 per 10 million populations in developing countries.[4] In India, the reported incidence of ocular trauma varies from 1% to 5%.OBT causes ocular damage by the coup and countercoup mechanism or by ocular compression.[4] The concept of coup and countercoup injury was first introduced to explain brain damage caused by blunt trauma to the head by Courville.[5] This was later used by Wolter to explain eye injuries. Coup injuries refer to local trauma at the site of impact (e.g., subconjunctival hemorrhage, corneal abrasions, sub retinal and choroid hemorrhages, etc.). Countercoup refers to injuries at the opposite site of the impact caused by shock waves that traverse the eye (e.g., commotio retinae). Patient and social education regarding eye injuries and its early specialized treatment can give good visual prognosis. Delayed presentation results in substantial damage to the ocular structures and poor visual outcome.

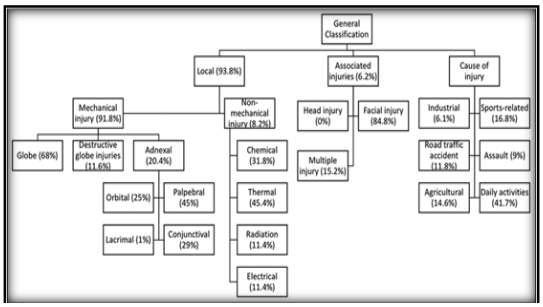

Figure 1: ocular trauma classification

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All patients were classified by the standardized international classification of ocular trauma (Birmingham Eye Trauma Terminology, BETT), which divided ocular injuries into those involving blunt force, resulting in contusion (closed globe injury) or rupture (open globe injury), and those involving sharp force, resulting in lamellar laceration (closed globe injury) or penetrating, perforating, and intraocular foreign body laceration (open globe injury).

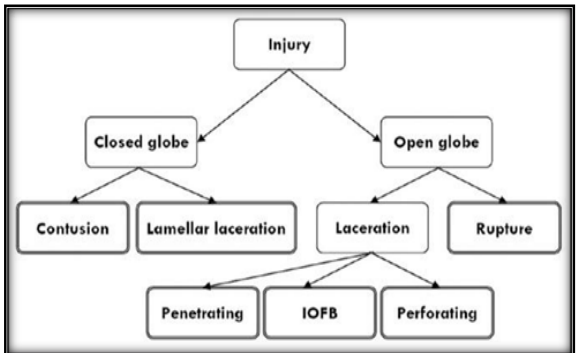

Figure 2: (Birmingham Eye Trauma Terminology, BETT)

Wound locations were defined by the Ocular Trauma Classification Group. Zone I injuries were confined to the cornea, zone II injuries confined up to anterior 5mm of the sclera and zone III injuries involved more than 5mm from the limbus.

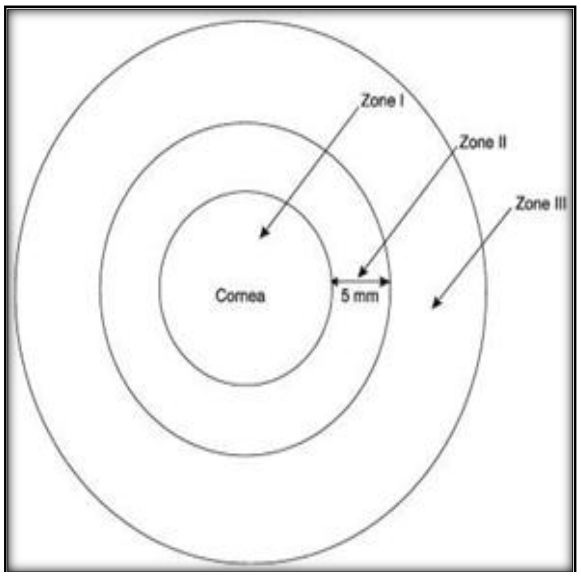

Figure 3: Zones of Cornea

There is an absence of representative data on the magnitude of ocular trauma, especially in western Maharashtra. This study provides new insights into the prevalence, risk factors and causes of ocular trauma and morbidity, visual outcome, and visual prognosis presenting to a tertiary care Centre in western Maharashtra.

MATERIALS AND METHODS

Study Design: A retrospective study of visual prognosis in blunt trauma patients.

Study Settings: Study was carried out on patients visiting ophthalmology OPD and casualty patients in a tertiary care centre in western Maharashtra

Duration of study:

Study Population

Patients attending hospital having blunt trauma injuries were included in the study

Case Selection:

All patients visiting ophthalmology outpatient department with or without vision loss were included

Inclusion Criteria:

All patients visiting Ophthalmology OPD having history of blunt ocular trauma with or without diminution of vision

Exclusion criteria:

1. Patients having penetrating ocular trauma
2. Head injury patients
3. Unconscious patients
4. Patients which are not willing

Methodology

Consent was obtained from patients after selection of cases for the study. Detailed history was obtained in the specially designed proforma regarding 1. Age and sex 2. Occupation 3. Address with contact number. 4. Time of injury. 5. Time interval between injury and presentation. 6. Mode of injury. 7. History of alcohol intake. 8.History of previous ocular problem.9. History of drug intake. General examination of the patient was done including assessment of cardiovascular and respiratory status and blood pressure measurement. Detailed Ophthalmic examination was done including 1. Uncorrected and best corrected visual acuity in both eyes using Snellen's chart. 2. Intraocular pressure measurement using noncontact tonometry for selected cases 3. Anterior segment examination with slit lamp. 4. Detailed pupillary examination including i. Direct and Indirect pupillary light reflex. ii. Reaction to accommodation. iii. Presence of RAPD. 5. Extra ocular movements and 6. fundus examination using direct and indirect ophthalmoscope.

Investigations

blood count, blood sugar, renal function tests. Electro Cardiogram. X-ray orbit and CT, MRI scan brain and orbit where ever necessary.

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RESULTS

Out of 80 patients involved in the study, 58 (72.5%) were males and 22 (27.5%) were females. RTA and occupational injuries were seen more in males as more males were included in driving, industrial and agricultural occupations

Table 1: Age-wise distribution of p

Age group	**No of cases**	**Percentage**
0-20 years	8	10%
21-40 years	45	56.25%
41-60 years	26	32.50%
Above 60 years	1	1.25%
Gender-wise distribution of patients: Gender	Number of patients	Percentage
Male	58	72.5 %
Female	22	27.5%
Eye affected	**No. of patients**	**Percentage**
Right eye	32	40%
Left eye	48	60

Out of 80 patients included in the study, 32 patients (40%) undergone blunt trauma to the right eye whereas 48 patients (60%) to the left eye.

Table 2: Time of presentation after blunt trauma

Time of presentation	**Number of cases**	**Percentage**
≤ 3 hours	34	42.5%
4-24 hours	26	32.5%
2-10 days	3	3.75%
11-30 days	6	7.5%
> 30 days	11	13.75%

Out of 80 patients, 34 patients (42.5%) were presented in ≤ 3 hours to our tertiary care Centre, 26 patients (32.5%) between 4-24 hours, 3 patients (3.75%) between 2-10 days, 6 patients (7.5%) between 11-30 days and 11 patients (13.75%) after 30 days.

Table 3: Mode of injury in study population

Mode of injury	**Number of patients**	**Percentage**
Accidental injuries (occupational + others)	39	48.75%
Assault	28	35%
Sports related	13	16.25

In this exercise, accidental injuries (occupational + others) were the commone approach of injury affecting 39 patients (48.75%) affected by assault in 28 patients (35%) and sports assosiated injuries in 13 patients (16.25%).

Table 4: Distribution of cases according to risk in occupation

Occupation	**No. of patients**	**Percentage**
Worker	27	33.75%
Farmer	21	26.25%
Student	19	23.75%
Housewife	8	10%
Teacher	5	6.25%

Out of 80 patients included in the study, 27 were workers (33.75%), 21 were farmers (26.25%), 19 were students (23.75%), 8 were housewives (10%) and 5 were teachers (6.25%) by occupation

Table 5: Agents causing blunt injury

Object causing blunt injury	**Number of patients**	**Percentage**
Stick	15	18.75%
Stone	13	16.25%
Motor vehicle (RTA)	12	15%
Rod	10	12.5%
Ball	9	11.25%
Fist	7	8.75%
Shuttle cock	4	5%
Elbow	3	3.75%
Fall	3	3.75%
Finger	2	2.5%
Horn	2	2.5%

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In this study, 15 patients (18.75%) suffered injury by stick, 13 patients (16.25%) by stone, 12 patients (15%) by motor vehicle, 10 patients (12.5%) by rod and 9 patients (11.25%) by ball. Other agents which caused blunt trauma were fist, shuttle cock, elbow, fall, finger and horn.

Table 6: Distribution of cases according to segment of the eye involved

Segment involved	No of patients	Percentage
Anterior segment	57	71.25%
Posterior segment	07	8.75%
Combined Anterior + Posterior segment	16	20%

In this study, 57 patients (71.25%) have anterior segment injury, 16 patients (20%) have combined anterior + posterior segment injury and 7 patients (8.75%) have posterior segment injury.

Table 7: Anterior segment findings in patients

Anterior segment findings	Number of patients	Percentage
Lid ecchymosis/edema	24	30%
Lid laceration	8	10%
Subconjunctival hemorrhage	36	45%
Conjunctival laceration	4	5%
Corneal abrasion	5	6.25%
Corneal opacity	9	11.25%
Corneal tear	1	1.25%
Corneal edema	3	3.75%
Scleral tear	1	1.25%
Hyphema	11	13.75%
Anterior Chamber cells	5	6.25%
Vitreous in anterior chamber	4	5%
Shallow/ collapsed anterior chamber	2	2.5%
Iridodialysis	4	5%
Iridodonesis	2	2.5%
Traumatic mydriasis	3	3.75%
Traumatic cataract	9	11.25%
Subluxated lens	5	6.25%
Dislocated lens	1	1.25%

In this exercise, the most commonly anterior segment findings were Subconjunctival hemorrhage in 45% patients affected by lid ecchymosis/edema in 30%, hyphema in 13.75%, corneal opacities in 11.25% and traumatic cataract in 11.25%. Other anterior segment findings observed were lid laceration in 10%, Corneal abrasion in 6.25%, subluxated lens in 6.25%, anterior chamber cells in 6.25%, conjunctival laceration in 5%, vitreous in anterior chamber in 5%, iridodialysis in 5%, corneal edema in 3.75%, traumatic mydriasis in 3.75%, shallow/ collapsed anterior chamber in 2.5%, iridodonesis in 2.5%, corneal tear in 1.25%, scleral tear in 1.25%, dislocated lens in 1.25%.

Table 8: Posterior segment findings in patients:

Posterior segment findings	No. of patients	Percentage
Vitreous hemorrhage	5	6.25%
Retinal detachment	7	8.75%
Macular hole	3	3.75%
Traumatic optic neuropathy	3	3.75%
Berlin's edema /commotio retinae	5	6.25%

In this study, the most commonly posterior segment finding were seen. And there was Retinal Detachment in 7 patients (8.75%) affected by Vitreous Hemorrhage in 5 patients (6.25%) and Berlin's Edema/Commotio Retinae in 5 patients (6.25%). Various findings observed were Macular Hole in 3 patients (3.75%) and Traumatic Optic Neuropathy in 3 patients (3.75%).

Table 9: Comparison of visual acuity at presentation with visual acuity at 6 weeks follow-up

Vision	Visual acuity at presentation to hospital		Visual acuity at 6 weeks follow-up after treatment		P - value
	No of patients	Percentage	No of patients	Percentage	
No PL	2	2.5%	2	2.5%	<0.0000001
< 6/60	35	43.75%	-	-	
6/60 -<6/24	9	11.25%	8	10%	
6/24 - <6/12	6	7.5%	5	6.25%	
≥ 6/12	28	35%	65	81.25%	

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DISCUSSION

Vision is one of the most important and indispensable senses of the human body, with an intact binocular vision playing a very significant role in development, independence, and betterment of the quality of life. Ophthalmic trauma is a major health problem which is responsible for early and comprehensive medical management thus mandating emergency care to be tended for all ocular trauma patients.[6] Worldwide approximately 6 million people get blinded by ocular injuries and this will make ocular trauma one of the most common causes of unilateral blindness.

125 One out of every 20 visits to an ophthalmologist are injury related and ocular injury is becoming the leading cause of eye related hospital admissions. Blunt ocular injuries comprise 80% of these injuries

Age Incidence

Out of 80 patients involved in this exercise, the youngest patient was 16 years old and the eldest was 62 years old. The incidence of ocular injuries was high in the age group between 21-40 years (56.25%). The second highest was in the group between 41 and 60 years (32.50%).[7]

Sex Incidence

A strong dominance of males was noted in this study. Out of 80 patients included in the study, 72.5% were males and 27.5% were females.[8]

Eye Affected

In this study, all cases have monocular entanglement with left eye resulted in 60% and the right eye in 40%. The slight predominance of the left eye injuries in this study may be explained by an observation that most people are right handed and the left eye of the victim is the one which is more vulnerable to attack from a right handed person.[9]

Mode of Injury

The commonest mode of injury in this study was accidental injuries (occupational + others) affecting 48.75% patients followed by assault injuries in 35% patients and sports related injuries in 16.25% patients.[10]

Occupation

In this exercise, it was seen that the most of the incidence of blunt injuries were amid workers (33.75%) tracked by farmers (26.25%), students (23.75%), housewives (10%) and teachers (6.25%).

Causative Agent/Source of Injury

In this exercise, 18.75% patients undergone injury by the stick, 16.25% patients by stone, 15% by motor vehicle, 12.5% by rod, 11.25% by ball, 8.75% by fist, 5% by shuttle cock, 3.75% by elbow, 3.75% by fall, 2.5% by finger and 2.5% by horn.

Time of Demonstration since Ocular Trauma

In this exercise, many of the patients (42.50%) showed in ≤ 3 hours, 32.5% patients between 4-24 hours, 3.75% between 2-10days, 7.5% between 11-30days and 13.75% after 30 days.

All the above exercises reported that many of the patients showed within 24 hours of injury which was very similar to observations made in this study.

Most of the patients who showed in early time to the department were those with more severe ocular injuries. Lag in following medical help after an ocular injury increases the harshness of the disease and influence the final visual outcome. The causes of delay were poor approach to health care services, illiteracy, social/cultural/superstitious beliefs, ignorance, rural status & poverty.

Segment of the Eye Got Affected

In this study, 71.25% patients had anterior segment injury, 20% patient had combined anterior and posterior segment injury and 8.75% patients had only posterior segment injury

Visual Acuity

In this study, it was observed that, at presentation 2 patients (2.5%) have no Perception of light, 35 patients (43.75%) have visual acuity <6/60, 9 patients (11.25%).

Have visual acuity between 6/60- <6/24, 6 patients (7.5%) have visual acuity between 6/24- <6/12 and 28 patients (35%) presented with visual acuity of ≥ 6/12. Significant Improvement was studied in visual acuity after doing treatment at 6 weeks follow-up. At 6 weeks follow-up, 2 patients (2.5%) have no perception of light, 8 patients (10%) have visual acuity between 6/60- <6/24, 5 patients (6.25%) have visual acuity between 6/24 -<6/12, and 65 patients (81.25%) had visual acuity ≥ 6/12.[11,12]

CONCLUSION

Blunt trauma is the vital part of ocular trauma. This exercise indicates the discrete forms that play the part in measuring the last visual outcome, in which males are affected more than females probably due to more exposure to outdoor activities. Urban population is more disturbed compared to rural population due to increase in industries and urbanization, implying the demand to explore workplace approach to lessen ocular trauma as a main preference.

Priority might be made about wearing protective goggles, face shields, availability of prompt emergency eye care execution and health education in relation to eye saftey. The time duration between injury and appearance influenced the last visual outcome. Visual improvement was good for those who showed within 24 hours of injury with recent appropriate intervention. Injuries involving zone III carried very little prognosis compared to zone I and

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zone II entanglement probably related to the comprehensive damage more posteriorly.

Visual outcome at the period of presentation had an influence on the end of visual outcome. Many patients with a reasonably well visual acuity after injury had a good final visual outcome. Patients who showed no improvement had refined secondary complications.

Patients who appeared initially to the hospital after the injury and with a moderately good initial visual acuity concluded with a reasonably positive final visual acuity after proper and early treatment. Eye care programs adressing high- risk ocular trauma groups may used to consider ocular trauma as a preferencing in eye health awareness strategies to overcome blindness due to trauma.

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