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Prevalence of Visual Impairment after Blunt Ocular Trauma in a Tertiary Hospital

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Abstract:
Background: *Ocular trauma is a major cause of visual morbidity. The visual impairment caused due to blunt ocular trauma has been neglected in developing countries.*
Purpose: *To study the prevalence of visual impairment in victims of blunt ocular trauma presenting to a tertiary hospital.*
Materials and Methods: *A prospective study which included 100 patients who presented to MLB Medical college,Jhansi with history of blunt trauma to one or both eyes. Demographic data, detailed history, clinical data, best-corrected visual acuity of all patients were noted at presentation. Patients treated medically and depending on their condition, surgical intervention done as required. Follow-up was done after 1-week, 1-month, 6-months, and 1-year of presentation.*
Results: *The mean age group of patients was 25 years. When adjusted for sex, males were more affected, that is, of the 100 patients, 83 were male, 27 were female. 23 patients had visual impairment at presentation. Impairment in vision resulted from corneal edema/partial corneal tears (3%), iridocyclitis (4%), cataract (9%), subluxated lens with vitreous herniation (2%), hyphema with vitreous hemorrhage and retinal detachment (2%), commotio retinae/retinal hemorrhages (2%), optic neuritis (1%). 13 patients (who had curable blindness, with vision <6/60) were surgically treated, and vision restored. On 1-year follow- up, two patients had a visual impairment, their vision being 6/9 and 6/12.*
Conclusion: *Prevalence of visual impairment in our study was 2%, thus requiring its prevention and early management to be a public health priority.*
Key words: *Morbidity, Trauma, Visual impairment*

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I. Introduction

Ocular trauma, once described as the "neglected disorder," has recently been highlighted as a major cause of visual morbidity.[1] Annually, over 2.5 million Americans suffer an eye injury, and globally more than half a million visually debilitating injuries occur every year.[2] The prevalence of ocular trauma in India was reported as 2.4%.[3] Worldwide, there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired, and 19 million with unilateral visual loss.[4]

Ocular trauma is a major cause of preventable monocular blindness and visual impairment in the world.[5]40,000- 60,000 of eye injuries lead to visual loss.[6]Despite its public health importance, there is relatively less population-based data on the magnitude and risk factors for ocular trauma, especially from developing countries.[7]

II. Materials And Methods

A prospective, observational study was done on 100 patients with blunt ocular traumapresenting to the emergency and outpatient department of Department of Ophthalmology at Maharani Laxmi Bai Medical college,Jhansi,Uttar Pradesh,India from July 2018 to May 2020.A total of 100 subjects(both males and females) were taken for this study.

Study design: Prospective observational study.
Study location: This was a tertiary care teaching hospital based study done in Department of Ophthalmology, at Maharani Laxmi Bai Medical college ,Jhansi, Uttar Pradesh, India.
Study duration: July 2018 to May 2020.
Sample size:100 patients

Inclusion Criteria

• Patients presenting to Ophthalmology outpatient department and emergency Department of Maharani Laxmi Bai medical college,Jhansi, India, with history and signs of blunt ocular trauma

• Patients who were willing to give consent.

Exclusion Criteria

• Patient in whom assessment is difficult due to severe head injury with reduced level of consciousness and co-operation

• History of any past ocular pathology, which impairs best-corrected visual acuity (BCVA).

Procedure methodology

Demographic data, detailed history, clinical data were recorded. Detailed ocular examination which included visual acuity (both distant and near vision), Retinoscopy, anterior segment evaluation with diffuse light, slit-lamp examination, intraocular pressure (IOP) with GAT, gonioscopy with Goldmann three mirror Gonioscope lens, posterior segment evaluation using +90D lens, +78D lens and indirect ophthalmoscope with +20D lens, visual fields by Humphrey Field Analyzer, B-scan, X-ray orbit, computerized tomography/magnetic resonance imaging was done.

BCVA of all patients was noted at presentation and during follow-up. Follow-up was done after 1-week, 1-month, 6 months, 1-year of presentation.

III. Result

Age

Mean age group of patients in our study was 25 years. There were 8 patients in the age group of 1-10 years, 16 patients in the age group of 11-21 years, 57 patients in the age group of 21-30 of years, 18 patients in the age group of 31-40 years, and 1 patient in the age group of 41-50 years. In our study, young adults were more prone to blunt ocular trauma.

Sex Distribution

Of the 100 patients, 83 were male and 17 were female.

Demography

Study included 22 patients from the rural sector and 78 patients from the urban sector.

Cause of Blunt Trauma

The cause of blunt trauma in our study was road traffic accident as seen in 22 patients, history of fall in 19 patients, history of assault in 32 patients, injury with blunt objects in 21 patients, and miscellaneous causes in 6 patients.

Visual Impairment

Of the 100 patients, 23 had a visual impairment. The best corrected visual acuity of these patients on presentation was as follows:

Best Corrected Visual Acuity on Presentation

In our study, there was 1 patient with visual acuity ranging from 6/12 to 6/18, 5 patients with visual acuity ranging from 6/24 to 6/36, and 16 patients with visual acuity ranging from 6/60 to <6/60.

Cause of Visual Impairment

Cause of visual impairment in our study was noted to be due to corneal edema as seen in 2 patients, partial corneal tear in 1 patient, traumatic iridocyclitis in 4 patients, traumatic cataract in 9 patients, subluxated lens in 2 patients, vitreous hemorrhage with retinal detachment in 2 patients, and traumatic optic neuritis in 1 patient (Figures 1-4).

Of this, 13 were surgically treated and improvement in vision was noted.

On Follow-up

Best corrected visual acuity after 1-week showed 2 patients with visual acuity between 6/6 and 6/9, 11 patients with visual acuity between 6/12 and 6/18, 4 patients with visual acuity between 6/24 and 6/36, 5 patients with visual acuity between 6/60 and <6/60.

Best corrected visual acuity after 6 months and 1-year showed 21 patients with visual acuity of 6/6, 1 patient with visual acuity of 6/9, and 1 patient with visual acuity of 6/12. Thus showing visual impairment in 2 patients at 1-year follow-up (Table 1).

Table 1: BCVA on presentation to the 1-year follow-up

Best corrected visual acuity	Number of patients on presentation	Number of patients after 1 week	Number of patients after 1 month	Number of patients after 6 months	Number of patients on 1 year follow up
6/6-6/9	0	2	17	21	21
6/12-6/18	1	11	1	1	1
6/24-6/36	5	4	1	0	0
6/60-<6/60	16	5	3	0	0

BCVA:Best corrected visual acuity

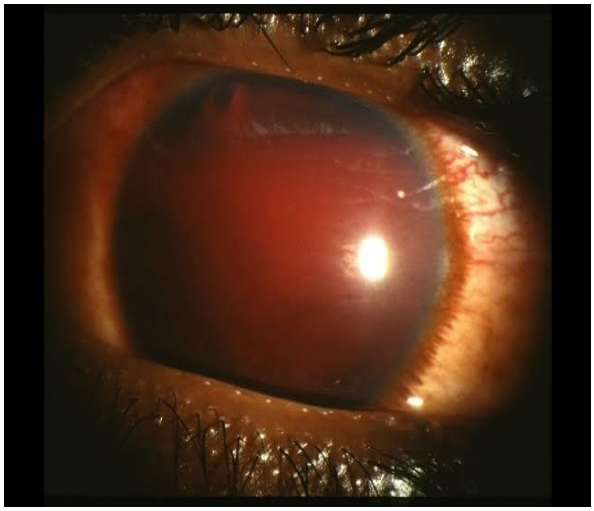

Figure 1: Total hyphema. Subconjunctival hemorrhage

Figure 2: Periorbital ecchymosis with.

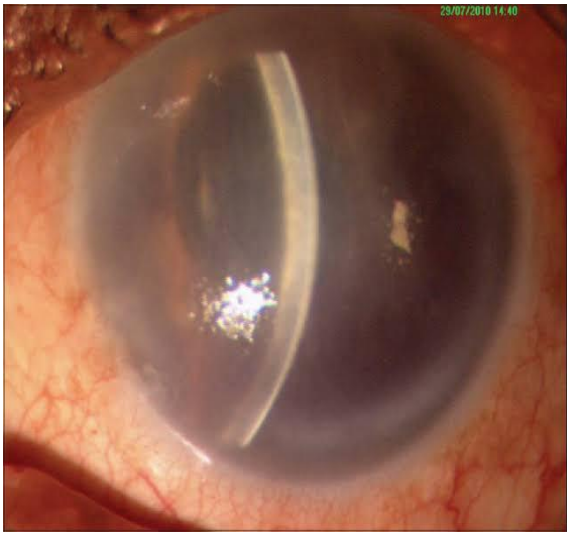

Figure 3: Corneal edema

Figure 4: Traumatic cataract

IV. Discussion

Pathogenesis of Blunt Trauma

Blunt trauma to the globe results in anteroposterior compression with simultaneous expansion in the equatorial plane associated with a transient but severe increase in IOP. The impact is primarily absorbed by the lens iris diaphragm and the vitreous base.

Mechanics of Blunt Trauma to Eyeball

1. Direct impact on the globe: It produces maximum damage at the point where the blow is received. It can be due to:

a. Compression wave force: It is transmitted through the fluid contents in all the directions. Maximum damage is produced at a point distant from the place of impact. This is called contrecoup damage

b. Reflected compression wave force: After strikingthe outer coats of the eyeball, the compression waves are reflected toward the posterior pole and may cause foveal damage

c. Rebound compression wave force: After striking the posterior wall of the globe, the compression waves rebound back anteriorly. This force damages the retina and choroid by forward pull and lens-iris diaphragm by forward thrust from the back.

Indirect force: Indirect forces act on the eyeball from the bony walls and elastic contents of the orbit when globe suddenly strikes against these structures.

Our study showed men and young adults to be more prone to blunt ocular trauma. This result was consistent with previous study done by Vats et al.[8]

Our study also showed a higher incidence in the urban population as compared to a rural one. In the study by Dandona et al.[9]and Nirmalan et al.,[10] it showed that a rural population (4.5%) may have a higher prevalence as compared to an urban one (3.97%).[9,10] Since our study was done in urban Bengaluru, our results can thus be substantiated.

The prevalence of visual impairment in our study was 2%. The study done by Glynn et al. reports cumulative prevalence of visual impairment (VA <20/40) due to ocular trauma is 8.5 per 1000 persons.[7]

Limitations in our study being loss of one patient on follow up and its sample size.

V. Conclusion

Prevalence of visual impairment in our study is 2%. Ocular 6. trauma has to be considered as a public health priority in developing countries like India as most of the patients affected belong to the economically productive age group.

As blunt ocular trauma is a major cause of preventable 8. visual impairment, "prevention is better than cure" aptly applies here. Prevention can be done by public awareness and education on the use of helmets while riding, use of protective glasses. Patients presenting with blunt trauma should be promptly and efficiently treated. Reducing the magnitude of visual impairment due to blunt trauma is the responsibility of both the patient and the ophthalmologist.

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