

Epidemiological pattern of ocular trauma in a tertiary hospital of northern IndiaShazia Qayum^{*}, Rafiq Anjum and Punita Garg*MM Institute of Medical Sciences and Research (MMIMSR), Mullana (Ambala), Haryana, Mullana (Ambala), Haryana, India****Correspondence Info:**

Dr. Shazia Qayum,

MM Institute of Medical Sciences and Research (MMIMSR),

Mullana (Ambala), Haryana, Mullana (Ambala), Haryana, India

E-mail: dshazbeig@gmail.com**Abstract**

Introduction: Ocular trauma is one of the major public health issues. More than 2.5 million ocular injuries occur in the United States every year and out of whom about 50,000 lose part or all of their vision on permanent basis and this incidence is even higher in developing countries. The rates at which patients with ocular trauma need hospitalization range from 4.9 to 89 per 100,000. This study was conducted to determine the epidemiological pattern of ocular trauma and various factors influencing it.

Methods: A retrospective study was conducted in our hospital between January 2015 to January 2016 and all the patients presented with ocular trauma in eye outpatient department and emergency were enrolled in the study. Various epidemiological parameters like age, sex distribution, duration of presentation, mode of injury, type of injury and final visual outcome was analysed.

Results: Of total 253 of patients, 139(54.9%) were below the age of 25 years and male to female ratio was 3.5:1. About 132(52.2%) of the patients presented to hospital within 24hrs of trauma. The causes of ocular trauma included Road traffic accidents 87 cases (34%), sports related and recreational 75(29.7%), occupation related 51(20.1%), domestic accidents 24(9.4%) and violence related 16(6.3%). Among the type of injuries Open globe injuries accounted for 184 cases (72.7%) and 69 patients (27.3%) suffered closed globe injuries. Delay in presentation was associated with poor visual outcome.

Keywords: Ocular trauma, open globe injury, closed globe injury.

1. Introduction

Ocular trauma is one of the leading causes of treatable visual morbidity and blindness.[1] There are about 6 million people blind due to eye injuries out of which 2.3 million are affected bilaterally and 19 million represents unilateral visual loss making eye trauma the most common etiology of unilateral blindness[2]. Ocular trauma is associated with great amount of emotional stress well as frequent hospital visits [3,4]. The distribution of eye trauma is bimodal with increased incidence in young adults and a later peak in elderly [5,6]. The typical male to female ratio is about 4:1 worldwide [7-9] with Open globe injury being the commonest.[10-13] A large number of studies on ocular trauma have been conducted in US [14-18] along with other developed countries[19-21] but the pattern of eye injuries in developing countries is not well known[22]. More than 2.5 million ocular injuries occur in the United States every year and out of whom about 50,000 lose part or all of their vision on permanent basis [23] and this incidence is even higher in developing countries [24]. The percentage at which patients with ocular trauma need hospitalization range from 4.9 to 89 per 100,000 [23,19]. This study will help in estimating the

burden of the preventable blindness in the region and also identify the contributing factors responsible.

2. Materials and Methods

This study was conducted in a tertiary care center of northern India mainly catering to rural population. All patients with ocular trauma presenting to the hospital between Jan 2015 to Jan 2016 were included in our study and evaluated for epidemiological parameters like mode of injury, age and sex distribution. Data was reviewed using appropriate statistical tests and outcome was compared with previous studies for discussion. Association among variables was checked by Chi-Square test and significance was considered when $p < 0.05$.

World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS)[25,26] describes definition of ocular trauma as

Blindness: Visual acuity $< 3/60$

Eye Wall: Cornea and Sclera

Closed Globe Injury: not a full thickness wound of eye wall

Contusions: direct energy delivery like. choroidal rupture or due to change in shape of the globe like angle recession

Lamellar laceration: partial thickness wound

Open Globe Injury: A full thickness wound of the eye wall

Laceration: Wound by a sharp object by outside- in mechanism

Penetrating: Presence of an entrance wound only

Perforating: Presence of an entrance as well as an exit wound

Intra- ocular foreign body

Rupture: Wound caused by any blunt object via inside out mechanism due to raised intraocular pressure

Adnexal injuries: Eyelid & conjunctiva injuries

acuity <6/18 -3/60 while 87 cases (34.4%) had unfortunate blinding visual outcome even with best operative procedure and management.

Table 1: Age group and sex distribution of ocular trauma

Age	Male (%Age)	Female (%Age)	Total (%Age)
<5 Yrs	13	08	21
5-15 Yrs	50	15	65
16-25 Yrs	42	11	53
26-35 Yrs	40	9	49
36-45 Yrs	30	6	36
46-55 Yrs	12	2	14
>55 Yrs	10	5	15
Total	197(77.9)	56(22.1)	253(100)

3. Results

Our study included 253 patients of ocular trauma attending eye OPD and emergency in the time period from Jan 2015 to Jan 2016. Of total no. of patients, 139(54.9%) were below the age of 25 years .Male to female ratio was 3.5:1 (Table 1).

In this study, 132(52.2%) of the patients presented to hospital within 24hrs of trauma while 56(22.1%) attended hospital within 2 days and 35(13.8%) in 2 to 7 days after trauma.

Road traffic accidents are the most common cause of ocular trauma and accounts for 87 cases (34%) in our study. Other causes included sports related and recreational 75(29.7%), occupation related 51(20.1%), domestic accidents 24(9.4%) and violence related 16(6.3%). Among the type of injuries Open globe injuries accounted for 184 cases (72.7%) and 69 patients (27.3%) suffered closed globe injuries.

In our study, 128 cases (50.6%) were blind at presentation i.e., visual acuity <3/60, 83(32.8%) with visual acuity 6/6-6/18 and in 42 (16.6%) cases, visual acuity was not documented as patients were not cooperative. After 1 week of treatment, visual outcome was documented. Out of 253 cases, 97(38.3%) had visual acuity 6/6-6/18, 27(10.7%) with visual

Table 2: Mode of Injury & Sex Distribution of Ocular Trauma Patients

Mode of Injury	Male	Female	Total (%Age)
1.Road Traffic Accident	65	22	87 (34%)
2.Occupation Related	36	15	51(20.1%)
3.Voience Related	16	0	16(6.3)
4.Domestic (Fall) Accidents	19	5	24(9.4%)
5.Sports Related, Recreational Related	61	14	75(29.7%)
Total	197 (77.9%)	56 (22.1%)	253(100)

Table 3: Duration of Presentation

Duration of Presentation	No. of Patients	% Age
<24 Hrs	132	52.2%
24-48 Hrs	56	22.1%
>48 Hrs- 1 Week	35	13.8%
>1 Week	30	11.9%
Total	253	100

Table 4: Injury Types and Final Visual Outcome

Type of Injury	Final Visual Outcome, BCVA				
	Non Cooperative/Not Documented	<3/60-No Pl	<6/18-3/60	6/18-6/6	Total (%Age)
Closed Globe Injuries					
Lamellar Laceration	3 (23.1%)	2 (15.4%)	2 (15.4%)	6 (46.2%)	13 (5.1%)
Contusion	11 (19.6%)	5 (8.9%)	5 (8.9%)	35 (62.6%)	56 (22.2%)
Open Globe Injuries					
Perforating	-	-	-	-	-
Penetrating	19 (16.8%)	74 (65.4%)	20 (17.7%)	-	113 (44.7%)
Intraocular Foreign Body	-	6 (50%)	-	6 (50%)	12 (4.7%)
Adnexal	9 (15.3%)	-	-	50(84.7%)	59 (23.3%)
Total	42 (16.6%)	87 (34.4%)	27 (10.7%)	97 (38.3%)	253 (100)

P=0.00

4. Discussion

The burden of ocular trauma was found to be 3.2% out of total patients attending eye opd. This no. is significantly lower when compared to other studies. A Study was conducted at JUDO south west Ethiopia[13] where this

burden was found 6.9%, with 63.8% of the cases below the age of 30 years with mean age 25.5 years and male to female ratio 3.2:1. There were 139 (54.9%) cases below 30 years and male to female ratio was 3.5:1 in our study. JUDO study revealed that 31.6 % of cases reported within 48 hours while

28.6% arrived one week or later [13]. In our study, 132(52.2%) of the patients presented to hospital within 24hrs of trauma while 56(22.1%) attended hospital within 2 days and 35(13.8%) in 2 to 7 days after ocular trauma. One of the studies conducted in Haryana found that males (76.01%) are affected more commonly than females (23.99%). Cornea was most commonly affected in about 47.6% followed by iris in 32.64% [19].

5. Conclusion

From this study it is concluded that delay in presentation has a significant effect on final visual outcome along with presence of complications. This study revealed that the most common cause of ocular trauma is road traffic accidents followed by sports related and recreational activities and occupation related injuries. So it is advised to take preventive measures like wearing seat belts while driving, protective goggles during welding, supervising children while playing, etc. There should be an urgent referral system for ocular trauma patients.

References

- [1] Omolase CO, Omolade EO, Ogunleye OT, Omolase BO, Jhemedu CO, Adeosun OA. Pattern of ocular injuries in Owo, Nigeria. *J. Ophthalmic Vis Res* 2011; 6: 114-118.
- [2] Negrel AD, Thylefors B. The global impact of eye injuries. *Ophthalmic Epidemiology* 1998; 5:143-169.
- [3] McGwin G, Owsley C. Incidence of emergency department treated eye injury in the United States. *Arch Ophthalmol* 2015; 123: 662–666.
- [4] McGwin G, Aiyuan X, Owsley C Rate of eye injury in the United States. *Arch Ophthalmol* 2005; 123: 970–976.
- [5] Glynn RJ, Seddon JM, Berlin BM. The incidence of eye injuries in New England. *Arch Ophthalmology* 1988; 106: 785- 789.
- [6] Desai P, Mac Ewen CJ, Baines P, Minaissian DC. Epidemiology and implications of ocular trauma admitted to hospital in Scotland. *J. Epidemiology Comm. Health* 1996; 50: 436-441.
- [7] Khan MD, Mohammad S, Islam ZU, Khattak MN. An 11 years review of ocular trauma in the North West Frontier Province of Pakistan. *Pak J Ophthalmology*, 1991; 7:15-18.
- [8] Kuhn F. Epidemiology of ocular trauma. In: Kuhn F, Morris R, Mester V, Witherspoon D. *Ocular Traumatology*. Springer- Verlag Berlin Heidelberg. 2005: 47-77.
- [9] Framme C, Roeder J. Epidemiology of open globe injuries. *Klin Monatsbl Augenheik* 1999; 215: 287-293.
- [10] Casson R, Walker J, Newland H. 4-year review of open eye injuries at the Royal Adeliade Hospital. *Clin Exp. Ophthalmol*, 2002; 30: 15-18.
- [11] Tielsch JM, Parver L, Shankar B. Time trends in the incidence of hospitalized ocular trauma. *Arch Ophthalmology*, 1989; 107:519-23.
- [12] Gyasi ME, Amoaku WMK, Adjuik MA. Hospitalized Ocular Injuries. *Ghana Medical Journal* 2007; 41: 171-75.
- [13] Asaminew T, Gelaw Y, Alemseged F. A 2-year review of ocular trauma in JIMMA University Specialized Hospital. *Ethiop J Health Sciences* 2009; 19:67-76.
- [14] Tielsch JM, Parver L, Shankar B. Time trends in the incidence of hospitalized ocular trauma. *Arch Ophthalmol* 1989; 107: 519–523.
- [15] Klopfer J, Tielsch JM, Vitale S, See LC, Canner JK. Ocular trauma in the United States: eye injuries resulting in hospitalization, 1984 through 1987. *Arch Ophthalmol* 110: 838–842.
- [16] McGwin G Jr, Hall TA, Xie A, Owsley C. Trends in Eye Injury in the United States, 1992–2001. *Invest Ophthalmol Vis Sci* 2006; 47: 521–527.
- [17] Macdonald EC, Cauchi PA, Azuara-Blanco A, Foot B. Surveillance of severe chemical corneal injuries in the UK. *Br J Ophthalmol* 2009; 93: 1177–1180.
- [18] Blomdahl S, Norell S. Perforating eye injury in the Stockholm population. *Acta Ophthalmologica* 1984; 62: 378–390.
- [19] Mela EK, Dvorak GJ, Mantzouranis GA, Giakoumis AP, Blatsios G, et al. Ocular trauma in a Greek population: review of 899 cases resulting in hospitalization. *Ophthalmic Epidemiol* 2005; 12: 185–190.
- [20] Tomazzoli L, Renzi G, Mansoldo C. Eye injuries in childhood: a retrospective investigation of 88 cases from 1988 to 2000. *Eur J Ophthalmol* 2003; 13: 710–713.
- [21] Loon SC, Tay WT, Saw SM, Wang JJ, Wong TY. Prevalence and risk factors of ocular trauma in an urban south-east Asian population: the Singapore Malay Eye Study. *Clin Experiment Ophthalmol* 2009; 37: 362–367.
- [22] Nordberg E. Injuries as a public health problem in sub-Saharan Africa: Epidemiology and prospects for control. *East Afr Med J* 2000; 77: 41–43.
- [23] Mieler W (2001) Overview of ocular trauma. In Principles and Practice of Ophthalmology 2nd edition. In Albert D, Jakobiec F, editors. Philadelphia, WB Saunders Co, p 5179.
- [24] Vats S, Murthy GVS, Chandra M, Gupta SK, Vashist P. Epidemiological study of ocular trauma in an urban slum population in Delhi, India. *Indian J Ophthalmol* 56: 313–316.
- [25] Kuhn F, Morris R, Witherspoon CD, Heimann K, Jeffers JB. A standardized classification of ocular trauma. *Ophthalmology* 1996; 103: 240–243.
- [26] Kuhn F, Morris F, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology system (BETT). *J Fr Ophthalmol* 2004; 27: 206–210.