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Profile of Ocular Trauma in a Tertiary Care Centre

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Abstract
Introduction: *Ocular trauma is a major cause of monocular visual impairment with socioeconomic and psychological ramifications.*
Aim: *This study was undertaken to assess the profile of ocular trauma in a tertiary care centre.*
Materials and Methods: *A prospective study was done on 187 eyes of 184 patients of ocular trauma attending ophthalmic OPD in a tertiary care hospital. Demographic data and history were noted,a comprehensive ophthalmic examination was done. The cases were classified according to international classification of ocular trauma, Birmingham Eye Trauma Terminology System (BETTS), Ocular Trauma Score (OTS) was calculated, time interval between the injury and reporting to an ophthalmologist was noted.*
Results:*70% were males, 55 % patients were from age group 20-40 years(mean age 32yrs);Among187 injured eyes of 184 patients 32 % required surgery, 84 % had closed globe injury.40 % sustaineddomestic related trauma, 23 %sports injuries, 21 % work related trauma, 9 % road traffic accidents. 69 % cases reported within 24 hrs of injury, 15 % cases between 24- 48 hrs.In the open globe injuries group 41% had Zone I, 24 % had Zone II injuries and 35 % had Zone III injuries.Among the closed globe injuries 70 % had Zone I, 21 % had Zone II and 9 % had Zone III injuries.*
Conclusion: *It is important for the doctor first examining the patient to accurately record visual acuity as it is used in calculating the OTS which is of prognostic value. Wearing protective polycarbonate eyewear should be enforced by employers where employees are at risk.*
Keywords: *Ocular trauma, OTS, BETTS*

I. Introduction

The eyes are the third most common organ affected by injuries after the hands and feet.[1] In statistical terms the eyes comprise only 0.1% of the total body surface& 0.27% of the anterior body surface.[1] However since ocular injuries can cause loss of career, major lifestyle changes, cosmetic disfigurement they have a significant socioeconomic and psychological impact. They are a significant cause of monocular visual impairment.[2,3]

II. Materials & Methods

A prospective study of ocular trauma cases in a tertiary care Centre of the Armed Forces catering to serving personnel, ex-servicemen and their families was done from Jan2015 to Dec 2015. Ocular injury was defined as any injury affecting eye or adnexa.

The patients demographic datawere noted. A complete ophthalmic examination including best corrected visual acuity (with Snellen's chart), slit light examination, fundoscopy, IOP (screening by NCT & Goldman applanation in all cases with borderline or raised IOP) was done. Relevant investigations like USG B scan, CT scan, MRI and VEP were done where indicated.

The ocular injuries were classified using the standardized international classification of ocular trauma, Birmingham Eye Trauma Terminology System (BETTS).[4](Table 1) Closed globe injuries where there was no full thickness wound of the eyewall were further classified as contusions and lamellar lacerations (partial thickness wound of the eyewall). Open globe injuries with full thickness wound of the eyewall were divided into ruptures (inside out mechanism) and lacerations (outside in mechanism).Lacerations further into penetrating (entry wound), perforating (entry and exit wound) and those with retained intraocular foreign body.

Wound location was defined by the Ocular Trauma Classification Group. In Open Globe Injuries Zone I injuries were confined to the cornea, zone II injuries confined to the anterior 5mm of the sclera and zone III injurieswhichinvolved more posterior than 5mm from the limbus. In Closed Group Injuries Zone I the injury was limited to bulbar conjunctiva, sclera, or cornea. Zone II the injury involved structures in the anterior

segment to the posterior lens capsule, including the pars plicata. Zone III the injury involved one or more of the remaining posterior segment structures.[5]

The Ocular Trauma Score (OTS) developed by Kuhn et al was used to assess the severity of injury.[6] It is based on the initial visual acuity and on five anatomical characteristics (rupture, endophthalmitis, perforating injury, retinal detachment, Afferent Pupillary Defect). A numerical value (raw points) is allocated to each of these variables and a total OTS is calculated. The obtained Numerical values related to the OTS variables were converted into OTS categories (Table 2 & 3).

The patients were divided into those that required surgical intervention and those that were managed conservatively. The time between the injury and the surgery was noted. The final visual outcome was compared with the OTS categories and with the time interval between the injury and surgery. In Open & Closed Globe Injuries the Zone of injury was compared with the final visual outcome.

III. Results

A total of 187 eyes of 184 patients were evaluated. 70% (129) were males and 30 % (55) were females. (P< 0.001 chi-square test). The age wise distribution is shown in Graph 1. 55 % (101) patients were from age group 20-40 years. 1.6% (3) patients had bilateral ocular trauma, 53.8 % (99) had right eye and 44.5 % (82) lefteye involvement. There was no significant difference between the incidences of ocular injuries with respect to laterality.Of the total 187 injured eyes of 184 patients 32 % (59) required surgery(Graph 2). 84 % (158) eyes had closed globe injury (Graph 3). Among the causes of trauma domestic injuries were the commonest 40 % (74) followed by sports 23 % (42), work related trauma 21 % (38), road traffic accidents9 % (17). (Graph 4). Childs hand/nail among young mothers, assault in middle aged men and fall in the bathroom among elderly were common causes of domestic injuries. Sports injuries were commonly caused by shuttlecocks, tennis and golf balls. Work related trauma commonly occurred during battery cleaning, soda water factory blasts, grenade blasts, chisel and hammer injuries. 69 % (127) cases reported within 24 hrs of injury, 15 % (27) cases between 24- 48 hrs. 6% (12) cases did not recall when they had the injury.(Graph 5). 60% (112) cases had multiple injuries. The injuries are shown in Table 4. Subconjuntivalhaemorrhagewas the commonest injury in 16.5 %(31 cases) followed by conjunctival laceration in 13.9 % (26), hyphaema 13.3 %(25), corneal abrasion 12.8%(24), corneal foreign body 11.7%(22), traumatic mydriasis 10.6 %(20), cataract 10.1 % (19) and lens subluxation 8.5% (16).

Among the open globe injuries 41 % (12 cases) had Zone I, 24 % (7 eyes) had Zone II and35 % (10 eyes) had Zone III injuries. (Graph 6). Among the closed globe injuries 70 % (110 cases) had Zone I injuries,21 % (33 eyes) had Zone II and 9 % (15 eyes) had Zone III injuries. (Graph 7).

To grade the severity of injury the ocular trauma score was assigned. 4 % (7 eyes), 11 % (20 eyes), 19 % (35 eyes), 17 % (33 eyes), 49 % (92 eyes) had OTS Category 1, 2, 3, 4, 5 respectively. (Graph 8).

IV. Discussion

There were 70% males compared to studies by Desai et al[7] (1996), Cillino et al[8] (2008), Pandita et al[9](2012) , Emem et al[10] (2012) who had 83 %, 84.6 %, 74% , 61.4% respectively. 55 % patients were from age group 20-40 years(mean age 32yrs) compared to 21-50 years (63.1%) by Emem et al[10]; 33 yrs mean age by Cillino et al[8] (2008); 35.5 yrs mean age by Pandita et al[9]..

In our study 69 % cases reported within 24 hrs of injury, 15 % cases between 24- 48 hrs. 6 % cases did not recall when they had the injury. In a study by Emem et al[10] 18.6% of the trauma cases reported within 24 hrs of injury, 39.1% within one week , 22.2% reported between one week and one month, 13.2% after one month, 4% did not recall when they had the injury. In a study by Qi Y et al[11] (2015) 83.6 % cases reported within 24 hours of injury. The wide variation between different studies maybe because of difference in medical facilities and patient literacy in various area where the studies were carried out. In our study the patients from rural areas and those army personnel deployed in far flung areas reported late.84 % had closed globe injury and 16 % had open globe injury. In a study by Qi Y et al[11] (2015) on hospitalized cases of ocular trauma 15.7% had closed globe injuries and 76.9 % open globe injuries.Soliman et al[12] (2008) reported 19.6 % closed globe injuries and 80.4 % open globe injuries. This variation is because our study included out patients. Pandita et al[9](2012)reported 69.1 % closed globe injuries and 30.9 % open globe injuries.

In this study 32 % required surgery compared to 77 % by May et al.[13]In our study domestic injuries were the commonest 40 % followed by sports 23 % , work related trauma 21 % , road traffic accidents 9 %. Desai et al[7](1996) reported the home as the most common place for a serious injury to occur (30.2%), followed by the workplace (19.6%) and a sports or leisure facility (15.8%).In a study by Emem et al[10] the most common causes of injury was assault (62.2%) followed by RTA (20.5Qi Y et al[11] (2015) reported fireworkrelated (24.5%),RTA (24.2%), related (15.0%) as the commonest causes. The wide variation in the causes of injury maybe due to the patient profile selected in various studies. In our study the cases were defence personnel,ex-servicemen and their families.

The limitations of this study is the small sample size. The high rate of blast injuries in our study is because patients being form the Armed Forces show a different pattern of trauma from the normal population. The line of duty and training exposes personnel from Armed Forces to a higher degree of ocular injuries. Many of them employ explosives of various types both during training and operations.

V. Conclusion

In all cases of ocular trauma it is important for the doctor first examining the patient to accurately record visual acuity as it is used in calculating the OTS.Wearing protective polycarbonate eyewear will minimize sports and work related injuries.[14,15]It is imperative that individuals who are involved in handling machine tools, chemicals, bottles and allied activities must wear protective eyewear. Professionals who are handling people in such activities need to pay heed to this very important aspect.

Table 1

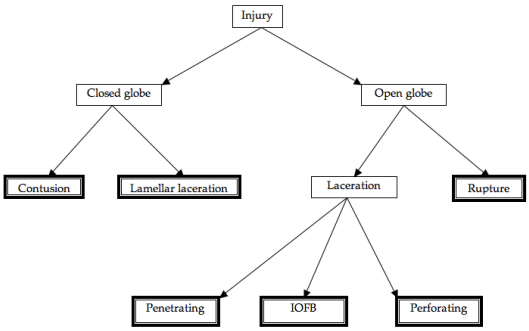


Table 2 Calculation of the OTS

	Initial visual factor Raw points	Raw points
A	Initial visual acuity category	
	NLP	60
	LP to HM	70
	1/200 to 19/200	80
	20/200 to 20/50	90
	≥20/40	100
B	Globe rupture	-23
C	Endophthalmitis	-17
D	Perforating Injury	-14
E	Retinal Detachment	-11
F	Afferent pupillary defect	-10

Table 3 Calculation of OTS Category

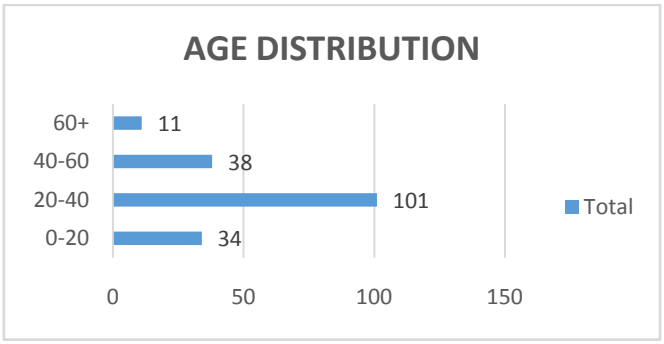
OTS Score	Category
0-44	1
45-65	2
66-80	3
81-91	4
92-100	5

Table 4

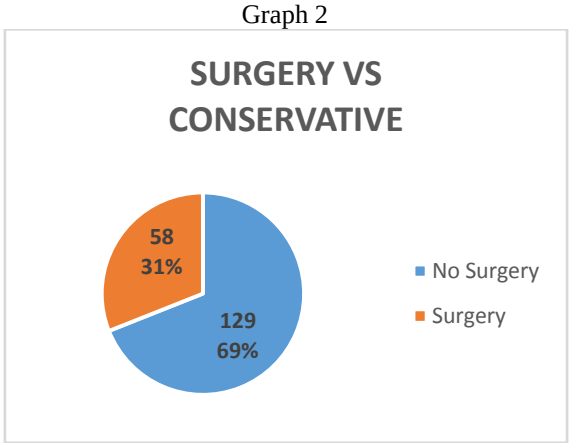
INJURIES	NO	%
Lid Laceration	24	12.8
Lid Avulsion	1	0.5
Ecchymosis	17	9
Corneal Foreign Body	22	11.7
Corneal abrasion	24	12.8
Conjunctival laceration	26	13.9
Subconjunctival haemorrhage	31	16.5
Corneal laceration	17	9
Scleral laceration	11	5.8
Hyphaema	25	13.3
Traumatic mydriasis	20	10.6
Angle recession	13	6.9
Cataract	19	10.1

Lens Dislocation/sub	16	8.5
Dislocated IOL	5	2.6
Macular oedema	4	2.1
Vitreous haemorrhage	9	4.8
IOFB	4	2.1
Retinal haemorrhages	4	2.1
Retinal Tear	2	1
Retinal Detachment	2	1
Choroidal rupture	2	1
Secondary Glaucoma	3	1.6
Traumatic Optic Neuropathy	7	3.7
Cranial Nerve Palsies	3	1.6
Blow out fracture	6	3.2
Chemical Injury	5	2.6

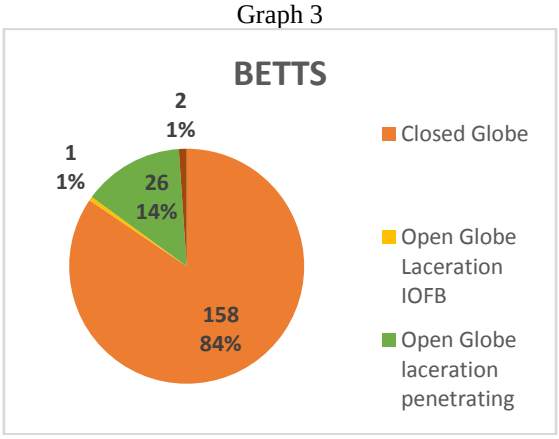
Graph 1



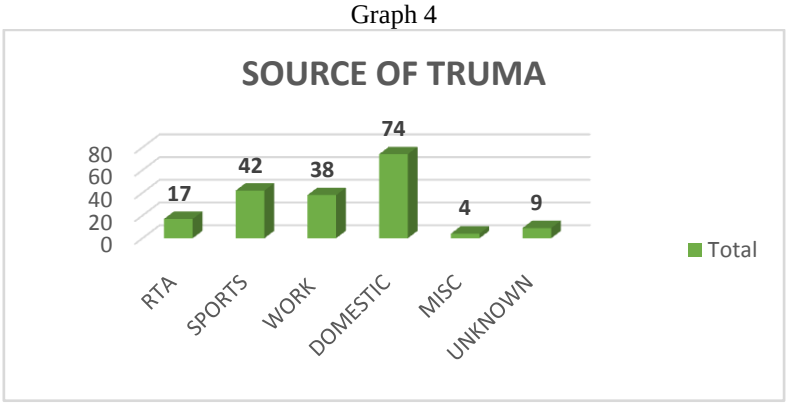
Graph 2



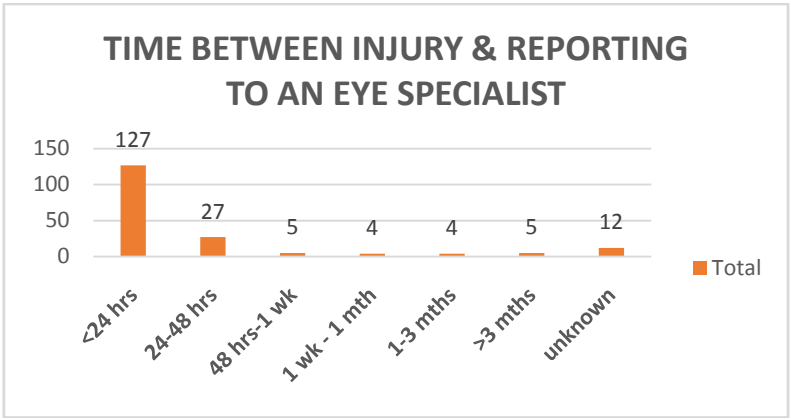
Graph 3



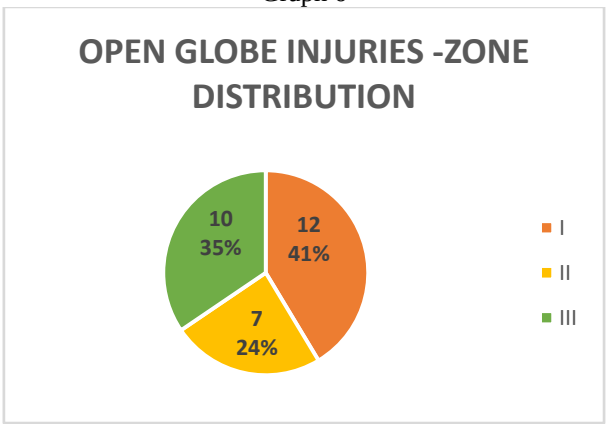
Graph 4



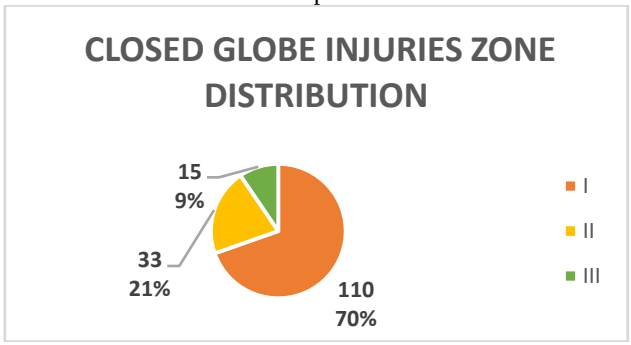
Graph 5



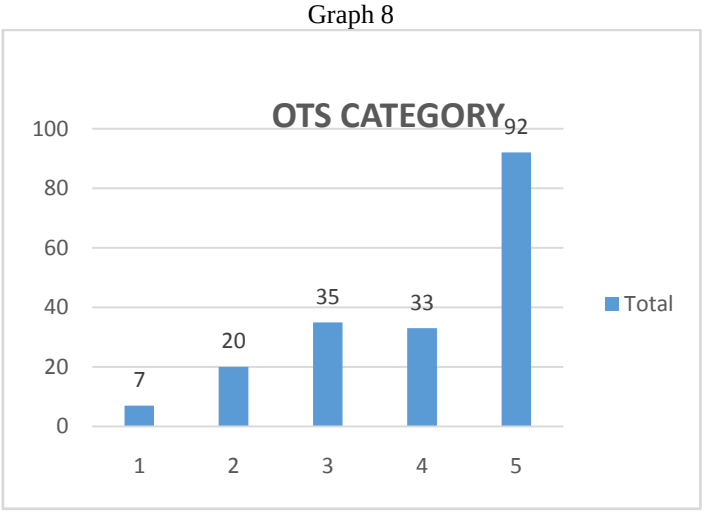
Graph 6



Graph 7



Graph 8



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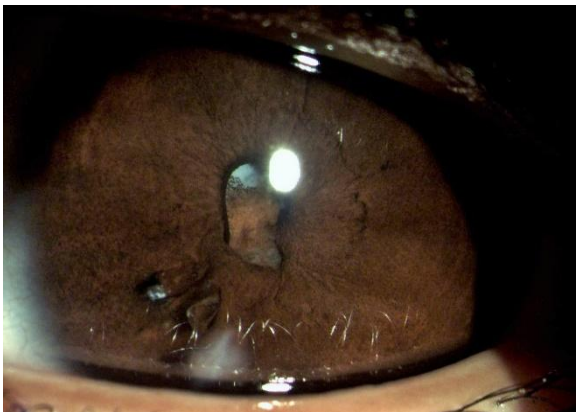

Figure 1 Intraocular Foreign Body

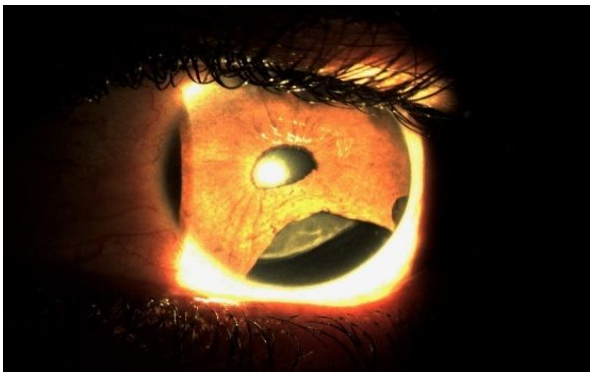

Figure 2Iridodialysis with ectopialentis

Figure 3 Choroidal tear