

Original Article**A 5 year retrospective study of ocular traumas requiring surgical intervention: a tertiary hospital experience**

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ABSTRACT

Background: Ocular trauma is known as a major cause of visual morbidity leading to diminished quality of life. The classification of ocular trauma used in our study is based on the Birmingham Eye Trauma Terminology. Many of such injuries need surgical management ranging from simple eyebrow laceration to a badly traumatised eye.

Aim: The study was aimed to find out the epidemiological pattern of various ocular traumas requiring surgical intervention in a tertiary care hospital.

Material and Methods: A retrospective study was conducted in ophthalmology department of Shri M. P. Shah Government Medical College, Jamnagar, and Gujarat. The data of surgery performed in ocular injury cases, over a period of 5 years (Jan 2007 – Dec 2011) was collected from the Operation Theatre (O.T.) records. The data was compiled and analysed under various headings to conclude on the epidemiological pattern of the injury.

Result: Total cataract surgeries performed were 47.79% and total ocular trauma cases needing surgical intervention were 42.85%. Incidence of closed globe injuries (CGI) was 95% and open globe injuries (OGI) were 5% with male preponderance. The age most prone for CGI is 0-10 years and OGI showed a bimodal peak.

Conclusion: The study shows that the incidence of ocular trauma needing surgical management is equivalent to cataract surgeries being performed. This hereby implies the high incidence of ocular injuries due to various causes in various age groups. Therefore there is a pressing need to take the required safety precautions for eye care at individual and mass level.

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

INTRODUCTION

Ocular trauma was once described as 'neglected disorder', but now it is known as a major cause of visual morbidity [1] leading to visual loss or impairment and diminished quality of life [2]. There are approximately 1.6 million people who get blind and 2.3 million people who get bilateral visual impairment due to eye injuries. Globally there are 19 million people who suffer unilateral visual loss due to ocular injuries, thus ocular trauma is the commonest cause of unilateral blindness at present [1,2].

According to the WHO's Blindness Data Bank, it is estimated that globally about 55 million eye injuries occur each year which restrict activity

for more than one day. 750,000 cases due to eye injury require hospitalization each year, out of which approximately 200,000 are due to open-globe injuries [2].

Ocular injuries have wide spectrum ranging from mild conjunctival haemorrhage to severe orbital fractures [3]. The classifications of ocular trauma used in our study is based on the Birmingham Eye Trauma Terminology [4,5]. We have also included the injuries of the ocular adnexa like the deep lid lacerations as they require surgical intervention like suturing or oculoplasty [6].

Table A: Various Ocular Trauma Terminologies [4]

Term	Definition	Comment
Closed globe injury (CGI)	No full-thickness wound of eye wall	The cornea and the sclera are not breached through and through
Open globe injury (OGI)	Full-thickness wound of the eye wall	The cornea and/or sclera is breached through and through
Contusion	No wound of the eye wall	The damage may be due to direct energy delivery/shock wave by the object (e.g., choroidal rupture), or to changes in the shape of the globe (e.g.- angle recession)
Lamellar laceration	Partial-thickness wound of the eye wall	The wound in the eye wall is not "through" but "into"
Rupture	Full-thickness wound of the eye wall, caused by a large blunt object	Since the eye is filled with incompressible liquid, the impact results in instant IOP elevation. The eye wall yields at its weakest point (rarely at the impact site, rather, for instance, along an old cataract wound); the actual wound is produced by an inside-out mechanism, and tissue prolapse is almost unavoidable
Laceration	Full-thickness wound of the eye wall, caused by a sharp object	The wound is at the impact site and is created by an outside-in mechanism; since IOP elevation is unavoidable, tissue prolapse is common
Penetrating injury	An entrance wound is present	If more than one wound is present, each must have been caused by a different object
IOFB	One or more foreign objects are present	Technically a penetrating injury, but grouped separately because of different clinical implications (management, prognosis)
Perforating injury	Both an entrance and an exit wound are present	The two wounds caused by the same agent

As eye is one of the most sensitive part of the body [7], even the most minor injuries can cause pain and discomfort, thereby requiring ophthalmic consultation [8]. Though lid lacerations may not cause any visual impairment but they require surgical intervention and even hospital stay in some cases. So, apart from the impact on the affected individuals, there are profound social implications of these injuries amounting to the loss in productivity of young men and requirement of rehabilitation by the elderly [1]. This results in adverse impact on economy not only due to loss in wages but also due to add on health care expenses [2].

Jamnagar is a city having varied industrial profile [9]; therefore the tertiary care hospital here experiences a variety of ocular injuries needing the emergency management, either surgical or medical.

It's seen that developing countries carry the largest burden of ocular injuries, yet are the least able to afford the costs [1]. As most ocular injuries and their complications can be prevented by appropriate safety precautions and early detection [2] it becomes essential to identify the various ocular injuries and their causative factors.

The study was aimed to find out the epidemiological pattern of various ocular injuries requiring surgical intervention in a tertiary care hospital. The objective behind this aim was to identify the pattern of the ocular injuries so as to plan and implement better strategies for prevention of ocular trauma and eye care.

MATERIAL AND METHOD

A retrospective study was conducted in ophthalmology department of Shri M. P. Shah Government Medical College, Jamnagar, Gujarat. The data of surgery performed in ocular injury cases, over a period of 5 years (Jan 2007 – Dec 2011) was collected from the O.T. records. Based on these records the ocular injuries were categorized as CLW (Contused lacerated wound) of various ocular regions, conjunctival and corneal lacerations, corneal perforations, scleral perforation etc. The data of total operations performed, total cataract surgeries performed, total ocular injuries repaired and other surgeries like keratoplasty, oculoplasty etc performed during the same period was also recorded. Along with the specified OT data, a data of total patients examined in OPD during the same period was noted consecutively. The data of surgeries performed was collected on monthly basis and the breakup of age & gender was done simultaneously.

The data collected was compiled under various headings and analysed to derive various conclusions on the epidemiological pattern of such injuries under following categories – i) out of total ocular surgeries performed the incidence of ocular injuries requiring surgical intervention, ii) gender more prone, iii) age more prone, iv) most common ocular trauma needing surgical intervention, v) part of eye most prone to injury.

RESULT

As per the 5 years data collected (Table 1) the total cataract surgeries performed were 47.79% and total cases of ocular trauma needing surgical

Table 1: Ophthalmic surgery profile

Year	Total OPD	Total No. of Surgeries	Total No. of Cataract surgeries (%)	Total No. of Ocular injury surgeries (%)
2011	32665	1491	693 (46.47)	706 (47.35)
2010	29670	1483	630 (42.48)	732 (49.35)
2009	29757	1268	663 (52.28)	459 (36.19)
2008	27928	1285	614 (47.78)	494 (38.44)
2007	32492	1401	711 (50.74)	578 (41.25)
Total	152512	6928	3311 (47.79)	2969 (42.85)

management were 42.85%. In the year 2010 the incidence of ocular trauma surgeries was more than the cataract surgeries. Whereas in the year 2011 ocular trauma surgeries and cataract surgeries were around 47%.

Table 2: Incidence of Various Ocular Perforations (OGI) with regard to other Ocular Injuries (CGI)

Year	Ocular Injuries	Ocular Perforations	Total
2007	549	29	578
2008	473	21	494
2009	436	23	459
2010	698	34	732
2011	666	40	706
Grand Total	2822	147	2969

The number of ocular injuries cases like contused lacerated wound (CLW) of the eyebrow and lid, injury to the punctum, conjunctival tear and hyphaema which needed surgical management are more as compared to the ocular perforations which included corneal perforation, scleral perforation, corneoscleral perforation and badly traumatized eye.

Most common ocular injury which needed surgical management was CLW of the eyebrow followed by the CLW of the eyelid. The third most common injury was corneal perforation followed by corneoscleral perforation, conjunctival tear and scleral perforation respectively. Other injuries like badly traumatised eye, injury to the punctum and hyphaema had lesser incidence.

As per table IV and V, ocular injuries were more common in age group of 0-10 years followed by 11-20 years. The age group of 21-30 years had third highest incidence of ocular injury whereas this age group was most affected in the cases of ocular perforation. Second age group most commonly affected by ocular perforation was of 0-10 years.

In both ocular injury and ocular perforation cases, males were more prone for the trauma as compared to the females of the same age group.

DISCUSSION

Table 3: Year wise incidence of various injuries which required surgical intervention

Year	Different types of Injuries									Total
	Other Ocular Injuries (CGI)					Ocular Perforation (OGI)				
	EB-CLW	L-CLW	P-Inj	C-TEAR	Hy.	K-Per	Scl-Per	K.Scl-Per	BTE	
2007	331	210	1	5	2	13	6	8	2	578
2008	323	141	1	6	2	7	2	7	5	494
2009	283	145	3	4	1	16	1	4	2	459
2010	419	273	1	4	1	21	6	6	1	732
2011	412	247	2	3	2	32	3	3	2	706
Total	1768	1016	8	22	8	89	18	28	12	
				2822				147		2969

EB-CLW: Eye Brow Contused Lacerated Wound; L-CLW: Lid Contused Lacerated Wound
P-Inj: Punctal Injury; C-TEAR: Conjunctival Tear; Hy: Hyphaema; K-Per: Corneal Perforation
Scl-Per: Scleral Perforation; K.Scl-Per: Corneoscleral Perforation;
BTE: Badly Traumatized Eye; CGI: closed globe injuries; OGI: open globe injuries.

Table 4: Age wise Gender Incidence of Ocular Injuries (closed globe injuries)

Age group	Year										Total
	2007		2008		2009		2010		2011		
	M	F	M	F	M	F	M	F	M	F	
0-10	66	44	70	33	71	40	105	57	103	51	640
11-20	69	49	76	31	54	48	97	59	95	56	634
21-30	77	38	74	28	44	26	86	51	87	45	556
31-40	62	26	47	20	41	22	61	41	63	30	413
41-50	40	15	25	10	23	19	52	24	49	20	277
51-60	27	13	18	12	18	12	30	13	31	11	185
61-70	10	9	16	5	7	6	12	2	10	5	82
>70	1	3	8	0	3	2	7	1	6	4	35
Total	352	197	334	139	261	175	450	248	444	222	
Grand Total		549		473		436		698		666	2822

Total Males =1841, Total Females = 981; M:F = 1.88:1

Out of many causes of blindness, there are some causes like cataract, ocular trauma which are preventable by surgery[10]. Our retrospective records of 5 years showed that there is not much difference in the number of surgeries for cataract and ocular injury, both amounting to 47.8% and 42.9% respectively. In the year 2010 the ocular injury cases numbered to be 49.3% and cataract surgeries amounted to 42.5% and in

the year 2011 both surgeries were almost similar in total number i.e. around 47%. Otherwise surgeries performed for cataract are little more in comparison to the surgeries performed for ocular injuries.

The data obtained from the ophthalmic OT records for 5 years showed that in ocular trauma cases which required surgical management, ocular

Table 5: Age wise Gender Incidence of Ocular Perforation (open globe injuries)

Age group	Year										Total
	2007		2008		2009		2010		2011		
	M	F	M	F	M	F	M	F	M	F	
0-10	10	1	5	0	6	1	4	4	7	3	41
11-20	5	1	3	0	2	1	2	4	7	2	27
21-30	6	1	7	2	6	1	6	3	9	4	45
31-40	2	1	0	0	1	1	4	0	3	2	14
41-50	1	0	2	0	0	1	5	1	1	1	12
51-60	1	0	2	0	1	0	0	0	0	0	4
61-70	0	0	0	0	1	0	0	0	1	0	2
>70	0	0	0	0	1	0	0	1	0	0	2
Total	25	4	19	2	18	5	21	13	28	12	147
Grand Total	29		21		23		34		40		

Total Males =111, Total Females = 36, M : F = 3.08:1

injuries like lacerations of ocular adnexa and closed globe injuries (CGI) were more 95% (n= 2822), in comparison to open globe injuries (OGI) like perforation 5% (n=147). The ratio of CGI to OGI being 19.2:1 in our study which is in contrast to the study of El-Mekawey et al [8] which has higher incidence of open globe injuries. Whereas our study had consistent findings with the study of Subudhi B N R et al i.e. the incidence of CGI is higher than OGI [11].

The most common site for CLW was eyebrow (59.5%). This site appears to be more common as it is situated at the superior orbital rim which is most prominent and offers anatomical protection to the eyes[12]. The second most common site prone to injury was CLW of eyelids (34.2%) followed by corneal perforation (2.9%). If we consider open globe injury, cornea is most prone for perforation. Similar findings are reported in study of Guerra García et al [13]. Other common injuries which follow in frequency respectively are corneoscleral perforation, conjunctival tear, scleral perforation and badly traumatised eye. Injury to the punctum and hyphaema (exclusive i.e. Not associated with any perforation) requiring surgical management had comparatively less incidence.

As seen in various studies like tehmina et al [2], Balaghafari Azita et al [14] and El-Mekawey et al [8] our study also showed male preponderance with male female ratio being 1.88:1 for CGI and 3.08:1 for OGI. The study of tehmina et al [2] showed M:F to be 3:1 and El-Mekawey et al [8] showed M:F to be 2:1. The age group more prone to CGI in our study was 0-10 years followed by 11-20 years. This could be as children and youngsters are exposed to injury like CLW while playing or outdoor sports. In OGI there was bimodal peak wherein the age group which had highest incidence was 21-30 years followed by 0-10 years. Our findings were in accordance with the study of El-Mekawey et al [8]. The reason for OGI being more common in the age group of 21-30 could be occupational injuries, vehicular accidents, drug abuse etc [8].

CONCLUSION

The study shows that the incidence of ocular trauma needing surgical intervention is equivalent to cataract surgeries being performed at this tertiary care hospital; which hereby implies the high incidence of ocular injuries. As ocular trauma not only causes severe visual loss in some cases, it also causes profound emotional trauma

to all the patients and their families since the treatment is not only time consuming but also expensive [15]. Knowing the high magnitude of the problem and the morbidity associated with such ocular injuries it is advisable to generate awareness for implementation of better preventive eye care measures at personal level and at mass level.

ACKNOWLEDGMENT

Our sincere thanks to Ramaben K. Dudhrechia, O.T. Incharge, Eye Department, Shri M. P. Shah Medical College, Jamnagar, Gujarat.

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Date of Submission: 16/11/13

Date of Acceptance: 17/12/13

How to cite this article: Dass R, Vasava IG, Gohel DJ. A 5 year retrospective study of ocular traumas requiring surgical intervention: a tertiary hospital experience. J Res Med Den Sci 2013;1(2):40-45

Source of Support: None
Conflict of Interest: None Declared