

A CLINICAL STUDY OF OCULAR TRAUMA

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ABSTRACT

AIM

This study is designed to enumerate various causes of ocular trauma, clinical spectrum of presentation and to evaluate the visual outcome after appropriate management.

MATERIALS AND METHODS

A prospective study was conducted on total of 136 patients from the places in and around Kakinada, East Godavari District of Andhra Pradesh, India. A detailed work up of all patients including slit lamp biomicroscopy, direct, indirect ophthalmoscopy and ultra sonography B scan was done.

RESULTS

Observations from the study were analyzed, discussed and compared with the existing studies in the literature. Mean age group of patients belong to young adults between 20-30 years (57.9%), males (81%) affected more than females. Illiterates, Agricultural labourers, Industrial workers affected more. Road Traffic Accidents (25.73%), industrial injuries (22.05%) and agricultural hazards (19.11%) being the major cause of unilateral eye injury. Closed globe injuries (80.88%) more common than Open globe injuries (19.12%).

CONCLUSIONS

Ophthalmic injuries due to innumerable causes results in various types of ocular trauma, leading to untold misery, visual impairment and economic burden to the family, society and country as a whole. Health education regarding use of preventive measures, seeking early treatment and appropriate rehabilitation are very much recommended to reduce the burden of morbidity due to ocular trauma.

KEYWORDS

Ocular Trauma, Visual Impairment, Blindness, Ocular Morbidity.

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INTRODUCTION: Ocular trauma is an important cause of visual loss and disability. A prospective study was conducted on all the patients attending our Ophthalmology Department at GGH, Kakinada from October 2012 to September 2014 with a primary diagnosis of ocular trauma.

MATERIALS AND METHODS: A prospective study was conducted on all the patients attending our Ophthalmology Department at GGH, Kakinada from October 2012 to September 2014 with a primary diagnosis of ocular trauma, which included a total of 136 patients from the places in and around Kakinada. A complete history of the mishap, its nature and place of injury were recorded.

Information on whether the patient was using any protective eye wear at the time of injury and whether he was intoxicated at the time of injury was collected using structured questionnaire.

A detailed work up of all patients including slit lamp bio microscopy, direct and indirect ophthalmoscopy was done.

B Scan ultrasonography was done where media prevented fundus evaluation.

Intra ocular pressure was recorded in all closed globe injuries, gonioscopy was done in closed globe injuries.¹

The trauma cases were classified based on standardized Birmingham Eye Trauma Terminology (BETT), which was endorsed by American Academy Of Ophthalmology, International Society of ocular trauma, World Eye injury Registry and the Vitreous and Retina societies.

The cases were managed on the basis of the guidelines given by Eye Trauma Society, while some cases were referred to higher centers for further management. The visual outcome was recorded at the time of discharge.

The cases were followed up and findings (complications) were recorded.

A record of pre and post treatment, clinical photographs of the patients is maintained.

The results thus obtained are analyzed, discussed and compared with the existing studies in the literature.

RESULTS: A prospective study of ocular trauma cases, total number of 141 eyes of 136 patients attended to out patients department of ophthalmology. Government General Hospital, Rangaraya Medical College, Kakinada, East

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Godavari District of Andhra Pradesh, India, were examined thoroughly. Analysis of the observations was done with regards to Age and Sex distribution, Laterality of the eye, Occupation of the person, place and type of injury, Aetiology and Anatomical location, Visual Acuity at the time of presentation and final visual outcome after appropriate management and Complications following Ocular Trauma. The observations presented in tables as follows:

Age group	No. of cases	%
0-10	10	7.4%
11-20	21	15.4%
21-30	41	30.1%
31-40	31	27.8%
41-50	18	13.2%
51-60	15	11.00%
Total	136	100%

Table 1: Age Incidence of ocular trauma

Observation: The above table depicts the age structure of the present sample. The maximum affected age group is 3rd decade, which is the major working group of the society followed by 4th and 2th decade. The mean age group that is most affected being 30 years.

Gender	No. of cases	%
Male	111	81.6%
Female	25	18.7%
Total	136	100%

Table 2: Sex incidence of ocular trauma

Observation: The gender distribution of the current sample clearly shows a male preponderance with 111 of 136 cases affecting the male population.

Eye involved	No. of cases	%
Unilateral	131	96.3%
RE	86	63.2%
LE	45	30.08%
Bilateral	5	3.67%
Total	136	

Table 3: Laterality of involvement

Observation: Unilateral involvement in majority of the cases studied with maximum involvement of right eye than left eye. Only 5 of 136 had a bilateral involvement.

Occupation	No. of cases	%
Farmer	30	23.96%
Labourer	25	17.35%
Quarry worker	7	4.95%
Student	25	17.35%
House wife	20	16.52%
Others	29	23.10%

Table 4: Occupation of the injured

Observation: Agricultural labourers are proven to be the most vulnerable group affected by ocular trauma in the

present study. This is followed by industrial suggesting increasing incidence of trauma at work place.

Place	No. of cases	%
RTA	35	25.73%
Farm	30	22.05%
Industrial	26	19.11%
Home	20	14.70%
sports	19	13.97%
School	6	4.41%

Table 5: Place and cause of injury

Observation: In the current study, maximum no. of trauma cases occurred due to road traffic accidents which is followed by work places either farms or industrial places.

Type of Injury	No. of cases	%
Open globe Injury	26	19.11%
Closed globe Injury	110	80.88%

Table 6: Based to thickness of eye wall defect

Observation: The current sample shows a high incidence of closed globe injures than open globe injuries.

Type of injury	No. of cases	%
Eyelid injuries	53	48.18%
Conveal foreign body	23	20.90%
Traumatic hyphema	15	13.63%
Traumatic cataract	15	13.63%
Traumatic vitreous haemorrhage	11	8.08%
Traumatic mydriasis with macular oedema	10	7.35%
Conjunctival laceration	5	4.54%
Orbital fractures	4	3.63%
Total	110	

Table 7: Closed globe injuries

Observation: The above table clearly depicts that of the closed globe injuries the maximum no. of cases are eyelid injuries that are followed by subconjunctival haemorrhage and they carry a very good prognosis. There are also few cases of traumatic cataract, hyphaemia and vitreous haemorrhage, which carry a guarded prognosis.

B. Anatomical location of closed globe Injuries

Zone	Location	No. of cases	%
I	Conjunctiva	40	36.36%
	Sclera	2	2.06%
	Cornea	20	18.18%
II	AC	11	10%
	Iris	4	3.63%
	Pupil	2	2.06%
	Lens	17	15.45%

III	Ciliary body	-	-
	Choroid	2	2.06%
	Vitreous	6	4.41%
	Retina	6	4.41%

C. Visual acuity at the time of presentation

Vision	No. of cases	%
6/6-6/12	55	50%
6/18-6/36	40	36.36%
6/60 CFL ml	6	5.45%
<CFL ml-PL+	3	3.63
NO PL	1	0.90%
Total	110	

Observation: The above table indicates that majority of closed globe injuries have a good visual potential with nearly half of the cases studied had vision ranging from 6/6 - 6/12. While 4% of cases had poor vision at presentation and NOPL 0.90%.

Type of injury	No. of cases	Percentage
Rupture	-	-
Simple Penetration	23	88.46%
Perforation	-	-
IOFB with Penetration	3	11.53%
Total	26	100%

Table 8: Open globe injuries

Observation: In the present study, 11.53% of open globe injuries are of retained intraocular foreign bodies.

B. Zone of involvement:

Zone	No. of cases	%
I	20	76.92%
II	4	15.38%
III	2	7.69%
Total	26	

Observation: In the present study, 76.92% of open Globe injuries were of zone I followed by 15.38% of Zone II open globe injuries and the rest 7.69% were zone III open globe injuries.

C. Visual Acuity at the time of presentation of open globe injuries:

Vision	No. of cases	%
<CF 1mt-PL+	16	61.53%
6/60-CF1mt	4	15.38%
NO PL	4	15.38%
6/18-6/36	2	7.69%
6/6-6/12	-	-
Total	26	100%

Observation: In contrast to the closed globe injuries, open globe injuries had a poor vision at presentation with 61.53% of cases having vision in a range of <CF 1mt to PL+ and 15.38% has to light perception.

Type of injury	No. of cases	%
RTA	35	25.73%
Agricultural	30	22.05%
Industrial	28	20.58%
Domestic	24	17.64%
Sports	19	13.97%

Table 9: Based on aetiology of ocular trauma

The above table depicts that RTA is the most common cause of ocular injuries followed by agricultural type.

Vision	No. of cases	%
6/6 - 6/9	60	44.11%
6/60-CF1mt	22	16.17%
NO PL	16	11.76%
6/24-6/36	11	8.08%
<CFI mt - PL+	11	8.08%
6/12-6/18	10	7.35%

Table 10: FINAL VISUAL OUTCOME

Observation: Different levels of visual impairment is noted. 44.11% sample had a good final visual outcome, 24.25% had a significant visual loss with 11.76 % having complete visual loss.

W.H.O	Visual Acuity	NPCB-India	No. of cases	%
Visual impairment	<6/18 to 6/60	Low vision	11	8.088%
Severe visual impairment	<6/60 to 3/60	Economic blindness	12	8.82%
Blindness	<3/60 to CF 1mt	Social blindness	10	7.35%
Blindness	<CF 1mt to PL+	Manifest blindness	11	8.088%
Blindness	NO PL	Absolute blindness	16	11.76%

Table 11: Categorization of patients based on final visual outcome (using blindness definition by WHO & NPCB)

Observation: This table clearly depicts that significant number of ocular trauma cases 11.76% are becoming absolutely blind followed by some cases of economic blindness and manifest blindness.

Complication	No. of cases	%
Corneal opacity	26	19.11%
Traumatic Cataract	15	11.01%
Retinal detachment	5	3.67%
Uveitis	5	3.67%

Pthisis bulbi	3	2.20%
PVD	2	1.47%
Endophthalmitis	1	0.73%
Subluxation of lens	1	0.73%

Table 12: Complications following Ocular Trauma

Observation: The most common complication noted is corneal opacity, followed cataract and uveitis. A significant number of cases had become phthisical.

DISCUSSION: Ocular trauma is an important cause of blindness and ocular morbidity most previous studies on the profile and prognostic factors in ocular trauma have been carried out in more developed countries where modern facilities for managing ocular trauma are available. There is paucity of studies on the profile of ocular trauma from less developed countries.

There is lack of published information on the causes of ocular trauma region wise. Hence this study is designed to enumerate various causes of ocular trauma, its management, complications and visual outcome in the cases attending GGH, Kakinada town of Andhra Pradesh.

With this backdrop, the results of the present study are analyzed and discussed in the light of available literature.

Age and Gender Distribution: Govind Singh Tityal et al (2013)² in their study noted 76.01% are males and 23.99% are females with ocular injury. S Vats, GVS Murthy et al (2008)³ in their study noted a significantly higher no. of males affected the mean age of incidence is 24.2 yrs. D.N. Prakash et al (2013)⁴ studied a total of 90 cases of whom 65.5% were male. A third of the injuries occurred in the age group of 25 to 40 years. The majority of the trauma resulting in blindness occurs during childhood and young adulthood. (Dandona et al)⁵

In the present study the maximum affected age group range between 21-30 yrs. with 81.6% males and 18.7% females. Males are more engaged in outdoor activities and as they constitute the working population, are more prone for ocular injuries.

Literacy Level of Sample: S. Krishnaiah et al (2006)⁶ found that incidence of ocular trauma was significantly greater among illiterate subjects ($p < 0.001$). Dr D.V Singh et al (2005)⁷ noted that high illiteracy levels in cases of ocular trauma.

In the current study majority of patients are illiterate.

The illiteracy has lead them to lack of awareness about the preventive measures and immediate attention to the ocular injury

Laterality of Involvement: Govind Singh Tityal et al (2013)² noted 43.6% affecting right eye and 50.9% in left eye. Sony Sinha et al⁸ study observed blunt injury (closed globe injury) constitute 62.4%, right eye affected in 68.4 % cases.

In the present study involvement of RE is 63.2%, LE 30.08% and both eyes in 3.67%. Ocular trauma causes a

significant no. of people of productive age group to be unilaterally blind for the rest of their life.

Eye Protection: Avinash Misra et al (2014)⁹ noted 5% wearing eye protection. In this study none of the cases had eye protection.

The sample chosen mostly hails from poor economic background; hence have no awareness regarding use of protective eye wear.

Occupation: Nirmalan, Katz et al¹⁰ noted high no. of cases in labourers. S. Krishnaiah et al⁶ also noted the same.

In the current study agricultural labourers is noted to be the most vulnerable sector.

Place of Injury: Govind Singh Tityal et al (2013)² in their study considered RTA to be the main cause of ocular injury.

In the present study the majority of cases occurred due to road traffic accidents. This is explained by the heavy increase in road traffic in recent years.

Type of Injury: Govind Singh Tityal et al (2013)² noted 77.30% closed globe injuries and 31.90% open globe injuries. D N Prakash et al⁴ noted closed globe injuries were the most common diagnosis made at the presentation (50.01%)

In the present study 80.88% of closed globe and 19.11% of open globe injuries are noted.

Closed Globe Injuries: Of the closed globe injuries noted there are more no. of lid injuries 48.18%. They are mostly associated with subconjunctival haemorrhage which carry good prognosis. Involvement of Zone I is 58% zone 2 is 31% and zone 3 is 15%. The zone 3 cases, which included cases of commotion retinae and vitreous haemorrhage have guarded prognosis.

Avinash Misra et al (2014)⁹ noted 50.63% zone 1 injuries and zone 2 are 30.93% zone 3 are 20.63%.

Open Globe Injuries: Avinash Misra et al (2014)⁹ noted 40.63% Penetrating injuries and 3.92% perforating injuries.

In this study 88.46% penetrating and 11.53% of IOFB are noted. In this study 76.92% of Zone 1 injuries are noted

Visual Acuity: BCVA at presentation in closed globe injuries is 6/6-6/12 in 51.7% while that in open globe injuries less than CF lmt-PL+ in 63.53%. Closed globe injuries though more commonly seen caused less visual morbidity than open globe injuries.

In the present study it is NOPL in 15.38%, CF 4mts-PL+ in 20.2% and more 6/12 in 61.53 %.

Aetiology: Govind Singh Tityal et al (2013)² found RTA more common cause of ocular injury. Avinash Misra et al (2014)⁹ noted 20% RTA 43.63% Agricultural and 37.01% other causes.

In the present study 25.73% RTA, 19.11% industrial and 22.05% of agricultural injuries are noted, a significant no. of sport and domestic injuries are also noted occupational hazards remain the most common cause ocular trauma, consistent with the previous records. Males and those engaged, as labourers are more at risk for trauma.

Final Visual Outcome: Govind Singh Tityal et al (2013)² 40% cases are with good visual outcome and 30.90% are with visual acuity less than 3/60.

In the present study the final visual outcome >6/36 was seen 59.55% and less than CF 5mts in 24.26%. The closed globe injuries confined to zone 1 had a good visual outcome. Those with poor visual outcome were those closed globe injuries with total hyphaema, massive vitreous haemorrhage, vitreous and retinal detachment. In open globe injuries most of the cases had a poor visual outcome due to formation of corneal scars, adherent leucomas & RD

COMPLICATIONS: Avinash Misra et al (2014)⁹ noted 33.3% of traumatic cataracts, 33.33% corneal scars and 8% phthisis.

In the present study anterior segment complications include 19.11% corneal opacities, and 11.76% traumatic cataract.

Among the posterior segment complications retinal detachment 3.67% were found. Significant no. of phthisis were noted.

No case of sympathetic ophthalmitis has been encountered during the study periods. This can be explained by appropriate management and timely administration of steroids, which prove useful in preventing the dreaded complication.

SUMMARY: A comprehensive study of various types of ocular injuries, their management, subsequent complications and prognosis has been undertaken from the 136 cases of ocular injury attending Ophthalmology Department, GGH, Kakinada.

The results obtained from the study is analyzed, discussed and compared with the existing studies in the literature. They are as follows:

Ocular injuries are more common among the male working population in their 2nd to 3rd decade; they are basically illiterate people not aware of the consequences of ocular trauma.

The females are less affected than males as most of them confined to houses do less risky jobs.

The school children playing on the streets with sharp objects like pencils, sticks, gilli danda, cricket etc. are mainly prone to the injury as they are not aware of consequences out of ignorance.

In my study, injuries sustained during RTA, stone crushing at quarries and explosive injuries are more severe leading to blindness.

Closed globe injuries with involvement of adnexa like the lids are more common than the open globe injuries and among the closed globe injuries Zonal injuries are more common than other types carrying a better visual prognosis and a lesser hospital stay.

CONCLUSION: The present study suggests a changing trend of ocular trauma in East Godavari District of Andhra Pradesh.

Ophthalmic injuries due to innumerable causes result and various types of ocular trauma, leading to untold misery, visual impairment and economic burden to the family and the country as a whole.

The sophisticated non-invasive investigative procedures and microsurgical vitreo retinal surgeries have revolutionized the management yet ocular trauma happens to be the leading cause of unilateral blindness in the world.

In this of 136 cases of ocular trauma it was noted that 80.88% of closed globe injuries and 19.11% are open globe injuries. Out of the closed globe injuries it was noted that 48.17% of lid injuries and 3.63% are orbital fractures.

Injuries of cornea and lens have a guarded visual prognosis. Sclero-corneal injuries with vitreous loss have a poor visual outcome.

In the light of the consequences of ocular injuries described earlier the following preventive measures have to be taken. They are:

1. Health education camps in schools.
2. Media propaganda to prevent injuries from fireworks.
3. Emphasizing the need to use protective measures in industrial workers.
4. Check on the vehicle drivers who drive under the influence of alcohol.

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