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IDENTIFICATION OF RISK FACTORS IN CASES OF OCULAR INJURIES

KEYWORDS

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ABSTRACT *Sense of vision, the choicest gift from the Almighty to the humans and other animals, is a complex function of the eyes. Mechanical trauma of the eye can result in serious morphological and functional impact on eye structures. As many as half a million people in the world are blind as a result of ocular injuries. Worldwide interest in ocular trauma is growing since effective techniques for prevention and treatment are currently available. In many studies, particularly in those dealing with epidemiology of eye injuries, the full attention has been given to preventive measures.*

INTRODUCTION

While eye injuries remain a cause for concern, fewer, less severe injuries, due to socio-economic change and effective preventative strategies, combined with modern surgical and medical management have led to an improvement in the over-all outcome in countries that have these means at their disposal. The impact of trauma on a human eye may range from occurrence of minute corneal abrasions, innocuous subconjunctival hemorrhage to a badly lacerated globe. Ocular trauma is a common cause of monocular visual impairment and blindness worldwide, with significant socioeconomic impact. One third to 40% of monocular blindness may be related to ocular trauma.

The role of ocular injuries in causation of blindness has been a subject of immense importance and will remain so because of the rapid industrialization and mechanized farming which is coining up in our country. Commonly mechanical injuries are more common that chemical and thermal injuries, also supported by 92% cases of mechanical injuries compared to only 8% cases of chemical and thermal injuries in referance study. Total blindness (person with less than 6/60 vision) underdeveloped countries, as well as in rural areas, are most frequently caused by injury due to wood, by branch or thorn, while in industrially developed countries they most frequently occur at place of work, sport grounds, or during recreation.

Children are injured more at home or while playing, with blunt or sharp objects. Resources should be mobilized to provide quality ocular emergency care to our rural and illiterate population with emphasis on immediate attention to any ocular trauma. Most of our patients were from low socio-economic status. Electronic and mass media should be used to disseminate ocular trauma related information. Factory workers and others in high-risk jobs should be educated about protective eyewear. Certain legislative directives for protection of laborers and factory workers should be enacted.

Although nowadays we do have powerful drugs and microsurgery has reached unimagined limits, yet prognosis for serious eye injuries is still poor, in general. Eye injuries request long-lasting care, including hospital treatment, a long period of conservative medication, with a possibility of one or repeated surgeries. We therefore decided to carry out a study to identify risk factors for ocular injuries.

AIMS AND OBJECTIVES

To Study risk factors for ocular injuries in 100 cases of ocular trauma. This study aimed at providing epidemiologic data on risk factors for ocular injuries and help in the planning and provision of eye care and safety strategies..

(1) The importance of eye protection, which is probably not fully appreciated by the exposed population in our area, should be emphasized to those at high risk
(2) It was believed that the results of the study would throw light on the risk factors and causes of the ocular injuries and thus help in implementing the preventive measures to reduce the ocular injuries.
(3) Eye care programs targeting high-risk ocular trauma groups may be needed to consider ocular trauma as a priority in eye health awareness strategies to reduce blindness due to trauma.
(4) Community education is an essential part in prevention of ocular injuries, so identification of common risk factors for ocular injuries in community and its education to the community is one of the most effective preventive measures in ocular injuries.

MATERIALS AND METHODS

Study comprises of 100 cases of different category of ocular injuries like blunt, penetrating, perforating, chemical, thermal, electrical and radiational injuries during period of 1 year.

Study Population:

All consecutive patients with ocular injuries seen in the eye unit for the first time were included in the survey. Patients treated elsewhere or on follow-up were excluded from the study.

Data on demographic information, distance, time interval between the injury and presentation for treatment, eye affected, initial and final visual acuities (V/A) were recorded. The demographic data of each patient including address (rural/urban), literacy status, occupation, and financial status were recorded in circumstances of the injury.

Grading of eye injury for extent/severity/typeallow scientific assessment.

Volume : 5 | Issue : 9 | September 2015 | ISSN - 2249-555X

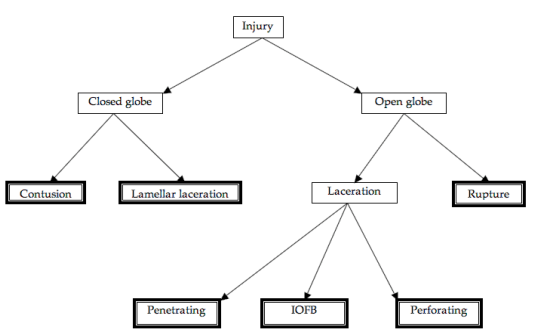
Parameters selected are
1. Category
2. Types
3. Visual acuity
4. Pupil
5. Zone

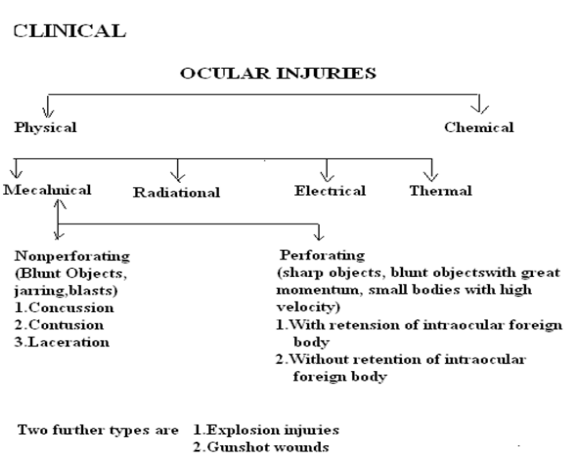
1. Type -as mechanical ocular trauma society classification.
2. Visual acuity-grade
   a,>6/12
   b, 6/12-6/36
   c, 6/36-1/60
   d, 1/60-pl
   e, no pl
3. Pupil RAPD-present
   RAPD-absent
4. Zone open globe injury
   1 cornea+limbus
   2 uo to 5 mm posterior to limbus
   3 > 5 mm posterior to limbus

closed globe injury
1 external
2 anterior segment up to posteriorlens capsule
3 posterior segment (pars plana & posterior)

CLASSIFICATION OF OCULAR INJURIES
THE BIRMINGHAM EYE TRAUMA TERMINOLOGYSYSTEM (BETT)

Fig. 1. BETTS. The double-framed boxes show the diagnoses that are used in clinical practice





AMERICAN OCULAR TRAUMA SOCIETY CLASSIFICATION

(A) Close globe injury
1 contusion
2 lamellar laceration

(B) Open globe injury
1 rupture
2 laceration
   a penetrating injury
   b perforating injury
3 intra ocular foreign body injury

Mechanical ocular trauma ocular trauma society classification,1996

(A) Closed globe injury
Type A - contusion
Type B -lamellar laceration
Type C -superficial foreign body
Type D -mixed

(B) Open globe injury
Type A-
   a,rupture
   b, laceration
Type B- penetrating
Type C- intra ocular foreign body
Type D- perforating
Type E- mixed

Eyes with pre-existing diseases like glaucoma, retinal and macular disorders, operated eyes (injury to previously operated eyes) were excluded from the study.

The literacy was determined on basis of educational status as reported by patients themselves. The detailed ophthalmic work up of all the patients including slit lamp examination, +90D examination and indirect ophthalmoscopy was carried out. Ultrasonography was used whenever unclear media prevented fundus evaluation. Intraocular pressure was measured in all eyes except in fresh open globe injuries. Gonioscopy was done in all closed globe injuries.

In eyes with corneal oedema and or hyphaema gonioscopy was done at next follow up. Complete details of ophthalmic examination including

(1) Initial best corrected visual acuity
(2) Lid or facial injury, sub- conjuctival haemorrhage or laceration
(3) Presence or absence of corneal/scleral perforation, hyphaema, iris injuries and afferent pupillary defect
(4) Presence or absence of vitreous haemorrhage, retinal detachment orforeign body, endophthalmitis, retinal breaks, choroidalrupture and or macular hole were noted.

All the patients were followed up at regular intervals. Standardized Ocular trauma classification described by Pieramiciet al was used to grade all injured eyes at initial examination. Ocular trauma classification variables were tested by univariate and multivariate analysis.

DISCUSSION

Present study deals with 100 cases of ocular injuries. Ocular trauma is an important cause of blindness and ocular morbidity. There is paucity of studies on the profile of ocular trauma from the less developed countries.

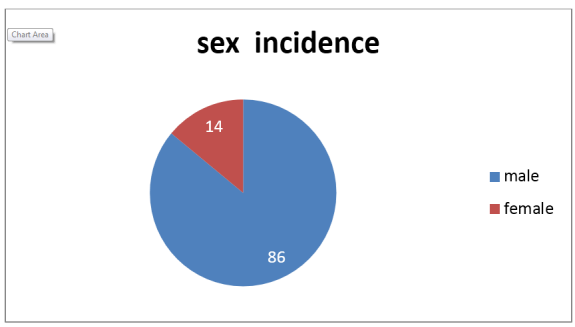
Study on identification of risk factors for ocular injuries can play an important role in identifying the target groups to providing them preventive measures and essential education regarding ocular injuries. Study also provide prognostic information on ocular injuries at the time of presentation, prevent many unnecessary surgical procedure and

Volume : 5 | Issue : 9 | September 2015 | ISSN - 2249-555X

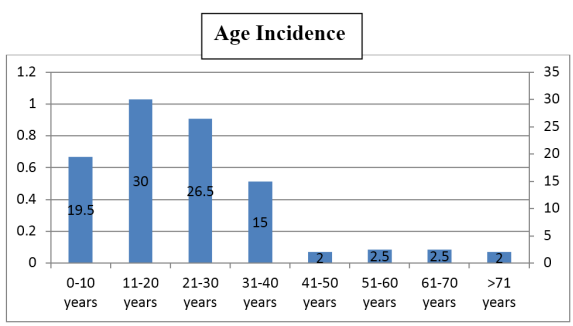
also help surgeons in dealing with ocular trauma in making clinical decisions.

General incidence

In my study males had incidence (86%) compared to the 88.1% male patient in Terrence kwong-weng soon, 88% male patient in D.V. Singh and 83.25%male patient in Shukla.



Out of 100 patients large population was < 25 years of age(65%) compared to 67% in D.V. Singh. Commonest age group for occular injuries in our series was second decade 30% compared to 29.5% Shukla,32% Doshi and33% Olurin.



In our study 76% of population was literate and 42% from rural area compared to 77%literate and 44% from rural area in D.V. Singh .

Nature of object

In our study 24% cases were from occupational injuries compared to 26% D.V. Singh, 29 %Shukla.

The western figures are however much higher in occupational group probably for their advancement in industrial spheres. Praun, Garrow and Duke Elder reported the incidence as high as 70%. In India nonoccupational injuries are more (83.3%) as reported by Malik etal. The usual causes of ocular trauma in previous studies were work related, sports related, articles of common use and road accidents.

In our study ocular injuries were most commonly caused by metallic objects (11%) compared to metallic objects (8.9%) in D. V. SINGH.

High incidence of metallic injuries reflects the high incidence of industrial accidents in the developing areas. Roper Hall, Stevens. Levy and Sorsby found that injury caused while working with hammer and chisel was the commonest cause of perforating injuries especially with retained intraocular foreign bodies.

In our study mechanical injuries constitute 86% of all ocular injuries. Incidence of open globe injuries(55%) and close globe injuries(31%) compared to the open globe(41.44%)and closed globe(26.4%) in D.V. Singh.

TABLE 8 : TYPE OF INJURY

NO	TYPE		NO OF PATIENTS	PERCENTAGE
1	MECHANICAL		86	86
	CLOSE GLOBE	CONCUSSION, BLUNT TRAUNA	31	31
	OPEN GLOBE		55	55
	BLUNT		28	28
	PENETRATING	NO IOFB	22	22
		WITH IOFB	3	3
	PERFORATING	NO IOFB	1	1
		WITH IOFB	1	1
2	CHEMICAL		9	9
		ALKALI	5	
		ACID	4	
3	THERMAL		4	4
4	RADIATIONAL		1	1
5	ELECTICAL		0	0
TOTAL			100	100

MECHANICAL INJURIES

TYPE OF INJURY		ZONE	NO OF CASES
CLOSE GLOBE INJURY	CONCUSSION, BLUNT	1	5
		2	10
		3	16
OPEN GLOBE INJURY	BLUNT	1	10
		2	3
		3	15
	PENTRATINGWITHOUT IOFB	1	18
		2	1
		3	3
	PENETRATING WITH IOFB	1	2
		2	0
		3	1
	PERFOTRATING WITHOUT IOFB	1	0
		2	0
		3	1
	PERFORATING WITH IOFB	1	0
		2	0
		3	1

Table shows that in close globe injury most common affected zone was zone 3. In open globe injury zone 1 is most commonly affected.followed by zone 3. In blunt open globe injury zone 3 is commonly affectedin penetrating and perforating open globe injury zone 1 was commonly affected.

In other comparision study Shukla the incidence of mechanical injury was 94.25% as compared to chemical & thermal injuries which constituted only 4.5% of ocular injuries.

Holland found perforating injuries to be commonest 39.2% followed by contusions 37.6%. Macdonald found perforating injuries in 51.6%, contusions in 41.7% while thermal and chemical injuries were found in 6.7% cases. Malik et al sub reported mechanical injury in 92%, chemical and thermal injury 8%. In his series 45.2% were perforating injuries against mechanical injuries with 3.4% retained intraocular foreign bodies. Olurin reported 56% cases of perforation of globe.

Our study shows that in close globe injury most common affected zone was zone 3.

Volume : 5 | Issue : 9 | September 2015 | ISSN - 2249-555X

In open globe injury zone 1 (52.50%)was most commonly affected compared to the D. V. SINGH in which also zone 1(50.7%) most commonly involved.

Incidence of chemical injuries was 9% in our study.

Incidence of thermal injuries was 4% in our study.

Incidence of radiational injuries was 1% in our study.

Duration of Injury and First Observation
In our study indicate that most of (56%) patients attended medical services within first 5 hours of injury because of marked diminution of vision, pain, redness and other distressing ocular complain comparing to the. Only3% of the patients were able to reach a tertiary carecentre within 48 hours in D. V. SINGH.

Majority of patients attended the hospital within 24 hours after receiving injury. In the our study 66% attended the hospital within 24 hours, comparable to 31.5% in shuklaand 83.1% in Malik et al. The factors responsible for such a sense of resignation are illiteracy, orthodox beliefs and customs, besides long distances.

Structural Involvement
Our analysis shows that the most commonly affected structure of eyeball is cornea (80%),followed by iris and cilliary body(54%) and lens(51%). as cornea is most exposed part of the eyeball cornea is most commonly affected part in all ocular injuries.

According to Malik et al cornea was affected in 55.8% cases while 64% in Shukla[20].

Other structures were involved in following orders. Lids 21.75%, iris and ciliary body 19.25%, lens 10.5%, retina and choroid 5.5% and sclera 2.75%.in Shukla.

Management
In our study 56% were treated with primary surgical repair with or without cataract extraction and intra ocular lens replacement.24.5% of eyes were required secondary surgical intervention in our study including vitreoretinal surgeries. Of all eyes 4% of eye were evicerated. .Intra ocular foreign body was present in10% of patient compared to 31.16% of the open globe injuries in D. V. SINGH.There was significant improvement in vision post treatment.

In ocular injuries commonest complication was corneal opacity(54%)followed by hyphaema (33%) and cataract (31%),

Vitreous haemorrhage as an associated or isolated findingwas present in 29%% of the eye compared to 34.8% in comparison D. V. SINGH.The clinical diagnosis of posttraumatic endophthalmitis was made in 3% of the open globe injuries compared to 20% in comparison study. This complication, which worsens theprognosis, was more common in younger and illiteratepatients from rural background.

The retinal detachment was found in 10% of all cases compared to 11.3% in comparision study. In contrast to endophthalmitis the development of retinal detachment was significantly associated with open globe injuries, larger lacerations (>10mm) and delayed presentation as compared closed globe injuries or smaller lacerations.

Other findings seen in a few patients included macularedema (25%)compared to 40% in D. V. SINGH. In our study 28% of the patients had excellent outcome defined by a visual acuity better than or equal to 6/18 at six months compare to 20.2% in D. V. SINGH.

This study once again emphasizes the importance of classifying and grading ocular injuries. The best-corrected visual acuity and presence of relative afferent papillary defect are strongest predictors of long- term visual outcome. Indirect traumatic rupture of globe carried a poorer prognosis as reported earlier. Disruption of lens removes barrier between anterior and posterior segment, provides culture media for microorganisms and also disturbs the ocular currents and thus prevents clearing of pathogens.

The open globe injuries were significantly more likely to have retinal detachment than closed globe injuries. This can be explained by higher incidence of vitreous disturbance, incarceration and resultant traction in open globe injuries.

CONCLUSION
1. Incidence of ocular injuries was for more common in males(86%) than females. Maximally affected age group was 11-20 years of age (30%) followed by 21-30 years of age (26.5%).
2 Study shows that 76% people are literate that expose to ocular injuries. Of all cases 42% cases were from rural areas and 24 % injuries were occupational .
3 The incidence of mechanical injuries was most common (86%) among all type of injuries. metallic objects were common source of ocular injuries then other objects.
4. Open globe injuries (55%) were more common than close globe injuries (31%) in ocular injuries. In open globe injury zone 1 is most commonly affected. followed by zone 3. In close globe injury most common affected zone was zone 3.
5. Study interprets that majority (56%) patients attended medical services within first 5 hours of injury.
6. The most commonly affected structure of eyeball was cornea (80%), followed by iris and ciliary body and lens. In ocular injuries commonest complication was corneal opacity (54%) followed by hyphaema, cataract ,vitreous haemorrhage and retinal detachment
7 Visual recovery on average was good with 28% patients having visual acuity better than or equal to 6/18 with best correction possible at 6 month follow up.

The results of this study suggest the need to explore strategies to minimize ocular trauma as a priority. Trauma is usually not a random event and the groups in which trauma occurs need to be targeted with preventive strategies. Furthermore, such use should be recorded in the medical record.

Based upon our findings, health education and safety strategies, which have traditionally targeted the workplace, sports, and other high-risk activities, should also target high-risk activities at home.

Volume : 5 | Issue : 9 | September 2015 | ISSN - 2249-555X

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