Eye Injuries and Foreign Bodies

A Study Conducted in Schell Eye Hospital, Vellore

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Ocular trauma is a major cause of ophthalmic morbidity and unilateral loss of vision as well as a relatively common cause of blindness. Further more, the human social and economic consequences of eye injuries are enormous in all parts of the world.

Eye injuries comprise a disproportionately large part of all bodily injuries more specifically, while the front surface of the eye constitutes only 0.27% of the body surface, 0.54% of the anterior body surface, and 4.0% of the area of the face, eye injuries comprise up to 10% of all bodily injuries. The reason for this discrepancy is obvious - trauma such as that caused by a minute missile (for example, a piece of iron 0.1 mm in diameter) is hardly noticed when it penetrates the skin. However, when such a small fragment perforates the eye, it is always a cause of hospitalization and often for major ocular surgery. It may lead to loss of the affected eye and cause blindness in both eyes due to sympathetic ophthalmia. Thus every ocular injury is a potentially serious condition never to be trifled with, and always requiring an expert evaluation and treatment.

According to the WHO statistics, there are 42 million blind in the world. It is estimated that in India, 9 million people are blind and 45 million are visually handicapped. Among the causes of blindness, eye injuries occupy a major position. According to the American National Society to prevent blindness, injury is the second most common cause of visual impairment (after cataract). Park and Park report that in India blindness due to eye injuries is only 1.25% (i.e. only sixth in importance) which is more than due to glaucoma (0.5%). Major portion of blindness in India is also due to cataract (55%). American National Society to Prevent Blindness report that almost a million people in the U.S. suffer from visual impairment due to eye injury. Of these, 7% have severe bilateral impairment, and 79% are blind in one eye. The annual incidence of impairment is about 40,000, with 10% in the bilateral category. And the situation is also bleak when the paediatric age group is considered; about 5% of blindness in U.S. pre-school and school children results from accidental trauma.

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Review of Literature

The numerous reports in the literature on the epidemiology of eye injuries contain considerable difference in part, because of variations in the economic, social and cultural characteristics of the populations investigated. However, these differences stem chiefly from the different methods of data collection used, populations investigated and definitions of ocular trauma utilized.

In recent years, 5 to 10% of all ophthalmic hospital admissions have resulted from eye injuries. In a civilian setting in developed countries, about 35% of these cases have retained intraocular foreign bodies, 25% have perforating injuries without an intraocular foreign body, and 25% have non-perforating injuries. The rest suffer from burns and adnexal injuries.

There is a distinct male preponderance among ophthalmic casualties. The average male-to-female ratio in the various surveys is 4:1 but 9:1 ratios have also been recorded.

No age is immune to ocular trauma, although some age groups show more predilection for eye injuries, notably children. Some surveys have shown that upto 50% of all casualties are under 18 years of age. According to the American National Society to prevent blindness, 55% of eye injuries are sustained by people under 25 years of age. Ellen Tuve in her study reviews that out of 117 cases came in the Schell Eye Hospital OPD for 5 days, 6 cases were injuries (5.13%), and 16 cases were foreign bodies (13.68%).

Material and methods

The study was conducted by taking all cases of ocular trauma and foreign bodies which underwent surgical treatment in the Schell Eye Hospital, Christian Medical College, Vellore, during the years 1985, 1986 and 1987.

This study aimed the incidence of different type of injuries according to the extent and severity total evicerations and enucleation done under the age of 15 and the foreign bodies which were removed under general anaesthesia.

Another aim was to study the relation between injury and factors like eye. sex, religion and side of the eye, associated procedures which were done along with tear surgeries and the ratio between intra ocular foreign bodies and extra ocular foreign bodies. The study was done by taking all cases entered in the register which is maintained inside the surgical theatre.

Statement of the Problem

A Study on Eye Injuries and Foreign Bodies:

Significance and Limitation of the Study

Even though a lot of literature is available on this subject, this study is the primary attempt on this subject in

Schell Eye Hospital.

The relation between occupation and eye injury and the prognosis of eye injuries are important aspects in the study of eye injuries. This study is having only a vague picture about the occupational cause of eye injury and its prognosis.

Results and Discussions

Table I

Incidence of Ocular Trauma

Sl. No.	Injuries	1985 N	1985 %	1986 N	1986 %	1987 N	1987 %	Total N	Total %
1.	Foreign Bodies	25	16.23	30	16.13	54	25.23	109	20.57
2.	Conjunctival tears	4	3.08	2	1.08	7	3.27	13	2.45
3.	Corneal tears	38	29.23	74	39.78	87	40.65	199	37.55
4.	Scleral tears	12	9.23	33	17.74	16	7.48	61	11.51
5.	Lid tears	16	12.31	7	3.76	9	4.21	32	6.04
6.	Enucleations Below the age 15	15	11.54	10	5.38	9	4.21	34	6.42
7.	Evicerations Below the age 15	20	15.38	29	15.99	32	14.95	81	15.28
8.	Other	-	—	*1	0.54	-	—	1	0.19
Total Ocular Trauma		130	7.19	186	7.23	214	6.88	530	7.08
Total Cataract Surgeries		1048	57.99	1421	55.27	2038	65.55	4907	65.54
Total Surgeries		1807		2571		3109		7487	

* Worm Removal

Table 1 shows that corneal injuries are more common (37.6%) when compared to other injuries. Second comes the foreign bodies (20.6%), Scleral tear is only 11.5% which comes fourth only.

A noticeable thing, during the year 1986 is that a worm had been removed from the left eye of a 7-year-old girl.

An increase in the number of treated tears can be noticed with succeeding years. Among corneal injuries an increase of 36 cases from '85 to '86, and 13 cases from '86 to '87, i.e. an increase of 49 cases within two years period. This type of increase in the number of treated cases can also be seen in the case of conjunctival tears, evicerations and foreign bodies.

The frequency of doing tear surgery when compared to cataract surgery is 1:9 (1:8, 1:8 and 1:10 respectively in the years '85, '86 and '87) and with the total number of surgeries is 1:14, i.e. out of every 15 surgeries one would be the surgery for ocular trauma.

According to the nature, extent and complication of wound, some associated procedures are also done along with tear suturing. The common procedures done in these three years are the following:-

Sl. No.	Procedures	Total: No. in 3 yrs
1.	Canaliculi repair	9
2.	Intravitreal injection along with foreign body removal	1
3.	Virectomy.	4
4.	Retinal detachment surgery	2
5.	Lens matter evacuation	3
6.	Lensectomy	2
7.	Iris prolapse repair	7
8.	Conjunctival flap	2
9.	Epilation	1
10.	Lateral rectus suturing	1
11.	Extra capsular lens extraction	1

Among the 81 evicerations listed in the table (below the age of 15), 14 cases are due to fresh injury, i.e. 17.3% of total evicerations, six adults were underwent evicerations due to fresh injury.

Total foreign bodies removed under anaesthesia = 109

Total extra ocular foreign bodies = 75 (68.8%)

Total intra ocular foreign bodies = 34 (31.2%)

Patients with intraocular foreign bodies are at a higher risk for developing

Table II

Age and Injury

Sl. No.	Injuries	1985 N	1985 %	1986 N	1986 %	1987 N	1987 %	Total N	Total %
1.	1 - 5	36	26.67	30	16.57	27	12.62	93	17.55
2.	6 - 10	24	17.78	29	16.02	39	18.22	92	17.36
3.	11 - 15	15	11.11	18	9.94	19	8.88	52	9.81
4.	16 - 20	17	12.59	19	10.50	20	9.35	56	10.57
5.	21 - 25	12	8.89	15	8.24	19	8.88	46	8.68
6.	26 - 30	6	4.45	18	9.94	26	12.15	50	9.43
7.	31 - 35	5	3.70	10	5.52	10	4.67	25	4.72
8.	36 - 40	4	2.96	8	4.42	15	7.01	27	5.09
9.	41 - 45	3	2.22	10	5.52	9	4.21	22	4.15
10	46 - 50	5	3.70	7	3.87	5	2.34	17	3.21
11.	Above 50	8	5.93	17	9.40	25	11.68	50	9.43

endophthalmitis due to the direct introduction of infection.

In a larger retrospective study of 257 cases, Brinton et al (1984)[2] found a 5.2% incidence of endophthalmitis in patients without intraocular foreign bodies and a 10.7% incidence in patients with intra ocular foreign bodies.

Table II shows that most injuries occur in children and teenagers. 17.6% of injuries occurred in the age group of 1 - 5 years; 17.4% in the age group of 6 - 10 years; 9.4% in the age group above 50 years. More than half of total cases occurred in the age group below 20 years (55.3%).

It is observed that in months like April and May, the incidence of eye injuries among children is more (summer vacation). Another factor affecting eye injuries in children is festivals and television programmes. For example it was observed in most of the eye hospitals the incidence of penetrating injuries in this age group was increased to thrice than normal incidence at the time of Ramayana and Mahabharata serials.

From table III we can observe that the incidence of injury is more in males (76%) when compared to females (24%). The greater incidence in males is due to traffic accidents and occupational accidents.

The male and female ratio is 3.2 : 1 that means 16 males were undergoing tear surgeries when 5 females were undergoing the same.

(O.E.- Oculis dexter; O.S.- Oculis sinister; O.U.- Oculis uterque)

Table IV shows only a slight increase of incidence in left eye (4%). So the side of the eye in which tear occurring is not significant.

Table III

Sex and Injury

Sl. No.	Sex	1985 N	1985 %	1986 N	1986 %	1987 N	1987 %	Total N	Total %
1.	Male	99	73.33	136	75.14	168	78.50	403	76.03
2.	Female	36	26.67	45	24.86	46	21.50	127	23.96
	Ratio	2.8 : 1		3.02 : 1		3.65 : 1		3.2 : 1	

Table IV

Side of the Eye and Injury

Sl. No.	Side	1985 N	1985 %	1986 N	1986 %	1987 N	1987 %	Total N	Total %
1.	RE (O.D.)	62	45.93	84	46.41	101	47.20	247	46.60
2.	LE (O.S.)	70	51.85	94	51.93	107	50.00	271	51.13
3.	BE (O.U.)	3	2.22	3	1.66	6	2.80	12	2.26

Table V

Religion and Eye Injury

Sl. No.	Religion	1985 N	1985 %	1986 N	1986 %	1987 N	1987 %	Total N	Total %
1.	Hindus	125	92.59	161	88.95	201	93.93	487	91.89
2.	Christians	4	2.96	7	3.87	5	2.34	16	3.02
3.	Muslims	6	4.44	13	7.18	8	3.74	27	5.09

Only very few persons were treated with injuries on both eyes, i.e. 2.3% of total injuries. Both eyes were injured from motor accidents, cracker bursting, etc.

Table V shows a high incidence of eye injuries among Hindus. This is because Hindus are more prominent in Vellore. Most of the agricultural labour and other jobs risky to the eye were being done by the particular community. Most of the Christians in this area were hospital workers. Most of the Muslims in this area were doing simple jobs, small scale industries like leather industry, beedi making and business which posed less threat to the eye.

Occupation and Eye Injury

Eye injuries have a close relation with the occupation. Next to children's play, the most common activities causing accidental eye injuries are those related to paid and unpaid (domestic) work. Studies show that in Glasgow between 1908 and 1913, 70% of eye injuries were occupational while in Israel in the early 1980s' only 29.2% of the civilian eye injuries were sustained during paid activities.

In schell Eye Hospital, we are getting eye injuries mainly due to accidents during children's play, agricultural activities, traffic accidents and animal hit. It is mainly workers who are related with bursting rocks, chopping wood, cracker bursting, etc. who come with the eye injuries. Chemical, thermal, electrical and radiational injuries were nil.

Prognosis of Tear Surgeries

Various nation wide surveys have indicated that in the second half of the 20th century accidental ocular trauma caused 3.8% of blindness in Japan and 11.6% of blindness in Sweden over 15 years of age.

Prognosis after tear surgeries in Schell Eye Hospital is very good. More

than 98% persons underwent trauma surgery regained vision. Very few cases of iris prolapse, enucleation, detachment and evicerations were reported. Hospital acquired infections and sympathetic ophthalmia were almost nil.

Conclusion and Suggestions

It can be summarised from the study that tear surgeries are more common and the ratio of it to the cataract surgery is 1:9 and to the total surgery is 1:14. Out of the total evincible under the age of 15, 17.3% is due to fresh injuries. 63.78% of total injury is under the age of 25 and 12.4% is above the age of 45 years. The male to female ratio is 16:5. Side of the eye injury is insignificant. The ratio of intra-ocular foreign body to extra ocular foreign body is 1:2.2. Religion wise incidence depends on the nature of population and the common job they do. Prognosis of tear surgery is good with very few complications.

Most of the eye injuries are preventable. Efforts should be more in preventing than treating. Theoretical prevention is simple.

It is the duty of ophthalmic team (doctors, nurses and technicians) to make the public aware of the benefits of protective equipment. The people should be encouraged to wear protective spectacles and goggles when doing welding and other riskful jobs and to wear safety belts while travelling. The children should be taught not to throw stones, not to play with bow and arrow, air rifles, etc. Mandatory use of face masks will reduce the eye traumas from sports like cricket, hockey, etc.

References

1. David Miller, Treatment of anterior segment ocular trauma, Robert Stegman, Medicopoec.
2. Eagle, E.M. 'Perforating injuries to the eye', British Journal of Ophthalmology, 60: 732-736, 1976.
3. Ellen Tuve, 'Study on the role of ophthalmic nurse in the detection and treatment of common eye conditions affecting O.P. in Schell Eye Hospital, Vellore, 1983.
4. J.E. Park and K. Park, 'Text book of preventive and social medicine', 11th edn.; pp 384-387.
5. Stephen, J.H. Miller, 'Parson disease of eye; 17th edn. Churchill Livingstone, Chapter 26, pp 242-253.
6. WHO (1979), WHO Chronicle, 33: 275.

Calendar of Events

Exhibition and Lectures, Health Care '92, June 16-18, 1992, at National Exhibition Centre, Birmingham, U.K.; Contact: The Trinity Group, Times House, Station Approach, Ruislip, Middlesex, HA4 8 NB, U.K.

Third International Participative Conference, 'Nurse Education Tomorrow', for teachers of Midwives, Nurses and Health Visitors and of other health workers. September 9-11, 1992, Durham University, at Grey College, Durham, U.K.; Contact: Jane Randell, Conference Organizer, 105 Hinton Way, Gt. Shelford, Cambridge, CB2 5AJ, U.K.

Sixth Annual Certificate Program, 'Financing Health Care in Developing Countries', September 17 to December 12, 1992, at Boston University School of Public Health Center for International Health; Contact: Financing Health Care in Developing Countries, Boston University School of Public Health, Center for International Health, 80, East Concord Street, A-310, Boston, MA 02118-2394, USA.

Second Pan Pacific Emergency Nurses' Conference, September 27-30, 1992, at Singapore; Contact: Conference Coordinator, 2nd Pan Pacific Emergency Nurses' Conference, P.O. Box 125, Heidelberg, vic 3084, Australia.

Ministerial Conference on Malaria, October 26-27, 1992, at Amsterdam, The Netherlands; Contact: Malaria Conference Secretariat, Division of Control of Tropical Diseases, World Health Organization, Avenue Appia - 1211, Geneva-27, Switzerland.

Third Asia and Pacific Nurses Convention 1992, December 9-12, 1992, at Mandarin, Singapore; Contact: The Convention Coordinator, 3rd ASPAN Convention, 1992, Singapore Nurses Association, 151 Manhattan House, Chin Swee Road, 9-13, Singapore 0316, Republic Of Singapore.

International Conference on Nutrition, December 5-11, 1992, at Rome, Italy; Contact: FAO//WHO Joint Secretariat for the Conference, Viale delle Terme di Caracalla, 00100 Rome, Italy.