



ORIGINAL RESEARCH PAPER

OPHTHALMOLOGY

ANALYSIS OF PERFORATING OCULAR INJURIES

KEY WORDS: Perforating injuries, Prophylaxis, Early diagnosis, appropriate management

DR. V. THARANIVEL, MS

Senior Assistant Professor, Department of Ophthalmology, Govt. Villupuram Medical College & Hospital, Villupuram

DR. S. RAVIKUMAR, MS

Senior Assistant Professor, Department of Ophthalmology, Govt. Villupuram Medical College & Hospital, Villupuram

ABSTRACT

Background:

Perforating ocular injuries remains as an important source of morbidity. The incidence of ocular injuries in adults has increased with industrial development and also common in agricultural work in our country. Early diagnosis and appropriate management of the injuries helps the patients to restore the vision and avoid complications.

Aim: To estimate the perforating ocular injuries with reference to incidence, etiology, affection of the eye structurally and functionally, diagnosis, management and visual prognosis.

Methods and Materials:

This study was a prospective study of 100 cases that had perforating ocular injuries. All the patients were from Govt. Villupuram Medical College, Villupuram. Study period from July 2015 to October 2016.

Results:

Statistical data analyzed based on clinical, imaging and lab findings. In this study 88 were males and 12 were females. Details of objects which caused injury, mode and site of injury were recorded. Visual acuity and prognosis were assessed according to the structure of the eye injured.

Conclusion:

Perforating injuries of the eyes causes serious visual impairment and blindness which is preventable. Awareness should be created in the public about the prophylaxis through stronger education campaign. The ophthalmologist should treat the injury as an emergency to restore the structural as well as functional capacity of the eye.

INTRODUCTION:

The Eye is the delicate structure in the human body. Trauma to the eye is essentially a very grave matter. So any injury to the eye however trivial it may appear must be deemed to be an ocular emergency and should be handled with utmost care.

Perforating wounds of the eye are common in children, injuries to the eye occur very frequently during sports and games³. The incidence of ocular injuries in adults has increased with industrial development. The incidences of ocular injuries are common in agricultural work in our country.⁴

Perforating injury causes structural damage with or without visual disturbances, introduction of infection, development of sympathetic ophthalmitis and specific effects due to retained ocular foreign bodies.^{1,2,5,11}

Early diagnosis and appropriate management of the injuries helps the patients to restore the vision and avoid complications to these injuries.¹⁰

AIM OF THE STUDY:

To evaluate the cases of perforating injuries who attend the Department of Ophthalmology, Govt. Villupuram Medical College, Villupuram during the period of July 2015 to October 2016, with reference to incidence, etiology, affection of the eye structurally and functionally, diagnosis, management and visual prognosis.

MATERIALS AND METHODS:

A prospective review of 100 cases of perforating injuries who attended the Department of Ophthalmology, Government Villupuram Medical College, Villupuram were taken for the study. Period of study from July 2015 to October 2016.

After eliciting the history all cases were thoroughly examined with binocular loupe and slit lamp microscope. Visual acuity was assessed with Snellan's chart.

In patients with clear media fundus examination was done with direct and indirect ophthalmoscopy.

In cases where a retained Intra-ocular foreign body was suspected relevant radiological procedure were done^{6,8,16}.

RESULTS:

Age incidence

Maximum incidence of perforating injury was noticed between 11-30 years of age 51%

Table 1 Age group distribution of cases

Age group (In years)	Number of cases	Percentage
0-10	12	12%
11-20	26	26%
21-30	25	25%
31-40	11	11%
41-50	15	15%
51 and above	11	11%

From this it is presumed that majority of injuries occur in bread winning group of individuals in our country. Also it shows the carelessness, inadequacy of training and lack of experience in these young individuals.

Sex incidence:

In this study 88 were males and 12 were females, the predominance was more in males since they belong to the working class and was exposed to the risk of occupational hazards.

Table 2: Gender distribution of cases

Sex	Number of cases	Percentage
Males	88	88%
Females	12	12%

Side of affection of eye:

Both eyes were equally affected with 48% and 52% on right and left respectively.

Table 3: Side of injury

Side of affection	Number of cases	Percentage
Right eye	48	48%
Left eye	52	52%

Endemicity:

The incidence of perforating injuries were almost equal in rural and urban population

Table 4: Disease prevalence

Area	Number of cases	percentage
Rural	59	59%
Urban	41	41%

Relation of endemicity to agent causing injury:

Among the rural population injury caused by vegetable matter and wood pieces are much more common as most of them are employed in field or quarries.

Among the urban population the most common agent causing injury is metal. So the population should be educated about the importance of protective glasses and protective measures especially who are employed in industry.

Table 5: Agents causing injury

No	Agents causing injury	Rural	Urban
1	Metal	6	13
2	Vegetable matter	5	-
3	Glass	3	3
4	Cracker injury	1	2
5	Stone	5	4
6	toys	6	7
7	Miscellaneous wood pieces	33	12

Mode of injury:

The commonest mode of injury is agriculture. Next comes the miscellaneous group which includes injuries due to sports or games and domestic injuries.

Table 6: Mode of injury

No	Mode	Cases	Percentage
1	Industrial	17	17%
2	Agricultural	37	37%
3	Road traffic accidents	6	6%
4	Blast injury	7	7%
5	miscellaneous	33	33%

Time interval between injury and admission:

It is observed that 44% of cases reported to hospital within 24 hours, whereas 56% reported late in which case it varied from more than a day to some years.

Table 7: Period of presentation

Period of presentation	Number of cases	Percentage
Immediate	44	44%
Late	56	56%

Visual acuity and its relation to the time interval between injury and admission

Table 8: Visual acuity and relation to presentation

No	Visual acuity at the time of discharge	Immediate	Late
1	NO PL	-	2
2	PL to <1/60	1	6
3	1/60 to 6/60	14	30
4	6/36 to 6/18	17	15
5	6/12 to 6/6	12	3

Of the 44 patients who reported immediately 29 had visual acuity of more than 6/60 when compared to 18 patients who reported late. This is because of early surgical intervention before development of complications. So the necessity of seeking professional help soon after the injury and danger of delaying treatment should be stressed.

Structure involved and its relation to visual prognosis

Corneal and scleral involvement:

Most commonly involved structure is cornea 77%, as it is the most exposed part of eye.

Table 9: Distribution of cases to injured structures

Serial number	Site of perforation	Number of cases	Percentage
1	Corneal	77	77%
2	Scleral	11	11%
3	Corneoscleral	7	7%
4	Limbal	5	5%

Relation of wound to visual prognosis:

When comparing the visual prognosis to structure involved it was better with scleral and limbal wound. Then comes the corneal wounds in which vision was good when it involved the periphery and not the visual axis. With corneoscleral wound the visual prognosis was the worst.

Table 10: Relation of wound to visual prognosis

No	Structure involved	NO PL	PL to 1/60	1/60 to 6/60	6/36 to 6/18	6/12 to 6/6
1	Corneal	-	4	34	28	11
2	Scleral	1	1	7	-	2
3	Corneoscleral	-	1	3	3	-
4		1	-	-	2	2

Uveal prolapse and incarceration are more common with perforating injury. among the 21 cases of Uveal prolapse 11 cases had vision less than 6 meters. Incarceration was seen in 3 cases out of which 2 cases had vision less than 1 meter.

Iridocyclitis was seen in 4 cases with medical treatment patient had better vision.

Relation between uveal involvement and visual acuity:

Table 11: Relation between uveal involvement and visual acuity

S NO	Nature of affection	No of cases	Visual acuity				
			NO PL	PL to 1/60	1/60 to 6/60	6/36 to 6/18	6/12 to 6/6
1	Uveal prolapse	21	-	1	10	8	2
2	Iris incarceration	3	-	2	1	-	-
3	iridocyclitis	4	-	-	3	1	-

Lens involvement:

Table 12: Status of Lens with relation to visual acuity

S NO	Nature of affection	No of cases	Visual acuity				
			NO PL	PL to 1/60	1/60 to 6/60	6/36 to 6/18	6/12 to 6/6

1	Traumatic cataract	19	-	1	2	4	3
	With treatment	10	-	-	5	3	1
	Without treatment	9	-	-	-	-	-
2	Subluxation	1	-	-	-	1	-
3	Dislocation	3	-	1	2	-	-

Lens involvement was seen in 19 cases out of which needling aspiration was done in 2 cases. Extracapsular extraction with IOL implantation was done in 8 cases, 9 cases were left alone because they had either immature or localized cataract. The above table shows that the patients who underwent treatment had better vision.

Posterior segment involvement:

Table 13: Posterior segment involvement with relation to visual acuity

S NO	Nature of affection	No of cases	Visual acuity			
			NO PL	PL to 1/60	1/60 to 6/60	6/36 to 6/12 to 6/6
1	Retinal detachment	1	-	1	-	-
2	Vitreous haemorrhage	1	-	1	-	-
3	Vitreous prolapse	8	1	6	1	-

Seven cases showed intraocular foreign body. In those cases limbal ring was applied and appropriate radiograph was taken. Size of foreign body varied from 2mm to 9 mm.

Anterior chamber foreign body removed by paracentesis. Lenticular foreign body removed along with ECCE.

Table 14: Site of foreign body

No	Site of lodgement	Number of cases	Retained FB	Removed FB
1	Posterior segment	1	1	-
2	Anterior chamber	3	-	3
3	Lens	1	-	1
4	Intraorbital	1	-	1
5	Intrastroma of cornea	1	-	1

The relationship between site of lodgement and visual acuity. The anterior chamber foreign bodies showed good visual prognosis. Lenticular foreign body also had fairly good vision. Patients with IOFB were asked to come for regular follow up for early detection of siderosis and other effects.

Table 15: Relation between site of foreign body and visual acuity

S NO	Nature of affection	No of cases	Visual acuity			
			NO PL	PL to 1/60	1/60 to 6/60	6/36 to 6/12 to 6/6
1	Posterior segment	1	-	-	1	-
2	Anterior chamber	3	-	1	1	1
3	Lens	1	-	-	1	-
4	Intraorbital	1	-	-	1	-
5	Intra stroma of cornea	1	-	-	-	1

Image 1: Scleral tear



Image 2 : Corneal wound with traumatic cataract

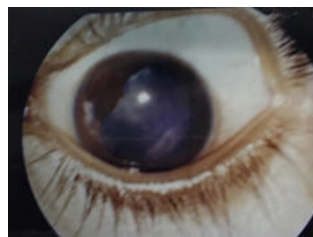


Image 3: Traumatic cataract with lens matter in anterior chamber..

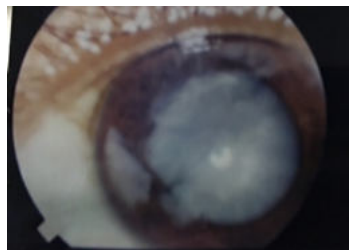


Image 4: Foreign body cornea with foreign body lens.

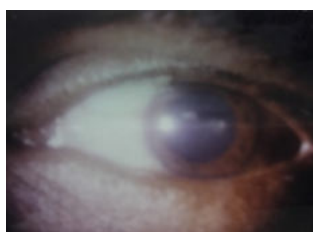


Image 5 : Traumatic iridocyclitis with secondary glaucoma

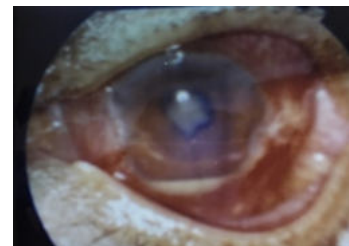


Image 6 : Sutured corneoscleral tear

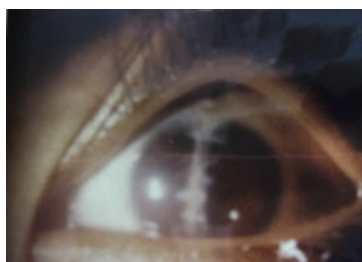


Image 7 : Skull radiograph AP view with limbal ring showing intraorbital foreign body.

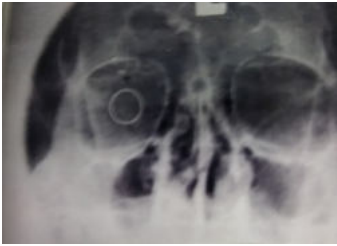
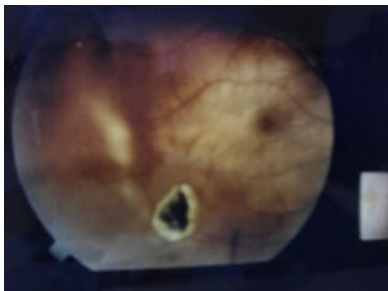


Image 8 : Skull radiograph lateral view with limbal ring showing intraorbital foreign body



Image 10 : Fundus picture showing intraocular foreign body



DISCUSSION:

Maximum incidence of perforating injury was between the age of 11- 30 years which could be explained due to exposure to play things in children and machinery in the employed section.⁴ (Table 1)

The incidence of perforating injuries is more in males. This indicates the risk of exposure of this sex to occupational hazards.^{3,4, 10}(Table 2)

Regarding side of affection it is almost equal in both eyes.(Table 3)

In this study endemicity is almost equal in rural and urban population. (Table 4). In rural population the injury caused by wood piece, vegetable matter is more.(Table 5& 6) So rural mass must be taught about seriousness of the injury that if not attended early are likely to lose vision due to mycotic infection.among the urban population the industrial workers must be taught about the importance of protective measures, thereby preventing visual loss due to injury⁸⁻¹³.

Regarding structure of involvement cornea constitutes 77%. Visual prognosis was better with simple limbal, scleral and peripheral corneal wounds without uveal involvement^{14,16}.(Table 9 & 10)(Image 1 to 3)

Iris, ciliary body and posterior segment involvement shows grave prognosis in which structural and functional recovery is poor.(Table 11, 12 & 13)(Image 5, 6)

Posterior segment intraocular foreign body has poor visual prognosis when compared to anterior segment because of problem in their removal and more trauma to ocular structures.¹⁷(Image 4,7, 8) Early removal should be done to prevent encapsulation, chemical changes and inflammation due to retained intraocular foreign body.^{11,15,18}(Table 14 & 15)(Image 10)

SUMMARY:

100 cases of perforating injuries were taken for study. Among them the incidence was more in age group of 11- 30 years (51%). Sex incidence showed predominance in males (88%). Side of affection was almost equal with 48% and 52% Right and Left respectively.

Incidence was slightly more in rural 59% than urban with 41%. Among them injuries caused by vegetable matter and wood piece were more common in rural population when compared to urban population in whom metal was the commonest agent.

Agricultural 37% and miscellaneous 33% injuries was the maximum. 56% patients reported late.

The commonest structure involved was cornea 77% followed by Uveal involvement in 21%. The other complication noted were traumatic cataract in 19% and intra-ocular foreign body in 7%. 4% had medical treatment, others had surgical treatment.

CONCLUSION:

Perforating injuries of the eyes causes serious permanent visual impairment and blindness which is preventable. They carry a high risk of visual morbidity in all age groups. Even though the most updated and heroic procedures may bring a complete cure. Awareness should be created in the public about the prophylaxis through stronger education campaign.

The ophthalmologist should spare no pains to treat the injury as an emergency with all the tools that modern medicine has provided to restore the structural as well as functional capacity of the eye.

REFERENCES:

1. Bernard Samuel – participation of Ocular Appendages in Sympathetic Ophthalmia and its bearing on Enucleation BJO Vol 32 1948 Page 559-575
2. Ton Jenning & ET at 20 cases of sympathetic ophthalmitis BJO Feb 1989 Vol 73 No2 page 140-145
3. Wykes W.N – A 10 year survey of penetrating injuries in Gwent 1976-85 – BJO – Aug 1988. Vol 72 No 8, Page 607-611
4. Peyman – Principles and Practice of Ophthalmology Vol III 1987 Pages 2444- 2489
5. John P. Shock M.D & et al Long term results from penetrating & perforating ocular injuries – AJO Vol 100 No 15, 1985, Page 714-718
6. Louis A. Lobes – Orbital trauma Evaluation by Computed Tomography IOC. 1982. Vol. 22 No 4. Pages 135- 137
7. Carolin M. Purnish & et al. Traumatic Endophthalmitis IOC Vol 27 No 2 Summer 1987- Page 112-118
8. Benjamin F. Boyd. Highlights of Ophthalmology letter Vol. XV. No2 1987. Series Page 4- 12
9. Stephan J. ryan – surgical retinal Vol III 1989. Posterior penetrating Trauma and trauma principles and Techniques of Treatment 455-465, 475- 493
10. T.P. It year in et al. Management of Penetrating Injuries with IOFB – KSOS Journal Volume II .No 12, December 90, Page 1287- 1291
11. S. K. Angra & et al Intra Lenticular Foreign body IJO Vol 28 1980 page 147- 149
12. Lingam Gopal M.S Pars Plana Surgery in Ocular Trauma KSOS Journal Volume II, No 9, September 1990 page 860- 864
13. Siddharthan & et al – A Preliminary clinical study of perforating injuries Journal of MSOA – vol XXI page 26-29
14. IM Shikha & R.N. Verma A clinical study of Ocular injuries IJO 1979 vol 27 page 33- 36
15. William F. Micker & et al – Retained IOFB and Endophthalmitis – Journal of American Academy of Ophthalmology Vol 97, page 1228- 1492
16. Varuna & et al – Ultrasonic evaluation of traumatized Eye – Journal of TNAO – vol XXVII March – June 90 , Page 49- 53
17. Bruce Wilson & et al MRI of Non- Metallic orbital FB – AJO Vol 105 No 6 June 15 1988
18. P. Namperumalsamy & et al Traumatic Glaucoma an analysis. Journal of TNOA Vol XXVIII No 1 Nov 1990 Page 19- 26.