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Prognosis of perforating eye injury

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The general prognosis of perforating eye injury has improved remarkably during the last two decades. It is a perplexing task to assess the prognosis in view of the variations in the severity of the wound and of the intraocular damage, as well as the great diversity of complications which may arise.

In this series, 130 cases of perforating globe are presented and a significant improvement in the overall position is revealed.

Material and methods

This series constituted 130 consecutive cases of accidental perforating eye injuries, including 22 with intraocular foreign bodies. Patients were treated in the Eye Department, Preston Royal Infirmary, and were followed-up at the clinic for a period varying between three months and four years, the last case being in November 1975. Patients who failed to attend for follow-up and some who were referred from other hospitals were excluded because full details during the follow-up period were lacking. Out of 130 cases, 20 (15·4 per cent) were women and 40 (30·7 per cent) were children, seven of whom were girls.

Injuries were mainly caused by road accidents, a fall on the ground, an accident with chisel and hammer, assault with fist or other blunt objects, gun-shot injury, or, particularly in children, by pointed objects such as a stick or branch of a tree, or a dart, arrow, or needle. Some injuries had been inflicted by less common objects such as a fish hook with a maggot on it, the edge of a sheet of paper, or water jet, etc. (Table I).

The site and extent (Table II) of injury observed varied from a small penetrating injury of single line 1 mm in length of cornea or sclera to major extensive ramified lacerations across the whole diameter of the cornea and almost the whole length of the sclera, with laceration, incarceration, avulsion, and even expulsion of uveal tissue, lens, and vitreous humour. In one patient the posterior portion of the globe behind the equator was almost completely separated from the rest of the eye ball.

The degree of injury and severity of damage to the ocular structures was classified as follows:

FIRST DEGREE

Perforating injury of any length of cornea or sclera varying from a minute puncture to the whole diameter of cornea, without lens injury, uveal or vitreous prolapse, without intraocular foreign body.

SECOND DEGREE

Injuries of any size to cornea or sclera with lens injury, or uveal, vitrous prolapse, or with intraocular foreign body.

THIRD DEGREE

Double perforation of the globe caused by gun-shot or other metallic particles, extensive ramified lacerations of the anterior segment, laceration of the posterior pole, and injuries with massive haemorrhage leading to vitreous disorganization.

The incidence of the types of injury is shown in Table III. On first admission 80 cases (61·5 per cent) were found to have uveal tissue either incarcerated in the wound or prolapsed. In some patients the tissues were reposited and in others tissue had to be abscised during repair. Seventy-six cases (58·4 per cent) needed treatment for traumatic cataract. During the follow-up

Table I *Causes of injury*

Patients	*Road accident*	*Chisel and hammer*	*Flying objects*	*Assaults*	*Blunt objects*	*Pointed objects*	*Others*
No.	26	16	18	9	19	20	22
Percentage	20	12·3	13·8	6·9	14·6	15·4	16·9

Table II *Site of injury*

Patients	*Corneal (single or ramified laceration)*	*Scleral (single or ramified laceration)*	*Corneo-scleral (radial single line or ramified)*	*Limbal (circum-ferential)*
No.	49	25	34	22
Percentage	37·7	19·2	26	16·9

Table III *Incidence of different degree of injury*

Patients	*Degree*		
	First	*Second*	*Third*
No.	24	75	31
Percentage	18·5	57·7	23·8

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period particular attention was paid to controlling inflammation in the affected eye, and the possible development of any anterior synechiae, secondary glaucoma, and retinal detachment; inflammatory reaction to the other eye was also looked out for. Fifty-eight cases (44·6 per cent) needed further operations during the follow-up period, such as synechiotomy, cataract extraction, needling and aspiration of lens material, drainage operation for secondary glaucoma, or surgery for retinal detachment.

Finally, assessment was made of the visual acuity obtained after correction of refractive error, either with spectacle lens or with contact lens. Enucleation was performed only in blind eyes that were not symptom-free and were cosmetically unsatisfactory or unsafe.

Results

The results are shown in Table IV.

Discussion

The prognosis of perforating lesions of the globe is uncertain because of complications, many of which depend on correct assessment, and vary in seriousness according to the time at which they occur, and the method of management. Our principles of management were aimed at securing an accurate surgical re-apposition of the wound and restoring the normal anatomy as quickly as possible, preventing or controlling infection, and maintaining and controlling the intraocular pressure within normal limits. One striking feature noted in the series was the low incidence of infection. In only three instances was intraocular reaction, caused either by infection or by the injury itself, severe enough to result in hypopyon, and in each this settled satisfactorily and the patient regained visual acuity of better than 6/12. In none was panophthalmitis or chronic endophthalmitis found to develop to warrant removal of the eye, compared with the overall infection in 15 per cent, including 38·6 per cent of all enucleated eyes (Snell, 1945) and 28·9 per cent of enucleated eyes caused by infection or vitreous abscess (Remky, Kobor, and Pfeiffer, 1967).

Table IV *Results in visual acuity for 130 patients*

	Degree				
Result	*1st*	*2nd*	*3rd*	*Total*	*Overall percentage*
Vision better than 6/12	21	58	3	82	63
Vision between 6/60 and 6/18	2	5	5	12	9·2
Vision less than 6/60	1	9	10	20	15·4
No perception of light cosmetically satisfactory	0	2	2	4	3
Enucleation or evisceration	0	1	11	12	9·2
Total	24	75	31	130	100

Among the 24 cases of first degree injury, three needed further operation during the follow-up period, one for anterior synechiae, one for cataract, and one for tractional retinal detachment. Twenty-one cases (87·5 per cent) retained vision better than 6/12, two between 6/60 and 6/18, and one less than 6/60.

Further operation was necessary in 40 out of 75 cases of second degree injury, mainly for traumatic cataract and anterior synechiae. If aspiration of lens material was considered to be justified, it was generally done within two weeks of the injury. Tractional retinal detachment was found in four instances and secondary glaucoma in three. In this group, 58 patients (77·3 per cent) recovered their vision to better than 6/12, five cases to between 6/60 and 6/18, nine cases to less than 6/60, two cases lost perception of light, and enucleation was performed in one.

Apart from the extensive reparative procedure carried out during the first operation, out of 31 cases of third degree injury further operation was justifiable only in eight. In the remaining patients either the lens with some vitreous was extruded during the injury and an unexpected amount of sight regained, or further surgery was not considered likely to be beneficial. In this group only three patients (9·7 per cent) regained 6/12 vision, five cases between 6/60 and 6/18, 10 cases less than 6/60, two cases lost perception of light, and enucleation was necessary in 11 eyes.

Altogether 12 eyes (9·2 per cent) were excised. In five (3·8 per cent) the eye was excised shortly after injury without any attempt at reconstruction because the eye was hopelessly damaged and was considered at the time to be unsafe to preserve and potentially dangerous for the other eye. Seven eyes were enucleated later, two for chronic haemophthalmitis after further trauma (self-inflicted) to the same eye, two for painful blind eye due to intractable secondary glaucoma, and three for phthis bulbi.

Eyes with visual acuity of between 6/60 and 6/18, could probably have been improved further by some minor procedure—such as needling—or major procedure—such as optical keratoplasty—but it was not possible to carry these out for various reasons. In 20 eyes the visual acuity decreased to less than 6/60; in five there was tractional retinal detachment, three had organized vitreous around

non-magnetic, unremoved intraocular foreign bodies, and the remaining eyes had severe corneal scars, organized vitreous haemorrhages, blood-stained corneae or macular changes, either alone or in combination. Six patients were found to have secondary glaucoma. In two instances, gradual atrophy of the iris after trauma leading to complete aniridia in the course of 12 and 16 months' time was the other significant change associated with the injury.

None of the patients was found to develop sympathetic ophthalmitis.

Summary

The assessment of visual function in a series of 130 consecutive patients of perforating eye injuries, revealed that visual acuity of 6/12 or better was regained in 63 per cent, between 6/60 and 6/18 in 9·2 per cent, less than 6/60 in 15·3 per cent, and enucleation was necessary in 9·2 per cent. In 3 per cent, the eyes were retained as blind, symptom-free, and cosmetically satisfactory organs. Two eyes were found to develop complete traumatic aniridia. None in the series was found to have sympathetic ophthalmitis.

References

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