A 6½-years survey of intraocular and intraorbital foreign bodies in the North-west Frontier Province, Pakistan

M DAUD KHAN, NIAMUTALLAH KUNDI, ZIA MOHAMMED, AND
ANISA F NAZEER

From the Khyber Hospital, Peshawar, and Postgraduate Medical Institute, Lady Reading Hospital, Pakistan

SUMMARY A survey of 198 patients (210 eyes) with intraocular or intraorbital foreign bodies is presented. Most were males between 16 and 30 years of age, and 6.1% of cases were bilateral. The commonest cause was a flying particle while using a hand hammer, followed by fragments of bomb and mine blasts. Intraorbital foreign bodies occurred in 78 eyes and intraocular foreign bodies in 132 eyes. Irreparable damage caused 13 eyes (6.2%) to be enucleated. Ten eyes developed severe endophthalmitis or panophthalmitis requiring evisceration. One hundred and thirty-four (63.8%) foreign bodies were removed, and 76 (36.2%) foreign bodies could not be removed. The causes of non-removal, the various complications, and the pattern of foreign bodies in the eye or orbit in Pakistan are discussed and compared with those of other regions.

Foreign bodies of the eye or orbit account for a small but significant part of ocular trauma. The significance of this type of injury is heightened by its association with occupation and the serious complications it causes both early and late. It was while studying ocular trauma in general at the Khyber Teaching Hospital, University of Peshawar, Pakistan, from January 1978 to August 1984 that we took a deeper look at the local pattern of intraocular and intraorbital foreign bodies, their distribution, causes, and complications. Two cases of deep corneal foreign bodies seen are excluded from this study.

Material and methods

Case records were derived from the files of the Khyber Teaching Hospital. A specific history about the type of object and occupation at the time of injury was taken from all patients. An examination was then carried out with a slit-lamp and direct and indirect ophthalmoscopes, when possible. In severe cases with much oedema of the eyelids the examination was carried out under general anaesthesia with an indirect ophthalmoscope and operating microscope.

Correspondence to M D Khan, FRCS, Department of Ophthalmology Postgraduate Medical Institute, Lady Reading Hospital, Peshawar, Pakistan.

X-ray of the orbit, with antero-posterior and lateral views, plain, and with a limbal ring or contact lens with radio-opaque dots was carried out. Final localisation was done with a Roper-Hall foreign-body locator. In cases with magnetic foreign bodies a magnet with an anterior or pars plana approach was used. Non-magnetic foreign bodies were removed mainly with microforceps from the anterior chamber or iris, and by lens extraction when situated in the lens. Posterior segment non-magnetic foreign bodies could usually not be removed owing to lack of facilities for vitrectomy.

Separate removal of the foreign body was not attempted in eyes with gross infection or irreparable damage. In such cases evisceration or enucleation was done as a primary procedure. Follow-up was erratic, but it is presumed that at least patients with complications presented again. At follow-up the eyes were again examined and the observations recorded.

Results

Out of 1971 patients (2060 eyes) who sustained ocular injuries severe enough to require admission, foreign bodies in the eye or orbit were found in 198 patients (210 eyes, or 10.2%), of whom 28 were Afghan refugees. 195 patients (98.5%) were male, (1.5%)

female. Most of the patients (89%) fell in the age group 16-30 years (Table 1). 6.1% of the injuries were bilateral, of which two-thirds occurred in Afghan refugees. Intra-orbital foreign bodies were present in 78 eyes (37%) and intraocular foreign bodies in 132 eyes (63%). The commonest object was a flying iron particle while the patient was using a hand hammer (53.3%). This occurred entirely among patients working in motor vehicle repair shops or factories manually manufacturing weapons at Dara Adam Khel. These injuries accounted for the majority of magnetic foreign bodies. They were followed in frequency by injuries caused by fragments from bomb and dynamite blasts (20.5%) and bullets from firearms or pellets from airguns. Foreign bodies from fireworks caused bilateral multiple corneal and anterior chamber injuries in three patients (2.9% eyes). Injuries from pieces of wood while chopping occurred in 2.9% eyes, while one patient had a large piece of glass in the orbit following a road traffic accident (Table 2). This patient had a blow-out fracture and vertical squint and required multiple operations.

The foreign body was removed from the eye or orbit in 63.8% eyes, while in 36.2% of cases removal was not possible (Table 3). This was due to double penetration, with the foreign body lying posteriorly in the orbit, or to non-magnetic foreign bodies in the posterior segment, or because the patient presented very late and the foreign body was perhaps encapsulated in a tough fibrous capsule. Some of these last patients presented with siderosis bulbi.

Patients either presented within 24 hours of injury or 7-10 days later, when infections or early lenticular opacities had set in, or in a few cases even 1-2 months later with a healed perforations and cataract or secondary glaucoma. The average delay was five days. Small flying iron particles were responsible for the longer delays.

The common immediate complications (Table 4) were haemorrhage in the anterior chamber (4.8%) or vitreous (4.8%) and irreparable damage to the eye (4.3%) caused by large foreign bodies like bullets, airgun pellets, and fragments driven in by bomb or dynamite blasts. Other early complications were traumatic cataracts (5.2%) and gross infection (4.8%) in patients with delayed presentation. Complications seen in patients presenting very late or coming for subsequent follow-up were: traumatic cataract (9.0%), secondary glaucoma (5.7%), phthisis bulbi (5.2%), retinal detachment (3.8%), and siderosis bulbi (1.4%).

Discussion

Foreign bodies accounted for 10.2% of all ocular

Table 1 Age and sex distribution

Age group	No of patients	%*	Male	Female
0-15	18	9.09	16	2
16-30	166	88.84	166	0
Over 30	14	7.07	13	1
Total	198	100.00	195	3

*The percentage is of total number of cases with foreign bodies.

Table 2 Aetiological distribution

Causes	Number of eyes	%
Flying iron particles using hand hammer	112	53.3
Bomb and dynamite blasts	43	20.5
Firework injuries	6	2.9
Firearm injuries	22	10.5
Airgun pellets	20	9.5
Wood	6	2.9
Glass	1	0.4
Total	210	100.0

Table 3 Causes of non-removal

Causes	No.
Bomb fragments in orbit	22
Foreign body embedded in the angle	2
Orbital pellets	18
Failed removal of non-magnetic foreign bodies	15
Orbital bullets	9
Left hospital against medical advice	4
Failed removal of magnetic foreign bodies	3
Missed foreign bodies, now siderosis bulbi	3

Table 4 Complications of intraocular or intraorbital foreign bodies

Type of complication	No. of eyes	%
<i>Immediate</i>		
Irreparable damage	9	4.3
Vitreous haemorrhage	10	4.8
Hyphaema	10	4.8
Commotio retinae	1	0.5
Complete external ophthalmoplegia	1	0.5
Squint due to fixation of inferior rectus by foreign body	1	0.5
<i>Early</i>		
Traumatic cataract	11	5.2
Intraocular infection	10	4.8
Retained foreign body	76	36.3
Orbital cellulitis	1	0.5
<i>Late</i>		
Traumatic cataract	95	45.2
Secondary glaucoma	12	5.7
Phthisis	11	5.2
Retinal detachment	8	3.8
Siderosis bulbi	3	1.4

injuries during the same period (Khan MD, *et al.*, unpublished). The incidence in this study was about three per month, this appears to be somewhat higher than reported from the UK (two per month) in 1972,¹ Ceylon in 1964 (6.4%),² and Ireland in 1980 (8.4%),³ but lower than reported from India (28%)⁴ in 1985. However, when we consider that this study is composed of both intraocular and intraorbital foreign bodies, the incidence becomes almost similar to those from UK and Ireland. In sharp contrast to these observations are those in a study from Malawi,⁵ where not a single case of intraocular or intraorbital foreign body was reported.

Our figures are indicative of a crude, largely manual, or semiautomated industry, with a complete lack of protection at work, combined with an aggressive and criminally negligent attitude of the average person, whether young or old. This is shown by the large number of injuries from bullets and airgun pellets (20%). The almost exclusively male preponderance is similar to that reported elsewhere,^{1,6} and points towards the largely occupational nature of these injuries.

In our study flying particles account for 53.3% of injured eyes (56.6% of patients), compared with 63% reported by Percival¹ from the UK. Bomb blast injuries accounted for almost 20% of injured eyes and occurred mainly among victims of the war across the border. Firearm injuries occurred mainly during local scuffles, only two cases being in refugees. Percival,¹ on the other hand, reported only two cases of explosions and eight cases of shotgun pellets in 245 patients, while not a single case was reported from Ceylon² or Malawi.⁵

Airgun pellets deserve special mention. In this study they occurred in 9.5% of patients compared with 2.4% reported by Percival¹ and a similarly low number by Brinton *et al.*⁷ The ages of these patients ranged from between a few months to 56 years. The main cause of the injuries was the unsupervised use of potentially dangerous weapons by careless and ignorant youngsters. We also noticed an increase in the number of these injuries at festival times. A similar finding has been reported by Kreshon.⁸

Dynamite blasts accounted for 3% out of the 21% of blast injuries. They were found mainly to affect those working at the construction of roads in hilly areas, where dynamite is used for blasting rocks. This figure is much less than reported from India,⁹ where blast injuries affected roughly 9.3% of patients with intraocular foreign bodies.

There was a mild intraocular inflammation in all but 7.8% of eyes; these latter 7.8% represent 3% of eyes which required primary enucleation and 4.8% eyes which were grossly infected and subsequently required evisceration. Primary enucleation was done

only in those eyes which were damaged beyond repair. These figures are somewhat higher than reported by Percival.¹

Removal of the foreign body was not possible in 36% cases. They were mainly cases of intraorbital or posterior segment foreign bodies which could not be removed by forceps alone, as vitrectomy was necessary, for which we did not possess the required equipment. The major late complication was a gradually progressive lenticular opacity. In these cases extraction was done, but the visual outcome was poor in unioocular cases as we could not provide the majority of patients with either an intraocular implant or a contact lens. Secondary glaucoma occurred as frequently as reported by Percival.¹⁰ Most of these patients presented late, when little could be done for them. Pthisis bulbi, detachments, and siderosis bulbi occurred less frequently than reported by Percival.¹⁰ One reason could be the irregular and often infrequent follow-up, and many patients may have suffered in silence. The lack of a vitrectomy equipment proved to be a great handicap, for in many of these eyes vision might have been saved or at least improved if timely vitrectomies had been performed.^{6,7,11}

When going through the above figures the reader must bear in mind that they are much biased by the inclusion of the Afghan refugees. Afghan refugee patients made up only 11% of patients with injured eyes but accounted for 17% of intraocular or intraorbital foreign bodies. Afghan refugees accounted for 66.6% of bilateral foreign bodies. These patients are mainly the victims of bomb or dynamite blast injuries (Khan MD, *et al.*, unpublished), from which the morbidity is high.

Sympathetic ophthalmia was not seen in a single case in this study.

References

- 1 Percival SBP. A decade of intraocular foreign bodies *Br J Ophthalmol* 1972; **56**: 454-61.
- 2 Weerckoon L. Pattern of ocular accidents in Ceylon. *Br J Ophthalmol* 1964; **48**: 444-9.
- 3 Canavan YM, O'Flaherty MJ, Archer DB, Elwood JH. A 10-year survey of eye injuries in Northern Ireland, 1967-1976. *Br J Ophthalmol* 1980; **64**: 618-25.
- 4 Panda A, Bhatia IM, Dayal Y. Ocular injuries - a socio-economic importance (clinical presentation). *Afro-Asian J Ophthalmol* 1985; **4**: 163-6.
- 5 Ilisar M, Chirambo M, Belkin M. Ocular injuries in Malawi. *Br J Ophthalmol* 1982; **66**: 145-8.
- 6 Cooling RJ, McLeod D, Blach RK, Leaver PK. Closed microsurgery in the management of intra-ocular foreign bodies. *Trans Ophthalmol Soc UK* 1981; **101**: 181-3.
- 7 Brinton GS, Aaberg TM, Reesen FH, Topping TM, Abrams GW. Surgical results in ocular trauma involving the posterior segment. *Am J Ophthalmol* 1982; **93**: 271-8.
- 8 Kreshon MJ. Eye injuries due to BB-guns. *Am J Ophthalmol* 1964; **68**: 858-61.

- 9 Munjal VP, Mohan K, Dhir SP, Jain IS. Ocular blast injuries. *Afro-Asian J Ophthalmol* 1985; **3**: 175-7.
- 10 Percival SBP. Late complications of intraocular foreign bodies. *Br J Ophthalmol* 1972; **56**: 462-8.
- 11 Coleman DJ. Early vitrectomy in the management of the severely traumatized eye. *Am J Ophthalmol* 1982; **93**: 543-51.

Accepted for publication 26 September 1986.