

Non-metallic foreign bodies in the anterior chamber

D. B. ARCHER, M. S. DAVIES, AND J. J. KANSKI

Moorfields Eye Hospital, High Holborn, London

Anterior chamber foreign bodies are uncommon, making up only about 15 per cent. of all intraocular foreign bodies. The velocity and point of entry determine the site at which a foreign body comes to rest. Non-metallic foreign bodies usually have a lower velocity than metallic, and once they have penetrated the cornea tend to remain in the anterior chamber. Metallic foreign bodies lodge in the iris or more commonly in the posterior segment of the globe and rarely remain in the anterior chamber.

The reaction set up in the anterior chamber to the foreign body depends on its composition, shape, and size together with the presence or absence of irritation of the adjacent structures, *i.e.* corneal endothelium, iris, and lens.

All the ten cases reported in this paper were treated at the High Holborn branch of Moorfields Eye Hospital during the last 16 years (Table).

Table *Clinical particulars of ten cases of foreign body in anterior chamber*

| <i>Foreign body</i> | | <i>Glass</i> | | | | | | | <i>Wood</i> | | <i>Plastics</i> |
|----------------------------|----------------------------|--------------|---|---|----|---|---|----|-------------|---|-----------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7* | 8 | 9 | 10† |
| <i>Cause</i> | Shattering spectacles | | + | + | | + | | + | | | |
| | Shattering of glass object | | | | + | | | + | | | |
| | Shattering windscreen | + | | | | | | | | | |
| | Other | | | | | | | | + | + | + |
| <i>Time before removal</i> | Days | | | | | | | | 1 | 1 | |
| | Weeks | | 3 | | | | 3 | | | | |
| | Months | | | | | | | 2 | | | |
| | Years | 1 | | 1 | | | | | | | 8 |
| <i>Not removed</i> | How long present (yrs) | | | | 20 | 7 | | | | | |
| <i>Final visual acuity</i> | 6/5-6/9 | + | + | | + | + | + | + | + | + | + |
| | 6/12-6/24 | | | + | | | | | | | |
| <i>Complications</i> | Corneal oedema | + | + | + | + | + | | | | | |
| | Lens opacities | | | | | | | + | + | | |

*See Fig. 1

†See Fig. 2

(1) Glass foreign bodies

It was at one time thought that eyes containing glass fragments would shrink relatively quickly. This view is no longer valid, as glass is inert, being composed of neutral sodium silicate (98 per cent.). The damage caused by a glass foreign body in the anterior chamber is due to mechanical irritation, the extent of which depends on its mobility and sharpness. Of the seven glass foreign bodies collected, four were caused by the shattering of spectacles (Cases 2, 3, 5, and 7), two by the explosion of glass objects (Cases 4 and 6), and one by the shattering of a windscreen (Case 1).

COMPLICATIONS

(a) Corneal oedema

This occurred in five out of seven cases and is the commonest complication, being due to endothelial damage. It may even progress to severe bullous keratopathy (Case 3). It is important to note that corneal oedema may not develop until months or even years after the original injury (11 months in Case 1 and 20 years in Case 4), and in the intervening period the eye may be white and symptomless. This may be due either to the sudden shifting of the foreign body or to repeated small movements both leading to endothelial damage. In Case 5 corneal oedema developed 2 months after the injury and was only transient, clearing spontaneously after 6 weeks; although the foreign body is still present the oedema has not recurred after 7 years. In two patients (Cases 1 and 2) the corneal oedema disappeared completely after the removal of the foreign body. In Case 3 the severe bullous keratopathy improved markedly after the removal of the foreign body one year after the injury. Its failure to disappear completely must be due to permanent endothelial damage.

It is significant that in the two cases in which there was no corneal oedema the injuries were more extensive (Case 6 an iridodialysis with posterior synechiae and localized lens opacity; Case 7 (Fig. 1) traumatic cataract requiring removal). In these it would seem that there was a much greater inflammatory response, and that the resultant exudate caused the foreign body to become bound down in the angle and immobilized.

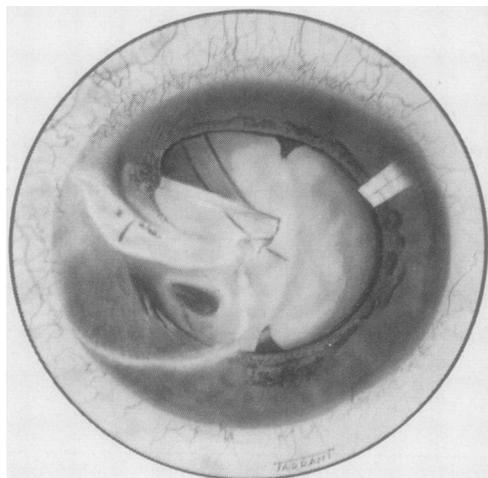


FIG. 1 Case 1 Glass in the anterior chamber

(b) Anterior uveitis

This may occur and even sympathetic ophthalmitis has been reported. Persistent anterior uveitis has not however been a feature of any of the cases reported in this paper.

(c) Cataract

This can result from the original injury (Cases 6 and 7) or may occur later through the movement of sharp spicules damaging the anterior lens capsule. This latter feature was not evident in our series.

DIAGNOSIS

A history of shattering of spectacles or of an accident involving breaking glass, no matter how distant or trivial, should arouse suspicion in a case of otherwise unexplained corneal oedema or bullous keratopathy. In most instances the only way in which glass fragments in the anterior chamber can be demonstrated is by careful slit-lamp and gonioscopic examination, after clearance of corneal oedema with 30 per cent. glycerol drops if necessary. X rays are usually unsatisfactory, but in certain cases glass can be demonstrated on tangential bone-free films taken at various angles and penetrations and processed in an identical manner.

TREATMENT

Small pieces of glass may be unknowingly retained in the angle for many years before causing symptoms (20 years in Case 4). Once symptoms do occur the foreign body should be removed. It is advisable to make an adequate incision as it may be difficult to grasp the glass with forceps. The attempted removal of small asymptomatic particles may cause unnecessary damage to the eye. On the other hand the foreign body may have been visible in the angle but symptomless for a long time (Case 4) and not until later cause corneal oedema: in these circumstances it may be difficult to re-locate it preoperatively even by gonioscopic examination despite the use of glycerol.

PROGNOSIS

The visual prognosis for retained glass in the angle is uniformly good. In three cases the visual acuity was 6/6 or better, in three it was 6/9 and in one 6/18. With regard to symptoms the outlook is also very good. Out of three cases with corneal oedema in which the foreign body was removed, two corneae returned to normal (Cases 1 and 2). In Case 3 the bullous keratopathy was markedly improved and symptoms much relieved.

In the two patients (Cases 6 and 7) in which the injuries were more extensive the eyes are quiet and symptomless. The foreign body was not removed in Cases 4 and 5: in the former there is a little corneal oedema below but symptoms are slight and intermittent; Case 5 is asymptomatic.

(2) Wood foreign bodies

Wood constitutes the commonest intraocular foreign body of a vegetable nature. The main danger is that of acute pyogenic infection, as the wood is frequently infected. Fortunately this did not occur in either of our two cases. In Case 8 the wood was removed on the same day, and in Case 9 it fell into the anterior chamber during an attempt to remove it from the cornea and was washed out immediately. In both cases the eyes remained quiet with a visual acuity of 6/9.

(3) Plastics foreign bodies

Plastics materials are usually inert and behave in the same way as glass, but some of the thermo-setting plastics such as bakelite and casein may cause a severe inflammatory reaction.

In our case (Case 10) a driving mirror had shattered 8 years previously and the patient had only recently noticed a shadow floating down when he was supine. This was seen to be a foreign body floating free in the anterior chamber, which passed into the pupillary area when he lay flat but otherwise remained asymptomatic in the superior recess of the angle (Fig. 2). It was not radio-opaque and after its removal the visual acuity remained 6/6, the eye being quiet and asymptomatic.

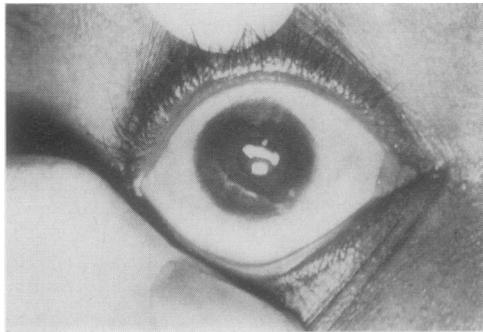


FIG. 2 Case 2 Plastic foreign body floating in the anterior chamber

Summary

Ten cases of non-metallic anterior chamber foreign bodies are discussed with regard to complications, diagnosis, prognosis, and treatment. The uniformly good prognosis is stressed even in cases in which the foreign body had been present for many years.

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Bibliography

- ANNOTATIONS (1941) "Eye injuries in air raids", *Brit. J. Ophthalm.*, **25**, 179
 DUKE-ELDER, S. (1954) "Text-book of Ophthalmology", vol. 6, pp. 6176-6177. Kimpton, London
 MCDONALD, P. ROBB, and ASHODIAN, M. J. (1959) *Amer. J. Ophthalm.*, **48**, 747
 MOSKOWITZ, H. L. (1953) *A.M.A. Arch. Ophthalm.*, **50**, 319
 ROBERTS, W. E. (1951) *Amer. J. Roentgenol.*, **66**, 44