AN ANTERIOR CHAMBER LENTICULAR IMPLANT*

BY

HAROLD RIDLEY

London

THE introduction of artificial intra-ocular lenses has been proved to be a practical possibility and has gone far to mitigate the disadvantages of aphakia especially in cases of monocular cataract. Intra-ocular acrylic lenses have now been in use for 7 years and there is no doubt that the eye can tolerate pure polymethyl methacrylate for at least this time, for satisfactory cases, once the initial irritation has passed, remain free from inflammation and symptoms or signs of foreign body reaction (H. Ridley, 1952, 1956). The operation, though not in principle difficult, has in practice not always proved straightforward, the two main complications being slow convalescence due to reactionary iritis and late dislocation of the lenticulus. Especial care is necessary to remove all or almost all of the cortical remnants and to avoid any damage to the very thin posterior capsule on which the stability of the lens depends. Surgical failure in either of these respects almost inevitably leads to a distressing result. Extracapsular extraction with insertion of an intra-ocular acrylic lens comprises two operations in one, and any operative error is likely to be heavily penalized.

The difficulties of intra-ocular acrylic lens surgery led Strampelli (1954) and later Schreck (1955) and Scharf (1955) to devise simpler techniques and to employ acrylic implants placed in front of the iris. A lens in the anterior chamber is not so ideally situated as one in the natural position, but it has certain advantages. It can be employed after intracapsular extraction since its large diameter prevents posterior dislocation. In extracapsular cases late capsulotomy is simple and differs little from such an operation after plain extracapsular surgery, for there is a space between the back of the lens and the posterior capsule. Two-stage surgery presents no difficulty, since posterior synechiae are of no practical importance and do not impede late insertion of the lens. In most cases a fair estimate of the refraction can be made and, if the manufacturer is given the back vertex power and vertex distance of the aphakic correction, and in monocular cataract the refraction of the other eye, a special anterior chamber lens can be ground to suit the particular case. Finally there is a smaller area of contact between the implant and the iris, and less post-operative iritis is to be expected, especially if the extraction has been intracapsular or if an adequate interval

has been allowed before insertion of the implant after extracapsular extraction.

Various patterns of lens have been designed by Strampelli (1954) and others but an ideal design has not yet been evolved. There seems at present to be a tendency to use simple implants about the diameter of the anterior chamber in length and some 6 mm. in width. Such a lens is easy to insert and only a small corneal incision is necessary, but it is possible for such an implant to twist on its longitudinal axis or to slip out of the line of the pupil unless the exact optimum length can be correctly assessed before insertion: and this is no simple problem. Furthermore, if the patient is young, the fit may become less accurate with growth of the eye.

To overcome these difficulties and to produce a lens with a very high degree of stability, it was decided to design an implant consisting of a central lenticulus supported by three legs (or arms) arranged to provide wide triangular support (Fig. 1). Two of these legs subtend an angle of 33° each from the vertical meridian below, while the third lies on the vertical meridian above. The legs curve backwards so that when their tips lie on the iris periphery the lens is supported approximately mid-way between the cornea and pupil with gaps of about 1 to 1.5 mm. between the front of the lens and the cornea and between the back of the lens and the posterior capsule. The posterior curvature can be varied by the manufacturer to suit the refraction of the particular eye for which it is intended. The diameter of the haptic can also be varied and it is advisable to have several sizes available before undertaking the insertion.

FIG. 1.—Anterior chamber lenticular implant (author's pattern).

Sets of such lenses in different haptic diameters (Fig. 2) are now available and will in future be sterilized by the makers in accordance with the directions given by Mr. Frederick Ridley (1957).

FIG. 2.—Insertion forceps and set of anterior chamber lenticular implants of various haptic diameters.

An anterior chamber implant of this pattern is comparatively easily inserted. A satisfactory method of judging the size to be employed has not yet been evolved, but an estimate may be made by measuring with calipers the diameter of the limbus (from white to white) in the vertical meridian and trying an implant with a haptic 0.5 mm. greater. If much

difficulty is encountered when inserting this, one size smaller may be used, for the broad triangular supports do not require firm pressure in the region of the angle to maintain the position. A corneal incision of about 8 mm. is made with a von Graefe knife so that a corneo-scleral lip is left. A keratome incision, being narrower internally than externally, is less suitable. The lens, grasped with special forceps (Fig. 3) by its upper projection, is directed through the wound, one of the lower

FIG. 3.—Insertion forceps. The implant is held in a groove at an angle of 45° to the line of the forceps.

legs being inserted before the other. Little difficulty should be encountered in siting the two lower legs if the pupil is small, but in eyes damaged by trauma some manipulation may be necessary to set both legs on the front of the iris and equidistant from the vertical meridian. When the two lower legs are seen to be in place the upper may be slipped behind the corneo-scleral lip and the wound closed with or without sutures.

There is little tendency for the eye to react sharply to this operation, partly because it is generally, though not necessarily, performed in two stages, and partly because much less of the prosthesis is in contact with the iris. Some exudates usually form on the acrylic surfaces but they quickly disperse with the aid of cortisone. It is simple to perform a later posterior capsulotomy should it be required. The appearance of the eye should be satisfactory, for the margin of the lenticular portion is concentric with the pupil.

It may be asked whether such an anterior chamber implant with its comparative ease of insertion and safety from dislocation supersedes the original intra-ocular acrylic lens which in favourable circumstances has provided such good results. The proper place for an artificial lenticulus must surely be where Nature intended the crystalline to be. The optics of an eye are restored most closely to normal when the artificial lens is behind the iris, and in eyes which have no defect except cataract the original pattern or some slight modification would seem ideal. There are however many eyes which have suffered injury or past inflammation, or in which growth is not complete, and in them the anterior chamber implant is safer and superior.

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