Extracapsular cataract extraction—some problems

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SUMMARY Comments are made on the method of removing the anterior capsule during the performance of extracapsular cataract operations. The difficulty of performing this manoeuvre adequately is emphasised. Observations carried out during the postoperative period by means of the slit-lamp revealed some hitherto undescribed changes in the capsule. The edge of the anterior capsule can be clearly seen and looks like broken glass. Fine fibrils have been observed attached to the fractured capsular edge. In the early postoperative period the anterior capsule tends to be separated from the posterior by quite a deep space, but at an early stage, usually about the fourth day, the edge of the anterior capsule becomes adherent to the posterior capsule, and rather rapidly a dense fibrous line forms along the joint.

We have been through a period in ophthalmology in the 1950s and 1960s when extracapsular cataract extraction had practically ceased—so much so that there is now a whole generation of ophthalmologists who have hardly been taught how to express a nucleus. Extracapsular cataract extraction is a very old operation, the first description being by Jaques Daviel in 1753.¹ The after-cataract which tends to form in the scaffolding of the remnants of capsule and lens matter has been extensively studied by Soemmering² and many others. Duke-Elder³ stated that in Soemmering's ring the edges of the anterior capsule adhere to the posterior but that fibrous cells may be laid down on the posterior capsule by fibroblasts from the iris. Furthermore, the subcapsular epithelium comes to line the ring—both anterior and posterior capsules. Bladder cells, Elschnig's pearls,⁴ and their possible removal by irrigation are also mentioned.

The indications for extracapsular surgery are present in any case of cataract where for some reason intracapsular extraction is thought to be hazardous or unsuitable. Absolute indications would be when the patient is below the age of 40 years, where later drainage surgery is contemplated, or where irido-capsular pseudophakos is planned. Relative indications would be patients between the ages of 40 and 60, patients with high myopia, and patients in whom ischaemic retinopathy is suspected.

Material and methods

The eyes of patients undergoing routine extracapsular cataract surgery at the Western Ophthalmic Hospital were observed during the year 1980. Particular attention was given to the slit-lamp appearances in the early postoperative period, and photographs were taken of the anterior capsule where appropriate on the second, fourth, and several subsequent days. In addition some photographs were taken during the course of extracapsular surgery in the operating theatre.

The surgical technique consisted in the forming of a limbal groove *ab externo*, the insertion of 3 preplaced sutures, and puncture of the anterior capsule with a hooked blue disposable needle attached to a drip of Hartmann's solution. The section was then opened and removal of the anterior capsule carried out, usually with Arruga's capsule forceps.

We tried to ensure that the removal of the anterior capsule should be as complete as possible, because while removing anterior capsule one is probably also removing active subcapsular epithelium and minimising the chance of after-cataract. (There have been recent pronouncements on the subjects of anterior capsular removal following the upsurge of interest consequent on phakoemulsification and pseudophakos. For example, Arnott⁵ recommended cutting the capsule in the shape of an inverted Christmas tree, the 'tree' being drawn out by fine toothed forceps, and Kelman⁶ advised an approxi-

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Fig. 1 While the capsule is being cut with a hooked blue needle, it tends to split in a linear fashion. Arrows indicate edge of split capsule.

mately similar manoeuvre carried out under an air bubble.)

After removal of capsule the nucleus was expressed and the wound temporarily closed by tying the sutures in bows. Irrigation-aspiration by a double cannula could then be carried out at leisure as in the closed technique, and at the conclusion of this procedure, or sometimes before it, a peripheral iridectomy was

Fig. 2 Broken-glass appearance of anterior capsule remnants 2 days postoperatively.

Fig. 3 Fibres 'growing' from edge of cut capsule 2 days postoperatively. Normally the fibres are very fine; these appear to have an opaque coagulum on them making them more visible than usual.

performed. Finally the bows were tied permanently or were undone and retied later if it was intended to insert an intraocular lens.

Results

We found that the anterior capsule tended to split in an erratic fashion, like tearing Cellophane, once it was pricked with a hooked blue needle—and the direction of the split was difficult to control. Furthermore, unless the microscope was zoomed up to a high magnification it was very difficult to see what was happening (Fig. 1). However, in many cases the capsule could be divided in a fairly satisfactory manner, hooked or rolled up towards the section, and eventually grasped with forceps, cut, and removed. It was important to include cutting in this procedure, since if pure traction was used it was possible to pull out the capsular rug from under the nucleus.

After lens extraction the edge of the anterior capsule could be seen in the anterior chamber looking very like broken glass (Fig. 2).

At an early stage—certainly within 3 days—fine fibrils appeared to be growing out of the fractured edge, though it was not clear whether they were only existing lens fibres whose position had been disrupted by the surgery (Fig. 3).

In 3 to 4 more days the anterior capsular edge moved backwards and became adherent to the posterior capsule. It was doubtful whether it was drawn backwards by contraction of the previously mentioned fibrils, which may first have become attached to the posterior capsule, or whether the

Fig. 4 The anterior and posterior capsules rapidly unite: arrow indicates junction.

backward movement was a chance one resulting from swirling currents in the anterior chamber, the adhesion to the posterior capsule being possibly mediated by the fibrils (Fig. 4). After a little longer the line of junction between the edge of the anterior capsular remnant and the intact posterior capsule became marked by dense fibrous tissue. It seems likely that this tissue is the successor to the fine fibrils originally noted, so that the mechanism mentioned by Duke-Elder of fibroblasts originating from the iris is probably incorrect. A question which interests us is why lens cells sometimes form dense fibrous bands and at other times the clear bladder cells with which we are familiar. The fibrous bands tend to form preferentially at the broken edge of the anterior capsule where it becomes tied down to the posterior capsule (Fig. 5).

Discussion

The main point of this paper is to draw attention to the hitherto undescribed changes in the position of the anterior lens capsule immediately following surgery and also to mention the fine fibrils sometimes

Fig. 5 One year after extracapsular extraction (fellow eye of Fig. 4). The approximately annular line of junction between anterior and posterior capsules marked by dense fibrous tissue can be clearly seen.

found on the capsular edge. It is uncertain whether these changes will prove to have any particular clinical or histopathological significance, but further extended observations on the behaviour of the anterior capsule may possibly yield some more interesting information.

We should like to emphasise in conclusion that we believe removal of the anterior lens capsule over as extensive an area as possible is the key to success in cataract surgery and that manoeuvres such as polishing the posterior capsule and even the exceptionally careful and complete removal of cortical material are of less importance than the removal of anterior capsule as efficiently as possible.

References

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