Effect of lens extraction in pseudoexfoliation of the lens capsule

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It is a matter of considerable clinical interest whether removal of the lens causes regression of pseudoexfoliation of the lens capsule. Before the paper by Dvorak-Theobald (1954), pseudoexfoliation of the lens capsule was often confused with true exfoliation, and it was suggested that lens extraction caused the condition to disappear (Irvine, 1940; Gradle and Sugar, 1947). After this paper appeared the effect of lens extraction on pseudoexfoliation was in doubt as the origin of the pseudoexfoliative material was uncertain.

Several workers (Bertelsen, 1966; Bertelsen and Ehlers, 1969; Dark, Streeten and Jones, 1969) have recently produced evidence that pseudoexfoliative material is derived from the lens and the term “fibrillo pathia epithelio capsularis” has been introduced. If the material does originate in the lens, then lens extraction may cause the pseudoexfoliative material to regress and eventually to disappear.

Material and methods

Thirty patients with pseudoexfoliation of the lens capsule, who underwent cataract extraction at the Royal Victorian Eye and Ear Hospital over a period of 12 years, have been followed up for varying periods of 12 months or more.

The presence of pseudoexfoliation of the lens capsule was determined by slit-lamp examination both pre- and postoperatively, before and after mydriasis. Studies of the intraocular pressures were also performed before and after operation.

Results

Cataract extraction was difficult in these patients; the lens capsule seemed very liable to break and large hyphaemas frequently occurred, particularly in the early cases in the series. There was a tendency for the pupil to stick to the vitreous face postoperatively causing pupillary block. Fourteen of the patients had advanced glaucoma with high intraocular pressure, cupping of the optic disc, and field loss.

Visual results

Fifteen patients achieved visual acuity of 6/9 or better, one 6/12, five 6/12 to 6/60, and nine less than 6/60.

The poor visual results were due to various causes including dense pupillary fibrosis (six patients), circinate retinopathy, advanced glaucoma, and glaucoma with central retinal thrombosis.

Five patients had bilateral cataract extractions and the results given are for the better eye.
Disappearance of pseudoexfoliative material

In all patients in whom intracapsular extraction was successfully performed the pseudoexfoliative material appeared to regress postoperatively. Small shrunken deposits of material were seen on the vitreous face and around the pupillary margin, but these were much less marked than before operation and appeared to regress slowly and to disappear, although faint traces persisted in many patients for a long time. In no case, however, did the deposits appear to increase postoperatively. In some patients the postoperative progress of the deposits was obscured by fibrosis in the pupillary area.

In patients with capsular remnants pseudoexfoliative deposits persisted in association with them but elsewhere the material appeared to regress.

Effect on intraocular pressure

This was rather difficult to assess. In two cases with established glaucoma, lens extraction appeared to give a definite improvement in the control of the raised intraocular pressure. Many of the other patients had a low degree of elevation of intraocular pressure which seemed to fall to normal levels postoperatively and this improvement was maintained. In one patient the tension was very difficult to control after an uncomplicated cataract extraction. Several patients developed aphakic glaucoma because of postoperative complications, particularly flat anterior chamber.

In a patient in whom a small fragment of capsule was left behind after operation, shrunken pseudoexfoliative deposits remained associated with the capsular remnant, but no deposits remained elsewhere (Fig. 1).

It was interesting that in a patient in whom lens remnants remained after an extracapsular extraction, pseudoexfoliative deposits persisted. In the opposite eye, on which a successful intracapsular operation was performed, the pseudoexfoliative material regressed.

Case 12, a woman aged 74 years, presented in 1963 with bilateral cataracts and pseudoexfoliation more advanced in the left eye. The visual acuity was 6/24 in the right eye and perception of light in the left. The ocular tension in the right eye was 20 mm. Hg (c−0.08) while in the left it was 34 mm. Hg (c=0.12).
On June 29, 1964, a left cataract extraction was performed with rupture of the capsule. Postoperatively well-marked lens remnants remained with persistence of associated pseudoexfoliative deposits.

On October 16, 1968, a right intracapsular cataract extraction was performed; postoperatively pseudoexfoliative material almost completely disappeared from the right eye. The visual acuity in the right eye is now 6/6 and in the left 6/9. The ocular tension in the right eye is 16 mm. Hg and in the left 12 mm. Hg (without treatment) (Figs 2 and 3).

Cataract extraction seemed to improve control of the intraocular pressure in a patient with pseudoexfoliation who had previously had thrombosis of the central retinal vein.

Case 21, a man aged 81 years, presented in 1965 with dense cataract, pseudoexfoliation of the lens capsule, asteroid vitreous bodies, and thrombosis of the central retinal vein in the right eye. The ocular tension in the right eye was 43 mm. Hg. The left eye had been lost in an accident in 1941. After a course of anticoagulants the thrombosis of the right central retinal vein cleared, but visual acuity was less than 3/60, and the intraocular pressure was difficult to control.

On April 30, 1968, a right intracapsular cataract extraction was carried out.

On March 1, 1971, the visual acuity was 6/36 in the right eye, and the ocular tension was 17 mm. Hg on gutt. pilocarpine four times daily. There was minimal evidence of residual pseudoexfoliative material.

Two patients with cataracts and pseudoexfoliation of the lens capsule had marked regression of the pseudoexfoliative material after intracapsular cataract extraction, but with little change in their pre-existing normal intraocular pressures.

Case 24, a woman aged 70, presented in 1965 with gradual visual loss due to bilateral cataracts with pseudoexfoliation. The visual acuity in the right eye was perception of light and in the left 6/9. The ocular tension was 12 mm. Hg in the right eye and 15 mm. Hg in the left. By 1969 the visual acuity in the left eye had fallen to 6/24.

On April 21, 1969, a right intracapsular cataract extraction was carried out.
On November 20, 1970, there were shrunken remnants of pseudoexfoliative material round the pupil margin and on the vitreous face. The ocular tension in the right eye was 11 mm. Hg and in the left 15 mm. Hg. The visual acuity in the right eye was 6/6 (Figs 4 and 5).

**Case 29, a woman aged 75,** presented with failing vision due to bilateral senile lens opacities with pseudoexfoliation. The visual acuity was 6/60 in the right eye and 6/24 in the left. The ocular tension was 12 mm. Hg (c=0.24) in the right eye and 12 mm. Hg (c=0.13) in the left.
On September 29, 1969, a right intracapsular cataract extraction was performed and on August 31, 1970, a left intracapsular cataract extraction.

On March 11, 1971, the visual acuity was 6/6 in each eye. The ocular tension was 18 mm Hg in the right eye (c=0.22) and 14 mm Hg (c=0.20) in the left. Only a few scattered and shrunken remnants of pseudoexfoliative material were seen in the anterior chamber (Figs 6 and 7).

Comment

In patients who had undergone intracapsular lens extractions, pseudoexfoliative material in the anterior segment of the eye regressed after lens extraction, and new material did not appear to be laid down. The presence of fresh exfoliative material could possibly be masked in some cases by postoperative inflammatory reaction round the pupil margin and by adhesions of the iris to the vitreous face, but, in those patients in whom free dilatation of the pupil was possible postoperatively, there was no evidence of the formation of fresh material. This is consistent with the electron microscopic studies of Bertelsen, Drablös, and Flood (1964) and Bertelsen and Ehlers (1969), indicating that the lens itself is the source of pseudoexfoliative material.

The present study indicates that there may be some improvement in aqueous outflow and some fall in intraocular pressure after lens extraction in patients with glaucoma associated with pseudoexfoliation of the lens capsule. The degree of fall in intraocular pressure after lens extraction may depend upon:

(i) The amount of pigment and exfoliative material already deposited in the trabecular meshwork.

(ii) Whether this material is able to be cleared from the trabeculae after its production ceases.

(iii) The pre-existing facility of aqueous outflow.

(iv) Perhaps on some modification of trabecular function following lens removal and flattening of the iris diaphragm.

Some immediate fall in intraocular pressure may accompany lens removal through (iv) and perhaps through postoperative hypotony. Over a longer period some further improvement in intraocular pressure may occur with improvement in trabecular function if the pigment and exfoliative material disappear from the trabeculae and no more is laid down.

These findings indicate that cataract extraction may have a favourable effect in cases of glaucoma associated with cataract and pseudoexfoliation of the lens capsule, especially if there is a tendency to ocular hypertension or if one eye has already developed glaucoma. However, the effect of lens extraction may not be immediate or profound, and probably the normal indications for cataract extraction should be observed.

The visual results of cataract extraction in these patients were worse in uncomplicated cases, particularly in the early cases in the series. Although sometimes due to advanced glaucoma, the poor results were often due to postoperative hyphaema and inflammatory changes. Later cases in the series seem to have done better with cryoextraction and a careful incision, pre-placed sutures, and accurate suturing under the microscope.

Summary

Thirty patients with cataracts associated with pseudoexfoliation of the lens capsule underwent cataract extraction. Evidence is presented that in these patients intracapsular cataract extraction caused the pseudoexfoliative material to diminish and regress.
The effect of lens extraction on intraocular pressure in these cases was less clear-cut, but some fall in intraocular pressure seemed common. Perhaps also the progression of intraocular pressure to higher levels was halted in some cases.

Cataract extraction may be helpful in patients with cataract, pseudoexfoliation, and a rise in intraocular pressure. Lens extraction in these patients tends to be complicated by hyphaema and a tendency for the pupil to adhere to the vitreous face.

The difficulties of lens extraction in these patients have been minimized by the use of pre-placed sutures, careful incision, cryoextraction, and careful attention to postoperative dilatation of the pupil. Complications were much less common in the later cases in the series.

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