CASE NOTES

FOLDS IN THE LENS CAPSULE AFTER TRAUMA* A SIGN OF PARTIAL RUPTURE OF THE ZONULE

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CASE REPORTS

Case 1. J. B., aged 42, engineer and sportsman was struck in the left eye by a squash ball on February 2, 1950. When seen 2½ hours later the right eye was normal and the vision 6/9. The left eye showed conjunctival injection, a small skin laceration just lateral to the outer canthus, and a bright cornea. The anterior chamber contained a hyphaema which was thin enough to detect iridodonesis, with the pupil inactive to light. No red reflex was seen in the pupil area, vision being hand movements at one foot with accurate projection. The tension was full. During the next few days the hyphaema disappeared completely, showing a partial subluxation of the lens and a developing posterior sub-capsular traumatic cataract of typical appearance. The cataract developed until sufficiently dense to prevent a red reflex being seen in the pupil area and again retrogressed to the very considerable extent shown in the final examination.

When discharged on February 12, 1950, he saw 6/5 right with -0.75 sph. The left vision was 6/24 with $+0.5$ sph. -1.0 cyl. at 20° . The cornea was clear and the anterior chamber contained numerous floating pigment particles. A dilated pupil and posterior cortical lens opacities were still present.

On March 1, 1950, his vision left was 6/24 unaided, having improved but little. The anterior chamber showed one or two floating pigment granules while the lens revealed posterior opacities much less apparent and folds in the anterior lens capsule much more prominent. In the retrolental space was a cloud of pigment particles. The fundus was well seen and showed normal appearances. On March 30, 1950, vision left was 6/12 with correction. The horizontal folds in the anterior lens capsule showed as horizontal dark streaks on a red background when seen with the mirror (Fig. 1).

When examined on August 24, 1950, he complained of inability to use the left eye when doing close work, having to close this eye with the fingers of his left hand to avoid an annoying blurred second image. He also complained of seeing flashes of light now and then. Examination of the left eye showed vision 6/9, the pupil 6 mm. in diameter as compared with 4.5 mm. in the right eye. The iris showed iridodonesis from 4 o'clock to 8 o'clock maximally. The vitreous and fundus appeared clear ophthalmoscopically. The right refraction was 6/6 with -0.5 D sph. $+0.25$ D cyl.

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FIG. 1.—Case 1, left eye, folds in anterior lens capsule seen with the plane mirror, March 1, 1950.

FIG. 2.—Case 1, left eye, undulations of anterior lens capsule seen with the slit lamp, August 24, 1950.

FIG. 3.—Case 1, left eye, opacity in sub-capsular region, August 24, 1950.

FIG. 4.—Case 2, right eye, diagram of anterior chamber, October 9, 1950.

FIG. 6.—Case 2, right eye, showing planes of the optical sections seen in Fig 7 (a), (b), and (c).

FIG. 5.—Case 2, right eye, appearances, October 9, 1950.

FIG. 7(a), (b), (c).—Case 2, right eye. Optical sections of anterior chamber and lens in three places, October 9, 1950.

at 60°, the near point being 27 cm. The left eye had a corrected vision of 6/6 (2 letters) with -0.5 D sph. $+0.25$ D cyl. at 90°. Binocular vision with this correction was 6/5 (-1). With a $+2.0$ D sph. placed in front of the left eye, and using the left eye only, the near point was 38 cm. and the far point 48 cm. He wished to read at approximately 40 cm.; the refraction at this far point (48 cm.) was $+2.0$ sph. $+0.25$ cyl. at 90°, this giving the best reading correction at this distance. At the corresponding near point the refraction was $+2.0$ D sph. $+1.0$ D cyl. at 90°. Vision for reading at 40 cm. was equalized with the correction of right $+0.25$ cyl. at 50°, and left $+2.0$ D sph. $+0.5$ D cyl. at 90°; this was ordered and he was comfortably binocular over several pages on testing.

The left lens when seen with the slit lamp showed the undulations of the anterior capsule shown in Fig. 2. Beneath each prominence there was a slight opacity, while a very faint opacity still existed in the sub-capsular region (Fig. 3). The anterior chamber remained relatively deep, especially above.

COMMENT.—It is considered that this case demonstrates the effects of partial rupture of zonule fibres as revealed by the localized iridodonesis, deep anterior chamber, and change of refraction and astigmatism when the patient attempted to accommodate, with stress folding of the anterior lens capsule due to unequal tension of the zonule.

Case 2. P. H., aged 9, schoolboy, was struck in the right eye by an arrow on August 29, 1950, and, according to reports, could distinguish only light from darkness on that day with the injured eye. The following day an operation was performed, at which an iris prolapse at 9 o'clock in the right eye was abscised. On admission on September 21, 1950, right vision was hand movements with accurate projection. The conjunctiva showed ciliary injection. There was a corneal wound at 9 o'clock healing well. No keratic precipitates were present, and the anterior chamber was filled with floating particles. The pupil was fully dilated, the iris showing an operative coloboma from 8 o'clock to 10 o'clock. The lens was relatively clear, revealing a hazy vitreous with haemorrhages, and oedema and haemorrhages at the macula and also over a large part of the retina. The tension was normal. Vision left eye was 6/6 with $+0.5$ sph. and otherwise normal.

With atropine and rest the vitreous haze cleared considerably and the patient was discharged on October 9, 1950, when the appearances were as follows:

Corneal opacity at 9 o'clock adjacent to the limbus. The anterior chamber was shallow laterally and deep medially (Fig. 4). Laterally there was an operative coloboma of the iris, the pupil being very widely dilated. The lens was clear but dark streaks across it could be seen with the retinoscope. There was an irregular refraction when looking at the fundus. The vitreous was slightly hazy and the fundus showed a hole at the macula, with a vertical tear with greyish margins and a white face, a large wide choroidal tear infero-temporally, and a grey oedematous area nasally, no true retinal detachment being seen. The lens showed a posterior sub-cortical opacity, 2 mm. in diameter, 1 mm. from the temporal edge at 9 o'clock (Fig. 5). The slightly serrated equator of the lens was visible at 8 o'clock past the iris coloboma edge, and a very fine radial striated appearance was present, running from the equator of the lens outwards. The lens was dislocated medially as shown by a portion of this edge of the lens, and thus, laterally on slit-lamp section, the lens was very thin and folds had begun to appear in the posterior capsule. In the centre of the pupil these folds were seen grossly, but medially, the posterior capsule was again quite regular (Figs 6 and 7 a, b, and c).

The anterior lens capsule was smooth and right vision was counting fingers at 50 cm. Left vision was 6/5 and the eye normal. Although no refraction was possible in this case, from examination it is seen that the lens is dislocated forwards with folds in the posterior capsule, presumably due to partial rupture of the zonule.

SUMMARY OF CASES

The first case shows:

- (a) Folds in the anterior lens capsule.
- (b) Lens displaced backwards.
- (c) On refraction, changes in the cylinder required when accommodating.

The second case shows:

- (a) Folds in posterior lens capsule.
- (b) Lens displaced forwards.
- (c) Anterior leaf of zonule visible laterally through the coloboma and appearing intact.

CONCLUSIONS

(1) The folds in the lens capsule showing clinically as parallel shadows when viewed by retro-illumination, and as an undulating surface of the lens on slit-lamp examination, are the result of partial ruptures of the zonule.

(2) Since these findings were associated in both cases with bodily shift in the lens (usually held to be impossible without some rupture of the zonule), there had in fact been a rupture of the zonule, producing the consistent effect of a cylindrical refractive change in the first case.

(3) The fact that the anterior zonule fibres were intact at the point of maximum displacement of the lens in the second case indicates that the partial posterior zonule rupture produced posterior lens capsule folds.

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