

Lens capsule in diabetes

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The vascular basement membrane is known to be thickened in diabetes (Bloodworth, 1963; LeCompte, 1964). This thickening has been observed in the kidney glomerulus (LeCompte, 1964) and the retinal capillaries (Bloodworth, 1963). Odin and Törnblom (1959) and Lazarow and Spiedel (1964) also showed that the basement membrane of the glomerulus contains a protein which can be identified as a collagen by its high content of hydroxyproline, and there is some evidence that this protein is increased in the thickened basement membrane of the diabetic (Lazarow and Spiedel, 1964). This protein is linked to a disaccharide of glucose and galactose (Spiro, 1967). A collagen containing glucose and galactose was found in lens capsule by Pirie (1951), who suggested that it might be present in other parts of the body. Later, Roberts (1957) found that rat lens capsule was antigenically similar to the basement membrane of the glomerulus and of the small blood vessels of the retina. A detailed chemical comparison of glomerular basement membrane and lens capsule has been made by Kefalides (1967), who found them very similar.

Recently Paterson and Heath (1967) have found that capsules from lenses of diabetics (*post mortem*) contain about three times as much hydroxyproline, and therefore possibly the capsular collagenous glycoprotein, as the capsules from lenses of non-diabetic persons. The hydroxyproline of the anterior capsule of cataractous lenses of non-diabetics was also increased, but less than that of the diabetic capsule. Thus the basement membrane of the lens epithelium reacts to the diabetic state in the same way as basement membrane elsewhere in the body.

Behaviour of capsule of diabetic lens at operation

Amongst several surveys of cataract extraction in diabetic patients, only that of Townes and Casey (1955) comments on the difficulties of intracapsular lens extraction in diabetics. These authors found that in diabetic cases 20 per cent. of capsules ruptured, while among all cases (including diabetics) the incidence of ruptured capsules was 12 per cent.

In this present work a survey was made of all the senile cataract extractions performed in the Oxford Eye Hospital on all patients over the age of 20 years from 1963 to 1966. It was found that ruptured capsule occurred in 16 per cent. of 869 non-diabetic eyes and 28 per cent. of 112 diabetic eyes (Fig. 1). Although the advent of cryosurgery at the end of 1965 reduced the overall figures for ruptured capsule, the risk of this complication is still considerably higher in diabetics than in non-diabetics. Fig. 2 shows that the use of

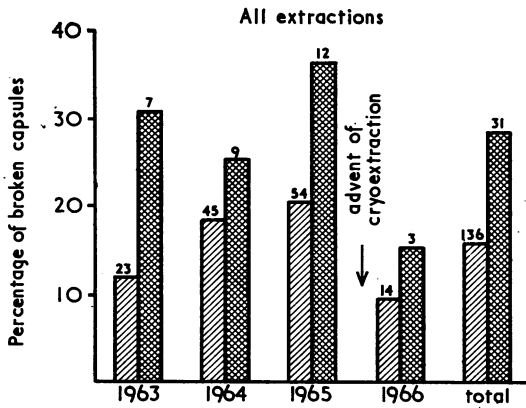


FIG. 1 Percentage of broken capsules in all "senile" lens extractions, Oxford Eye Hospital, 1963-1966 (Figures above columns are total numbers of broken capsules)

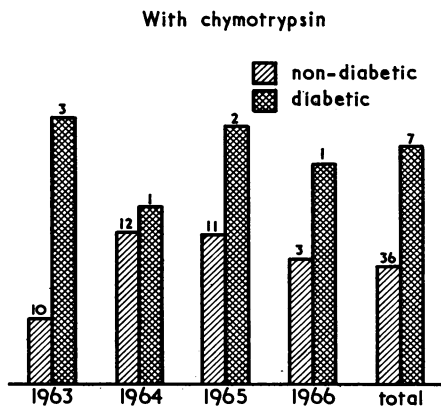


FIG. 2 Percentage of broken capsules in all "senile" lens extractions using α -chymotrypsin, Oxford Eye Hospital, 1963-1966 (Figures above columns are total numbers of broken capsules)

α -chymotrypsin has had no effect on the overall proportion of ruptured capsules and has made no difference to the excess breakage of capsules in diabetics.

The findings in this survey and in that of Townes and Casey (1955) are interesting in view of the previously mentioned biochemical studies (Kefalides, 1967). It seems possible that the thickened basement membrane of the diabetic is everywhere more friable than normal. It is known to be more permeable to proteins both in kidney (Hatch, Watt, Kramer, Parrish, and Howe, 1961) and in retina (Cunha-Vaz, Shakib, and Ashton, 1966).

Summary

In a large survey of senile cataract extractions the lens capsule was found to be considerably more friable in diabetics than in non-diabetics. This is of some importance in view of recent biochemical work on the capsule.

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