Cells of the Vitreous in Glaucoma

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This study was suggested by Prof. Colenbrander's observation that, in pathological preparations of glaucoma following thrombosis of the central vein of the retina, markedly more cells were present in the vitreous than normal.

The hypothesis was made that this might link up with the development of glaucoma in this disease. The line of reasoning is as follows:

If it is true that the cells in the vitreous produce hyaluronic acid, as has been suggested by Balazs and Szirmai, it may be supposed that more vitreous will be produced when there are more cells in the vitreous. This working hypothesis also explains why the anterior chamber is shallow in glaucoma associated with central vein thrombosis, and why it takes several months before the glaucoma becomes apparent. One may even ask oneself whether all cases of glaucoma with a shallow anterior chamber might be due to increased production of vitreous and associated with an increase in the number of cells in the vitreous.

In order to get a clearer picture the cells were counted in a number of eyes.

The study was performed on preparations from the existing collection. To make the material somewhat uniform, only sections were used which passed centrally through the optic nerve. To facilitate further comparisons, the eye was divided into sectors numbered like the clock, with the optic nerve always at 6 o'clock. The preparations were stained with haematoxylin and eosin.

In this study cells such as those described by Balazs and Szirmai and Hamburg, etc., were considered to be vitreous cells. These

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are characterized by: (1) kidney-shaped, sometimes oval, nucleus; (2) the presence of granules and vacuoles, and (3) protoplasm filaments.

The cells found were divided into 4 categories: (1) cells in the vitreous at a short distance from the retina; (2) cells in the vitreous lying against the retina, and each of these groups was divided into two depending upon whether the cell had much or little cytoplasm.

Up to now 2 sections each of 14 eyes have been examined; these included: 3 eyes without glaucoma; 4 eyes with absolute glaucoma; 5 eyes with glaucoma following venous thrombosis; 2 eyes with haemorrhagic glaucoma.

The results are summarized in the following table:

Table I

Number Average number of cells of eyes per section

Id. in percentages as compared with 1

No glaucoma 3

Absolute glaucoma 4

Glaucoma following 5 venous thrombosis

The eyes with haemorrhagic glaucoma are not included in this table. In these eyes many more cells were found, but it is not certain that these did not include a large number of white blood cells.

It is clear that many more cells are found in glaucoma following venous thrombosis. It also appears that the number of cells in the posterior area, i.e. sectors 5–7, increases more markedly than in the other sectors. Finally, one sees that in absolute glaucoma there is a relative increase in vitreous cells in front of the equator.