

HYPOTONY FOLLOWING CYCLODIALYSIS*

BY

STEPHEN J. H. MILLER

London

SUCCESSFUL results of cyclodialysis as an operation for glaucoma were first reported by Heine (1905). It is a method whereby a communication is made between the suprachoroidal space and the anterior chamber, by breaking down the attachment of the ciliary body to the scleral spur. Heine designed the operation following a report by Fuchs (1900), wherein he described the finding of separation of the ciliary body in hypotonic eyes which had developed choroidal separation following cataract extraction. He assumed that the cause of the choroidal detachment was a flow of intra-ocular fluid from the anterior chamber to the supra-choroidal space.

Cyclodialysis is an operation which is not effective in eyes with an acutely raised pressure, and in recent years has been used as an elective procedure in aphakic glaucoma with a closed angle. It also has a place as an adjunct to other operations, and has been widely employed when a basal iridectomy has failed to produce long-term control of closed-angle glaucoma. One of the complications of cyclodialysis is hypotony, and this may be produced in extreme degree so that it is impossible to record the ocular tension with a Schiötz tonometer. Vision is poor immediately after the operation, and examination of the eye reveals a shallow anterior chamber and oedema of the choroidal tissues so that the retina is raised in undulations extending backwards to the posterior pole, where the disc is found to be swollen.

Case Report

A man born in 1912 began to have sub-acute attacks of closed-angle glaucoma in the right eye in 1953, and a broad iridectomy was performed because pilocarpine failed to control them. He was regularly examined and in 1959 it was found that the intra-ocular pressure in the right eye was above normal. Medical treatment was again tried and pilocarpine 1 per cent. drops thrice daily controlled the glaucoma until March, 1960, when Diamox was added to the therapy. At that time he had a normal and full field, there were a few central lens opacities, and visual acuity in the right eye was 6/12 with correction.

In April, 1960, his local surgeon decided that surgery was required and a cyclodialysis operation was carried out in the lower temporal quadrant of the right eye. This was followed by the immediate onset of hypotonia, and two weeks after the operation the visual acuity was 6/36 with +9 D sph. In July, 1960, he came under my care, and at that

* Received for publication July, 26, 1962.

time the right fundus exhibited a swollen disc, oedema of the macular region, and folds in the retina (Fig. 1).

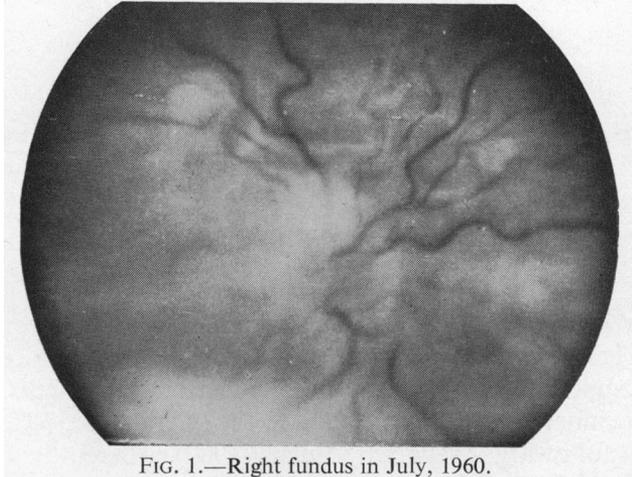


FIG. 1.—Right fundus in July, 1960.

A large cleft was seen gonioscopically in the lower and temporal quadrant although the anterior chamber was shallow. The tension was so low that it could not be measured. In July, 1960, the conjunctiva was reflected from the lower and outer quadrant of the globe, and an area 8 mm. from the limbus was treated with surface and perforating diathermy. One week later there was no improvement; the visual acuity was still 6/36 with +8 D sph. and the tension was low. On the following day, a series of seven perforations was made by diathermy 4 mm. from the limbus in the same area, and clear fluid escaped through the perforations. One week later, the tension had risen to 12 mm. Hg (Schiötz), and the refraction had fallen from +8 to +3 D sph. A month later, the tension was 20 mm. Hg (Schiötz), the retina was flat, and the visual acuity 6/24 with +3 D sph.; 3 weeks later, in August, 1960, the visual acuity was 6/18 (6/12 partly) with +3 D sph., +0.5 D cyl., axis 90°, and the right disc by that time showed a minor amount of cupping (Fig. 2).

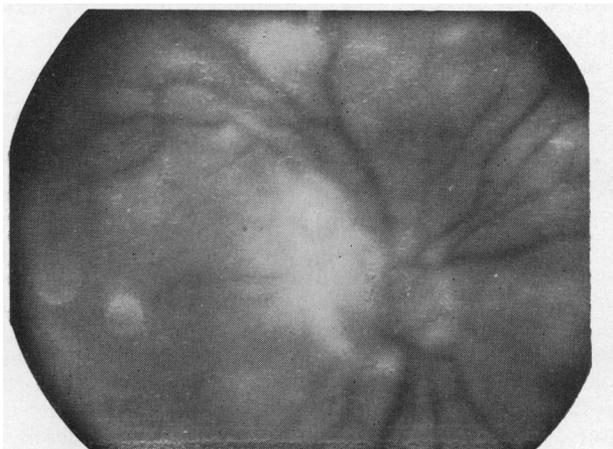


FIG. 2.—Right fundus in August, 1960.

The patient then returned home and came under the care of his local surgeon. Gradually, the tension of the right eye rose further, and eventually, in December, 1960, reached pathological levels so that miotics were once again begun.

In August, 1961, he was re-examined by me, and while using pilocarpine drops thrice daily the right tension was 25 mm. Hg (Schiötz), and the coefficient of outflow of the right eye was 0.07 (corrected for scleral rigidity). The outflow factor (Po/C) was 400. In August, 1961, a flap sclerotomy with iris inclusion was carried out on the right eye, to include the temporal pillar (Fig. 3).

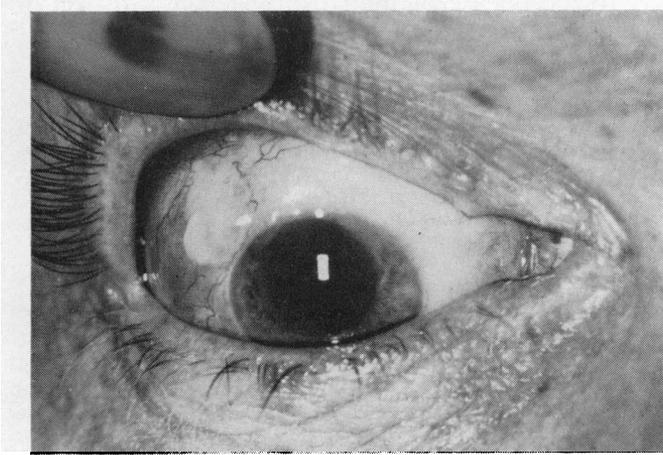


FIG. 3.—Right eye after flap sclerotomy in August, 1961.

The intra-ocular pressure has since been maintained at 18 mm. Hg (Schiötz) in the right eye, and the visual acuity at 6/12 with a full field.

Discussion

The cause of hypotony following cyclodialysis is a matter for speculation, and it has been suggested that the formation of intra-ocular fluid is suppressed when the ciliary body is detached as far forward as the scleral spur (Chandler and Maumenee, 1961).

Treacher Collins (1918) interested himself in the pathological examination of eyes with persistent hypotony following contusion, and in every case there was a separation of the ciliary body up to the scleral spur. This ciliary separation would appear to be of some aetiological significance and the dictum of Hudson (1914) that the degree of reduction of the intra-ocular pressure following trauma varies, more or less directly, with the degree of ciliary detachment, emphasizes this view. The clinical facts which support this hypothesis were excellently set out by Chandler and Maumenee (1961), and it is perhaps significant in the case which has come under my personal care that the first operation designed to close off the posterior end of the cleft failed to have any real effect on the intra-ocular pressure, but as soon as fluid was released over the ciliary body itself, by making perforations 4 mm. from the limbus, the intra-ocular pressure began to rise, and one week later

was three or four times its original height. The excellent result of this operation supports the hypothesis that the cause of hypotony in an eye in which there is no external filtration, is a serous detachment of the ciliary body, which interferes with its secretory mechanism.

Summary

A case of hypotony following cyclodialysis is reported, which responded so dramatically to the release of fluid from the outer aspect of the ciliary body that detachment of this structure is suggested as the cause of the low tension.

REFERENCES

- CHANDLER, P. A., and MAUMENEY, A. E. (1961). *Trans. Amer. Acad. Ophthal. Otolaryng.*, **65**, 563.
COLLINS, E. TREACHER (1918). *Trans. ophthal. Soc. U.K.*, **38**, 217.
FUCHS, E. (1900). *v. Graefes Arch. Ophthal.*, **51**, 199.
HEINE (1905). *Dtsch. med. Wschr.*, **31**, 824.
HUDSON, A. C. (1914). *Roy. Lond. ophthal. Hosp. Rep.*, **19**, 301.