MALIGNANT GLAUCOMA*

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MALIGNANT glaucoma is a condition in which a rise in intra-ocular pressure is associated with complete or almost complete loss of the anterior chamber of the eye. It usually develops after surgical treatment for glaucoma has been carried out and in eyes with a narrow angle. It is usually found that, if it occurs in one eye, a rise in tension in the other eye follows a similar course. It is uncommon, but it has long been recognized and was first described by von Graefe (1869). Interest in this form of glaucoma has been stimulated by the observations of Chandler (1950), who postulated that extraction of the lens was the treatment which offered the best chance of restoration of vision, and further suggested that, with the onset of raised tension in the second eye, the lens of that eye should be extracted immediately. Removal of the lens had, of course, been practised intermittently for this condition since the 19th century. Malignant glaucoma is associated with an anterior movement of the iris-lens diaphragm, and is said to occur more usually in eyes with a shallow anterior chamber and in which the tension has been elevated at the time of operation. It occurs, not infrequently, in patients of a fairly young age group. This communication describes a patient who developed malignant glaucoma first in one eye and then in the other, and who recovered vision and normal tension in both eyes without extraction of the lenses.

Case Report

A man aged 49 first attended on January 22, 1957, complaining of transient blurring of the vision of the left eye during the previous few months. The blurring was said to be associated with some ocular and frontal pain, but there was no definite history of haloes.

Examination.—The visual acuity was full with a mixed astigmatic correction and the intra-ocular pressure was within normal limits in each eye. The left field of vision showed nasal loss, with an arcuate scotoma breaking out above fixation.

Treatment.—1 per cent. pilocarpine nitrate drops were prescribed, and one week later the visual acuity and intra-ocular pressure remained unchanged, but the vision was said, subjectively, to be slightly blurred.

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One week later, the intra-ocular pressure had risen to 48 mm. Hg (Schiötz), and treatment was modified by giving 250 mg. Diamox twice daily.

On February 12, 1957, the intra-ocular pressure was normal and the patient said the vision was clearer. One week later, although the left intra-ocular pressure was still normal (22 mm. Hg, Schiötz), the vision was said to be blurred, and it was decided that surgical treatment must be undertaken. The diagnosis appeared to be closed-angle glaucoma.

Operation.—Peripheral iridectomy was performed on March 6, 1957. The eye settled satisfactorily after the operation, and the visual acuity returned to 6/5 with a slightly more myopic correction than previously, the tension being normal.

Progress.—The field remained unchanged 4 weeks later, except that a narrow arcuate scotoma was observed to have developed below. On April 30, 1957, there was a complaint of slight haze of the vision in the left eye but the intra-ocular pressure remained normal. 4 weeks later the patient stated that he had very marked blurring of vision in the left eye which had begun on the previous evening. The visual acuity was less than 6/60, the tension was raised, and the anterior chamber had almost disappeared. A diagnosis of malignant glaucoma was made, and the patient was admitted to hospital.

Treatment.—Diamox and 1 per cent. eserine drops were given and 18 hours later, though the anterior chamber was very slightly deeper and the vision less blurred, the ocular tension was still raised, and it was apparent that surgical treatment was necessary. It was decided to undertake an inferior iridectomy, since it was felt that the superior iridectomy was being blocked by forward displacement of the lens and that, unless the lens was unusually large, it could not at the same time block an inferior iridectomy.

Operation.—Complete iridectomy below was performed on May 23, 1957, and on the following day the intra-ocular pressure was normal and a good anterior chamber had reformed.

Progress.—On May 28, 1957, the patient complained of pain in and around the eye and when he was examined it was found that the ocular tension was raised and the anterior chamber absent. Treatment with eserine sulphate drops and Diamox caused no improvement. After discussion with Mr. E. F. King, arrangements were made to perform a combination of procedures which he had found to be helpful in a similar case.

Operation.—On May 30, under general anaesthesia, a cyclodialysis was performed in the 8 o'clock meridian, where some element of the anterior chamber remained, an incision being made about 7 mm. behind the limbus. A posterior sclerotomy was carried out about 2 mm. further back and about 0.2 ml. vitreous was evacuated through a wide-bore needle with a hypodermic syringe. A lacrimal cannula was passed through the cyclodialysis track and air was forced into the anterior chamber, which reformed with an audible click as though some suction had existed between the posterior corneal and anterior lens surfaces. The air bubble was completely replaced by aqueous in 5 days, and the patient had a deep anterior chamber with normal tension, and satisfactory vision, when he left hospital 2 weeks after the operation.

Progress.—On June 22, 1957, the ocular tension of the left eye was normal, the anterior chamber of average depth, and the visual acuity 6/9 with correction. The patient had, however, noticed some discomfort of the right eye, though the vision and ocular tension showed no abnormality.

On June 28, 1957, there was a complaint of pain in the right eye, similar to that felt previously in the left eye, and the anterior chamber was noticed to be becoming shallow, though the ocular tension and vision were still normal. On the following day the tension of the right eye was 40 mm. Hg (Schiötz), the pain was more severe, and the anterior chamber almost absent.

Operation.—A peripheral iridectomy was performed above, followed by posterior sclerotomy, vitreous evacuation, and the injection of air into the anterior chamber. The air absorbed and the anterior chamber reformed with a normal ocular tension, but by July 4 the rise in ocular tension had recurred, the anterior chamber was again lost, and pain was increasing.

Operation.—It was then decided to perform the combination of cyclodialysis, posterior sclerotomy with vitreous evacuation, and insertion of air to the anterior chamber which had been successful in the left eye, and this was carried out under general anaesthesia on the same day. The eye settled rapidly, and the patient left hospital on July 13, 1957, with normal ocular tension and anterior chambers of average depth in both eyes.

Progress.—On July 31, 1957, the ocular tension and anterior chambers remained normal. The visual acuity in the right eye was 6/5 with +0.5D sph., -1.5D cyl., axis 92.5°, and in the left eye 6/9 with +0.5D sph., -0.5D cyl., axis 45°. The right visual field was full, and the left still showed nasal loss and an arcuate scotoma as at the examination on April 2, 1957. Some organized exudate was present on the anterior lens capsule of the left eye but there was no significant lens opacity in either eye. The condition of both eyes was still satisfactory in January, 1958.

Discussion

This case is reported because it falls into the classification of malignant glaucoma, though the second eye showed the condition of raised tension and loss of anterior chamber before operation, and because the tension in both eyes has been controlled by surgical treatment without having to undertake the relatively disabling operation of lens extraction. The precise mechanism of the rise in tension in this case is uncertain, but it seems that the aqueous was being retained in the vitreous cavity so that the lens was forced forwards to obliterate the anterior chamber and close its angle. Shaffer (1954) has pointed out that the aqueous can find its way into the posterior part of the vitreous causing separation of the vitreous and the retina, and that the lens may be pressed forward to obstruct the angle of the anterior chamber. He states that this is more likely to occur after surgical treatment on the eyeball, and suggests that previous ocular hypertension may make this even more likely. It is also possible that this patient, and others who suffer from malignant glaucoma, have an actual or relative increase in the size of the lens, and that this type of glaucoma is secondary to an abnormal anatomical condition. Increasing myopia may be a sign of an enlarging lens (Chandler, 1950), and may follow an intra-ocular operation. It appears that in this case the puncture and drainage of the vitreous cavity, combined with the cyclodialysis and the forcible reformation of the anterior chamber by the insertion of air, must have restored the flow of aqueous through the lens-iris diaphragm and through the angle of the anterior chamber, so that normal ocular tension and normal anterior chambers have been reconstituted. It was felt at the onset of the raised tension in the right eye (the second eye affected) that it was essential to perform an iridectomy so that a passage would be provided through the lens-iris diaphragm. The progress of the case showed that this,

even in combination with vitreous puncture, did not overcome the condition causing the rise in tension, and the further operative procedure became necessary. Various authors, including Birge (1957), report the use of posterior sclerotomy and vitreous aspiration in cases of malignant glaucoma, but without satisfactory results. It appears that the reformation of the anterior chamber by air injection is an essential procedure, and it is worthy of emphasis that, in the case of the right eye, it was possible to force more air into the anterior chamber through the long narrow cyclodialysis track than through the wider iridectomy incision.

Summary

A case is reported of bilateral malignant glaucoma, successfully treated by surgery without the removal of the lens which has been the orthodox procedure in recent years.

I should like to express my thanks to Sir Stewart Duke-Elder, to Mr. E. F. King, and to Mr. Redmond Smith for their help in the management of this case.

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