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Sir,

Improved visual acuity in an eye with glaucomatous optic atrophy following loss of the good eye

Glaucoma is known to be a disease of the retinal nerve fibre layer characterised by a progressive and irreversible loss of axons in the optic nerve head. Glaucomatous optic nerve damage can be detected clinically as an increase in the cup:disc ratio with thinning of the neural rim, with resultant optic atrophy and glaucomatous visual field loss, all of which are known to be irreversible. Central vision is generally the last to be affected in glaucoma.

This report describes a patient with glaucoma who had an unexpected improvement in visual acuity in an eye with glaucomatous optic atrophy following loss of the fellow good eye.

Case report

A 46-year-old man presented with a complaint of decreased visual acuity in his right eye for the previous 6 months. On examination, the visual acuity was less than 20/200 (counting fingers to 2 m from the temporal side) in the right eye and 20/20 with myopic astigmatic correction ($-0.75 -0.50 \times 30$) in the left eye. The visual acuity did not improve with refractive correction in the

right eye. The intraocular pressure (IOP) was 29 mmHg in the right and 31 mmHg in the left eye with a cup:disc ratio of 0.9 and 0.6 respectively. Both eyes underwent mitomycin C trabeculectomy 1 month apart starting with the right eye, after failure of a medical treatment trial. The IOP stabilised at around 12 mmHg in both eyes and the cup:disc ratios became 0.8 and 0.5 in the right and left eyes, respectively, after the operation. Post-operatively the best corrected visual acuities remained the same as the pre-operative values. Eight months after the operation leakage from the bleb was noted in the left eye with a picture of acute endophthalmitis, and the patient was hospitalised for medical and surgical treatments. Microbiological examination of the vitreous sample revealed coagulase-negative staphylococci. The left eye was lost in spite of vigorous medical and surgical treatments and had to be enucleated 10 months later.

The point of interest is the patient's feeling of increasing vision in the right eye, starting 2 months after loss of the left eye. On examination, best corrected visual acuity of the right eye was 20/200 (with $-0.50 -2.00 \times 100$), which gradually improved to 20/50 with the same refractive correction within a year.

Perimetric examination of the central 30° with an Octopus Perimeter revealed a very narrowed small island of central vision and an accompanying temporal island with a mean defect value of +25.6, which had been +28.9 before the loss of the better eye (Fig. 1). Retinal nerve fibre layer examination was also performed, by means of a scanning laser polarimeter (Nerve Fibre Analyzer I; Laser Diagnostic Technologies, San Diego, CA), which revealed severe diffuse nerve fibre loss.

The patient had an avascular filtering bleb with an IOP of 11 mmHg without any medical treatment and a cup:disc ratio of 8/10 at his last follow-up visit (Fig. 2).

Fig. 1. Perimetric examination of the central 30° with an Octopus Perimeter. A small central island and an accompanying temporal island of vision has remained. MD: +25.6.

Fig. 2. Post-operative appearance of the patient's disc (cup:disc ratio was 8/10).

Best corrected visual acuity in his remaining right eye has stabilised at 20/50 for the last 6 months without any further increase.

Comment

To the best of our knowledge, this is the first report presenting improved vision in an eye with glaucomatous optic atrophy after loss of the fellow better eye. A spontaneous increase in visual acuity in amblyopia after loss of the good eye at adult ages was previously reported to occur in 17.4% of cases.¹ Although the patient denied previous lower vision in the right eye compared with the left (during childhood), the reversal of amblyopia is still the most likely explanation for this case.

Reversal of optic disc cupping after glaucoma surgery has recently been reported to occur in patients having an IOP reduction of greater than 40%,² and the decrease in cup:disc ratio from 9/10 to 8/10 and improvement in

perimetric examination was attributed to the IOP decrease after the operation. Increase in visual acuity following an IOP decrease, however, has not been reported previously, so that this increase in visual acuity can not be attributed to the IOP decrease.

A surprising improvement after many years of stationary vision has occasionally been observed in only one eye of patients with Leber's optic neuropathy.³ The question is whether the same improvement is possible with glaucomatous visual loss, which is another type of optic neuropathy. If the answer is yes, the concept of partial reversibility of glaucomatous optic atrophy may be discussed.

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