Surgical removal of epiretinal membranes

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Abstract

In this paper we present the results of fifteen consecutive patients who underwent vitrectomy surgery for epiretinal membranes in the posterior pole of the eye, resulting in a visual improvement in 75% of the cases. Complaints of metamorphopsia disappeared or decreased considerably in nearly all cases.

Introduction

Epiretinal membranes have been described in several different terms, including macular pucker, surface wrinkling retinopathy, preretinal fibrosis and cellophane maculopathy. These membranes covering and distorting the retina cause varying amounts of reduction of central vision, sometimes accompanied by complaints of metamorphopsia, macropsia and micropsia. The origin of epiretinal membranes is not clear. A histological difference has been demonstrated in various membranes, these being composed of glial cells, fibrous tissue, posterior cortical vitreous, pigment epithelial cells or a combination there of (1).

The macroscopic structure varies from a thin cellophane-like layer to a moderately thick fibrous membrane. The epiretinal membranes occur in various ocular disorders, such as after retinal reattachment surgery, intraocular inflammatory states, retinal vascular disorders and after laser coagulation therapy. They can also develop as an idiopathic condition which is found mostly after a posterior vitreous detachment. Spontaneous separation can occur with subsequent improvement of vision, but this is quite rare. It is possible to separate these membranes from the underlying membrana limitans interna by surgical dissection (5,6). This paper reviews the surgical techniques and results of 15 consecutive cases of epiretinal membranes which were reducing central vision in several ocular disease states.

Material and methods

The operation was performed using a high magnification of the operation microscope (Zeiss-OPMI-6) with motorised focus and zoom magnification and a corneal contact lens. We used the Ocutome vitrectomy system, including a separate infusion cannula secured to the sclera, an illumination source held in one hand and various instruments, including the Ocutome cutting probe and a hooked needle alternately held in the other hand.

The cutting probe and the fiber optic illuminator were introduced through the pars plana in the nasal and temporal upper quadrants, respectively. Usually a posterior vitreous separation was present and the central portion of the vitreous gel and the posterior vitreous surface were excised. The key point in macular pucker dissection is to identify an edge of the epiretinal membrane under which one may insert an instrument, including a hooked needle. Usually the membrane can be completely stripped off the underlying retina. Excessive traction on the retina was carefully avoided. The separated tissue was then removed from the eye by using the vitrectomy system or by aspiration with a flute needle. In some cases a fluid-gas (sulfur hexadine) exchange

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was done to achieve a temporary internal tamponade. If one cannot find an edge the preretinal membrane has to be incised to create one.

Vitreous surgery was performed in fifteen consecutive cases with a macular pucker that had been the cause of reduced central vision. In ten cases the pucker was idiopathic, in three it developed after successful retinal re-attachment surgery, in one case after xenon laser therapy performed because of an attached retinal hole and in one case with an uveitis posterior.

Ten patients were men and five women. The age varied from 20 to 78, with a mean of 60. The follow-up interval ranged from 4 months to 24 months with a mean of 12 months.

Visual results and complications

The visual results are compiled in Table 1. The epiretinal membrane causing macular pucker was partly or totally removed in each case resulting in visual improvement in eleven out of fifteen cases (see Table).

As much as possible the traction on the retina was abolished resulting in a flattening of the retina (Figs. 1-6). In three cases we did a fluid-gas exchange because of a small retinal hole created in the macula area (Figs. 5, 6). With this method an internal tamponade of the retina was achieved and formation of subretinal fluid was avoided. The retina remained well attached in those cases. A peripheral retinal detachment (rhegmatogenous) occurred in one eye a few days after the removal of the pucker, but this was successfully treated with scleral buckling. Case 8 showed an extreme macular pucker with a local rhegmatogenous detachment. After removal of the membranes the retina failed to attach because of periretinal proliferation. A second operation with intraocular silicone oil was performed with an anatomically good result. The visual acuity remained however finger-counting (3/60).

Discussion

As described above there are differences in the macroscopic appearance of the membranes covering the macula, varying from a thin cellophane layer to a more compact white structure. Roth and Foos (7) described surface wrinkling retinopathy in autopsy eyes and felt that epiretinal membranes arose from focal interruption in the inner limiting membrane. In a histopathological review Clarkson et al. (1) ascertained that the main part of the membranes was composed of glial cells. Their origin was not certain, probably based on an outgrowth and overgrowth of Müller’s cells or retinal astrocytes as a consequence of small breaks in the membra limitans interna. Membranes consisting mainly of pigment epithelium were seen after a history of retinal detachment. Other membranes, occurring less frequently were composed of fibrous tissue and developed in occlusive vascular diseases and after previous ocular surgery. Membranes derived from posterior cortical vitreous were seen mostly in combination with a posterior vitreous detachment. The theory is that vitreous remnants proliferate and contract causing a wrinkling of the inner limiting membrane. Green et al. (3) investigated the ultrastructure of removed epiretinal membranes which developed after retinal attachment surgery and found a mixture of different cells, including fibrous astrocytes, retinal pigment epithelial cells, fibrocytes and macrophages. However in some cases it was not possible to make such a clear distinction. They pointed