Complications of surgery for epiretinal membranes

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Abstract • Purpose: Surgery has been successful in removing epiretinal membranes (ERM) from the macula, allowing some improvement in vision in 80–90% of patients; however, complications are relatively frequent. We conducted a retrospective study to evaluate the rate of peri- and postoperative complications and their influence on functional outcome of eyes having been operated on for ERM. • Material and methods: Preoperative findings, intraoperative and postoperative complications as final results of 70 consecutive cases of idiopathic or secondary ERM operated on by the same retina surgeon were analyzed. • Results: In all cases the ERM were successfully removed from the fovea. The mean visual acuity (VA) increased from 0.34±0.2 to 0.54±0.31 (P<0.05) postoperatively. Idiopathic and secondary ERM both showed significant improvement after surgery. Complications included intraoperative hemorrhage and retinal tears and postoperative progressive nuclear sclerosis, retinal tears causing detachments, macular edema and retinal pigmentary epitheliopathy. Final VA was not significantly different from the mean after complications, apart from when retinal detachments involved the macular area. • Conclusions: Performing surgery for ERM is worthwhile in eyes with major decreased VA and in eyes with metamorphopsia but only moderately reduced vision. Postoperative complications are frequent but can usually be managed successfully. Of them, only retinal detachment has a negative effect on the final functional outcome.

Introduction

Epiretinal macular membranes (ERM) have been associated with numerous clinical conditions, including postretinal detachment repairs, ocular inflammatory disorders, macular holes, trauma accompanied by intravitreal hemorrhage, diabetic retinopathy, retinal vascular occlusive diseases, intraocular tumors, telangiectasis, retinal arteriolar macroaneurysms and retinitis pigmentosa. ERM may occur after photocoagulation or cryotherapy or as an idiopathic disorder [11].

ERM seem to be relatively common in patients over 50 years of age [8, 11, 17, 20, 22]. In this age group, incidence of idiopathic ERM has been reported to be as high as 6%, with 20% being bilateral during routine eye examination [17].

When the membrane involves the macula it can cause loss of visual acuity (VA), micropsia, metamorphopsia and occasionally monocular diplopia [8, 11]. The severity of symptoms experienced will depend on the membrane thickness, the degree of retinal distortion, the degree of edema in the macular area and the presence of significant traction causing a microdetachment of the posterior pole [8, 11, 26]. However, it must be stressed that ERM is considered a slowly progressing disease, with only 5% of patients having vision decreased to 0.1 (20/200) or worse [11, 17, 26, 27].
Pars plana vitrectomy has been found to successfully remove ERM from the macula, allowing some improvement in vision, in 80–90% of patients [10, 13]. Final visual outcome has been correlated with duration of symptoms, preoperative VA, degree of fluorescein leakage, the presence of ophthalmoscopically detectable cystoid macular edema, transparency of the membranes, intraretinal macular hemorrhage, cotton wool spots and age of the patient (for review see [19]). Surgery has been advocated for all symptomatic cases [8, 19]. However, some caution has been recommended for eyes with VA better than 0.25 (20/70) because of the relatively low improvement in vision after surgery [12, 19] and a relatively high incidence of complications (including accelerated nuclear sclerosis) [2, 3, 5].

We conducted a study to evaluate the functional outcome of eyes with ERM, the rate of peri- and postoperative complications and their influence on the visual outcome in patients operated on by a trained retina surgeon.

**Material and methods**

We performed a retrospective study of 70 consecutive cases of ERM operated on between 1994 and 1997. Only eyes with nonvascular-appearing ERM confined to the macula were included. Both idiopathic and secondary ERM were included. All the eyes operated on were symptomatic and had grade 1 or 2 ERM according to the classification of Gass [4]. Eyes with concomitant retinal detachment (RD) were not included. Eyes with extensive ERM extending outside the macula such as seen in posterior proliferative vitreoretinopathy (PVR) as eyes with fibrovascular tissue in the macular area were excluded.

Conventional vitreous surgery was carried out using a three-port system: a separate infusion cannula, a fibroptic light probe and a port for the introduction of a vitrectomy probe, vitreoretinal pick and intraocular forceps. The central vitreous gel was removed first. The posterior cortical vitreous, which was in all cases separated from the retinal surface, was then removed. The edge of the ERM was engaged with a Flinn cannula and gently elevated while the cannula was moved tangentially along the inner retinal surface. After delamination, the membrane was grasped with a diamond-coated end-opening forceps and peeling was completed. The membrane was usually removed as a single piece. Occasionally it had to be cut at a point of firm adhesion to the retinal surface. Sometimes the membrane was found to be constituted of multiple layers.

Information was recorded based on the history, preoperative eye examination, operative findings and postoperative course. Items recorded from history included age, gender and complaints of decreased vision or metamorphopsia. Preoperative investigations included: VA, grade of lens opacity (mild, moderate or severe), aphakia or pseudophakia, posterior vitreous detachment, retinal striae, retinal dragging, retinal vascular distortion, macular thickening and/or cystoid macular edema, peripheral retinal tears. Perioperative and postoperative findings were also recorded, as were data from the final visit. Preoperative and postoperative fluorescein angiographic findings were also reviewed, with particular attention to retinal vascular leakage and cystoid macular edema.

Statistical analysis was performed using Student’s t-test; values of P<0.05 were considered to show significant differences.

**Results**

**Preoperative findings**

The mean age of the patients was 67±12 years. Of the 70 subjects, 34 (49%) were men and 36 (51%) women. There were 35 right eyes (50%) and 35 left eyes (50%). The mean preoperative VA was 0.34±0.2. In 27 cases (40) VA was <0.25, in 43 cases (60%) it was ≥0.25.

Idiopathic ERM was diagnosed in 40 eyes (57%) and secondary in 30 eyes (43%). Secondary ERM included 24 eyes with previous RD, 3 eyes with angioma, 1 eye with previous branch vein occlusion, 1 eye with a previous Terson syndrome and 1 eye with juvenile sclerosis.

There was a significant difference in age between idiopathic cases (72±9 years) and secondary cases (61±15 years; P<0.05). The mean preoperative VA was 0.29±0.2 in cases of secondary ERM and 0.36±0.2 in cases of idiopathic ERM (difference not statistically significant P=0.08). However, 46% of the eyes with secondary ERM had preoperative VA <0.25, 17% preoperative 0.25≤VA≤0.4 and 37% preoperative VA ≥0.4; of the eyes with idiopathic ERM, 17% had preoperative VA <0.25, 33% preoperative 0.25≤VA≤0.4 and 50% preoperative VA≥0.4.

There were 54 phakic eyes and 16 pseudophakic eyes. Lens opacity was graded as mild in 24 (34%) of the phakic eyes and assessed to have had no influence on VA. No cases of moderate or severe lens opacity were recorded in our patients. Contralateral eyes (of phakic study eyes) also had only moderate or no significant lens opacity.

Some degree of retinal dragging, retinal striae and retinal vascular distortion was detected in all cases (100%).

Cystoid macular edema was detected in 14 (20%) of cases. In 4 cases it occurred in pseudophakic eyes. In all cases it was identified by both slit-lamp examination and fluorescein angiography (Fig. 1). The mean VA (0.29±0.2) was lower in the eyes with cystoid macular edema (P<0.05).

**Perioperative complications**

In all cases the ERM were successfully removed from the fovea, although in seven cases (10%) some residual membrane was left in the macular area, far from the fovea.

Intraoperatively small petechiae, from the perifoveal capillary bed, were reported in 13 cases (19%); none of these cases involved the fovea or caused a decrease in postoperative VA (Fig. 2).

Peripheral retinal tears were observed in six cases (9%) intraoperatively (Fig. 2). In all cases the tear could be treated intraoperatively by peripheral vitrectomy and transscleral cryotherapy. No secondary peripheral tears or RD were observed in these cases.