Results of surgery for epiretinal membranes and their recurrences

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Abstract
Aims/Background—This study was performed to identify factors predictive for recurrence of idiopathic and secondary epiretinal membranes after vitrectomy. Long term visual outcome was determined and compared with eyes without recurrence of epiretinal tissue.

Methods—Out of 350 consecutive cases vitrectomised for removal of epiretinal macular membranes, 42 patients (42 eyes) with recurrence of epiretinal membranes were re-examined and their records reviewed. Recurrence of epiretinal membranes was determined by new appearance of epiretinal tissue or abnormal sheen of the central retina. The preoperative findings, best postoperative and final visual acuity of these patients were compared with a comparable cohort of eyes without recurrence after removal of macular pucker (131 eyes). The eligibility criterion was a follow up of at least 6 months.

Results—The best postoperative (0.46 (SD 0.24)) and the final visual acuity (0.39 (0.26)) of eyes with recurrent membranes (42 eyes) was statistically better than preoperative vision (0.27 (0.22)) (p=0.0003 and 0.0089). Because of reduced or distorted vision eight of the 42 eyes underwent a retreatment during the follow up (mean 23 months). Best postoperative visual acuity (0.50 (0.21)) and final visual acuity (0.47 (0.25)) of eyes which received a second vitrectomy (n=8) were not statistically different from the 32 eyes with recurrence of epiretinal tissue but without vitrectomy (p=0.253 and 0.343). In addition, eyes with recurrence showed no different visual outcome compared with eyes without recurrence of epiretinal membranes after vitrectomy (p=0.84). Recurrence of epiretinal membranes was correlated with neither the type of membrane (thick or thin) nor incomplete membrane removal during pars plana vitrectomy.

Conclusion—This study demonstrates the overall favourable visual prognosis of patients with vitrectomy for macular pucker, even with recurrence of the premacular membrane.

(Please find the full text in the PDF file attached.)
Often the only ophthalmoscopic clue to their presence was a 'Cellophane' light reflex from the inner retinal surface and/or fine irregular crinkles on the retinal surface. Membranes classified as thick were opaque in most cases. Only five translucent membranes were classified as thick by the surgeon because the epiretinal membranes consisted of a thickness normally found only in opaque membranes. Except for these five cases (3%) the classification used is in accordance with the often used classification of translucent and opaque membranes which can be made by biomicroscopy preoperatively. At each visit the macula was examined by biomicroscopy. The analysed intraoperative findings were commented on in all operative reports.

The mean follow up after vitrectomy was 23 (range 6-53) months with no statistical difference in mean follow up between eyes with and without regrowth of epimacular tissue.

Statistical analyses were performed by comparison of two paired samples based on ranks, comparison of two independent samples based on pairs (Mann-Whitney), and contingency tables using the STATGRAPHICS software package (Statistical Graphics Co).

POSTOPERATIVE COMPLICATIONS

The main complication after vitrectomy was the development or progression of lens opacities. Cataract was the reason for the slight visual impairment during the follow up, shown as the mean difference between best and last visual acuity. In the total group (173 eyes), 103 of the 143 phakic eyes (72%) had the preoperative appearance of cataract formation. The severity of lens opacities was graded as: mild (64 eyes), moderate (36), severe (four). The location was not specified. Twenty six eyes (15%) were pseudophakic and four eyes were aphakic before pars plana vitrectomy. Capsulotomy had been performed in five of the 26 pseudophakic eyes.

In the total group of 173 investigated eyes, 76 of 143 preoperatively phakic eyes (53%) developed cataract; 38 (50%) of them received phacoemulsification and posterior chamber lens (PCL) implantation into the capsular bag during the follow up. The average time between vitrectomy and cataract surgery was 16.8 (SD 9.7) months.

The incidence of retinal detachment after vitrectomy was 4% (7/173 eyes) in the total group. Only one of these seven eyes had been operated on because of macular pucker following retinal detachment surgery. The six
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other eyes had idiopathic epiretinal membranes. In all eyes the retina was reattached with scleral buckling techniques or sulphur hexafluoride gas tamponade. The average time between pars plana vitrectomy and retinal detachment was 3-75 months.

POSSIBLE RISK FACTORS FOR RECURRENCE
To identify possible risk factors predictive for the recurrence of epiretinal membranes after vitrectomy we analysed the influence of several preoperative and intraoperative findings.

(1) Thickness of the epiretinal membrane
One hundred and seven eyes of the total group (62%) had a thin epiretinal membrane. Preoperatively, most of these eyes showed only an abnormal sheen of the macula. The nature of the preretinal membrane was not a prognostic factor for regrowth (p=0.849).

(2) Adherence of the epiretinal membrane
The epiretinal tissue proved to be firmly adherent to the underlying retina in 45 of all eyes (26%). Again, this factor was not correlated with recurrence (p=0.828).

(3) Complete/incomplete removal of the epiretinal membrane
In all vitrectomised eyes the membrane could be removed completely from the fovea, but in 25 eyes (14%) remnants were left at the posterior pole. Our data showed no significant correlation between incomplete membrane removal and recurrence (p=0.828).

(4) Idiopathic/secondary epiretinal membranes
One hundred and seventeen eyes (68%) of the total group had no associated ocular disorder or previous ocular surgery. In these cases the epiretinal membrane was classified as idiopathic regardless of the presence of systemic diseases – for example, hypertension. In 56 cases (32%) the condition occurred after several ocular diseases and surgical procedures including cataract removal (30 eyes), retinal reattachment surgery (12 eyes), laser photocoagulation/cryo (10 eyes), trauma (one eye), ocular inflammation (one eye), and retinal vascular abnormalities (two eyes). The cause of epiretinal membrane formation had no statistically significant influence on the recurrence of preretinal tissue (p=0.971). Separate statistical analysis was performed for cases with idiopathic as well as secondary epiretinal membranes. But the evaluation of these subgroups also showed no statistically significant risk factors for regrowth of epiretinal membranes after vitrectomy. Also, no significance could be calculated if eyes with epiretinal tissue following cataract surgery were not classified as secondary membranes.

Discussion
Out of 350 consecutive cases vitrectomised for macular pucker 42 eyes with recurrence of epiretinal tissue could be evaluated. They were compared with a cohort of 131 eyes without recurrence of epiretinal tissue. In some reports the recurrence rate of macular pucker is calculated on the basis of the reappearance of sizeable amounts of epiretinal tissue. Eyes which showed an increased sheen of the internal limiting membrane, suggesting presence of a thin epiretinal membrane, were not considered. This may contribute to the fact that regrowth after removal of epiretinal membranes is reported as a rare postoperative event. In our study eyes with increased sheen during follow up were also included in the group with recurrence of epiretinal tissue. Because of this morphological definition it is not surprising that only eight of the 42 patients with recurrent epiretinal membranes complained of newly reduced or distorted vision making revitrectomy necessary. Five of the eight eyes had idiopathic epiretinal membranes. Recurrence of removed idiopathic membranes is a rare event and revitrectomy for recurrent idiopathic membranes is reported only in single cases. In our patients no significant correlation between recurrence of epiretinal membranes and final visual acuity could be proved. All revitrectomised eyes retained a long term visual acuity better than before the first vitrectomy.

The association between vitrectomy and later cataract development or progression is well known. In our study 76 of 143 phakic eyes (53%) developed lens opacities during the follow up of nearly 2 years. In 38 eyes (50%) uneventful phacoemulsification and PCL implantation into the capsular bag was performed during follow up.

Trese et al. and Mester have suggested that translucent epiretinal membranes carry a better prognosis than opaque membranes. Eyes with Cellophane-like epiretinal membranes in the series of Rice and associates did less well than eyes with thicker epiretinal membranes. Other authors were not able to evaluate a statistical significance in postoperative visual acuity between eyes with thin or thick membranes or opaque or translucent membranes. The recurrence rate in our series was not influenced by the nature or the adherence of the epiretinal membranes.

It was speculated that incomplete removal of membranes may account for regrowth in some cases. Rice et al reported incomplete membrane removal in 6% and late recurrence of epiretinal membranes in 4%. But no correlation between these facts had been analysed by the authors. In 25 (14%) of our vitrectomised eyes remnants of epiretinal tissue were left at the posterior pole. In eyes with incomplete tissue removal the membranes had limited structural strength, were friable, and tended to shred. Often, these membranes were firmly adherent to the retina throughout the zone of contact. But incomplete removal of the epiretinal membranes was no risk factor for regrowth.

The incidence of recurrence of epiretinal membranes is low and is reported to be up to 6% in idiopathic cases. The incidence
of secondary membrane regrowth is up to 33%.\textsuperscript{17} In our study no correlation between primary or secondary epiretinal membrane and the rate of regrowth could be detected. This result was also obtained if the 30 eyes with earlier cataract procedures were classified as idiopathic epiretinal membranes.

Preretinal macular fibrosis has been reported not only in association with ocular diseases, but also with several systemic disorders. These include arteriosclerosis, diabetes mellitus, and hypertension.\textsuperscript{19} In our series, 64 of 173 investigated eyes (37\%) were from patients who had hypertension. This is comparable with the study of Appiah \textit{et al.}\textsuperscript{21} in which the proportion of patients with vascular hypertension was 36-4\%. In our study, associated systemic disorders such as diabetes mellitus without diabetic retinopathy and hypertension did not influence the recurrence rate. Our study was not prospective and the calculation of the recurrence rate may be biased by the fact that not all 350 consecutive eyes which were operated on for macular pucker could be observed over a minimal follow up period of 6 months. In conclusion, we were unable to prove any statistically significant risk factor for the regrowth of macular pucker after vitrectomy.

