

Summary

Diabetic macular edema (DME) is the leading cause of severe visual loss in patients with diabetic retinopathy. Focal photocoagulation of focal edema is very efficient but grid photocoagulation of diffuse edema is controversial and according to some authors it is even harmful. In recent years some authors refer about the treatment of diffuse DME using vitrectomy with internal limiting membrane (ILM) peeling. Various hypotheses about the influence of ILM on DME were formulated.

The purpose of our study was to prove the beneficial anatomical and functional effect of vitrectomy with ILM peeling on DME, to evaluate the risk of complications, to analyze the structure of membranes, removed from the retina surface, namely to differentiate between the epiretinal membrane (ERM) and pathologically changed ILM, to study the cellulization of these membranes and to assess if the ILM is capable of contraction and tangential traction on the retina.

We reviewed 40 eyes of 35 patients with DME which could not be treated with laser for diffuse leakage, microaneurysms in the foveal avascular zone or CME. Clinical evaluation included the visual acuity assessment using the ETDRS chart, biomicroscopy, color fundus photography and OCT.

All patients were treated with vitrectomy, ERM removal and ILM peeling using the trypan blue. None of the patients was treated with additional laser coagulation of the macula. ERM and ILM specimen were evaluated using light microscopy. Paired t-test was performed to determine the visual acuity change. The regression analysis was performed to determine the variables predicting the change in the visual acuity. The Fischer test was used to compare our results with literature.

The follow-up time was 1 to 32 months (the mean follow-up was 8,5 months +/- 6,7); five months follow-up was available in 27 eyes (67,5 %).

There was an anatomical improvement, such as the regression of macular thickening, observed biomicroscopically, regression of CME, or disappearance of lipid exsudates, in 30 eyes (75 %). In 7 eyes (17,5 %) the finding remained unchanged and it was deteriorated in 3 eyes (7,5 %).

The OCT finding was available in 20 patients (50 %). The improvement of the OCT finding was observed in 12 eyes (60 %), in 7 eyes (35 %) the OCT remained stable and worsening was present in one patient (5 %).

There was a statistically significant improvement of the mean visual acuity from 0,123 +/- 0,11 preoperatively to 0,248 +/- 0,22 postoperatively ($p < 0,001$). The median visual acuity improvement was 84 % (range = -99 to +1100 %).

The mean functional improvement, measured by lines of ETDRS chart, was +2,5 lines +/- 3,3 (range -8 to +11). Thirty-one eyes (77,5 %) had visual improvement, visual acuity remained unchanged in 4 eyes (10 %) and worsened in 5 eyes (12,5 %). Twenty-six eyes (65 %) improved by at least 2 lines.

Regression analysis demonstrated significant dependence of the final visual acuity on the baseline visual acuity ($r = 0,705$, $p < 0,001$). The most prominent improvement of visual acuity was observed in patients with baseline visual acuity worse than 0,10.

No surgical complications were observed in 25 eyes (62,5 %). There were mild to moderate complications in 15 eyes (37,5 %), including cataract progression, retinal tear, IOP elevation, intraocular hemorrhage or BRVO. One patient had a rhegmatogenous retinal detachment.

Histopathologically we identified two types of epiretinal membranes, a cellulized contractile ERM and acellular ILM. No contractile elements in the ILM were identified.

Vitrectomy with ILM peeling leads to regression of diabetic macular edema, assessed ophthalmoscopically and on OCT, and to statistically significant improvement of visual acuity. Vitrectomy with ILM peeling is an efficient and safe method of treatment of diabetic macular edema. Its use is applicable especially in patients with diffuse macular edema refractory to laser treatment.