

Short Communication

Macular Hole Treatment. Different Methods

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Abstract

Background or Purpose: To evaluate the effect of pars plana vitrectomy (PPV) combined with joining of the hole edges on the closure of full-thickness macular holes.

Methods: clinical interview of surgeon. Various types of macular holes treatment are discussed.

Conclusions: Mechanical joining and compression of the retinal edges during surgery for Stage 3 or 4 idiopathic macular holes appears to yield a promising anatomical and functional result.

INTRODUCTION

Since the initial report on pars plana vitrectomy (PPV) for macular holes in 1991 by Kelly and Wendell [1], vitreous surgery has been established as a standard treatment for macular holes. The main goal of surgical management is removing tangential and anterior-posterior traction around the hole and immobilization and connection of hole edges. Therefore posterior hyaloid, the ILM, and epiretinal membranes must be removed. The traction exerted by the posterior hyaloid on the macula should be relieved by either removing perimacular vitreous alone or combining it with the induction of a complete posterior vitreous detachment. Various surgical techniques have been described to accomplish this task. I use the vitrectomy cutter with the maximum aspiration. The posterior hyaloid membrane in this case, as a rule, leaves from the underlying retina and shifts to the center of the vitreous cavity. Then, it may be removed with the vitrectomy cutter. Visualization agents, such as triamcinolone acetonide, may assist in the identification of remaining posterior hyaloid.

The ILM is a scaffold for cellular proliferation. The main purpose of peeling the ILM is removing any tangential tractional components as epiretinal membrane and associated glial cells or residual adherent vitreous cortex could exert persistent traction and prevent hole closure. Therefore, ILM peeling is also performed in most cases. The ILM is peeled circumferentially around the hole by end-gripping forceps or a diamond-dusted membrane scraper. Vital dyes such as indocyanine green, trypan blue, brilliant blue and triamcinolone acetonide, can assist in the visualization and identification of the ILM, making it easier to grasp. Dyes can stain and penetrate the ILM, resulting in a well-visualized margin during the peeling. Peeling without staining could lead to damage to the retina, incomplete ILM removal and failure of macular hole closure.

Long-acting gas tamponade with postoperative face-down position is another common technique of macular hole surgery. It is assumed that the gas covering the hole thereby preventing trans-hole fluid flow from the vitreous cavity and creates conditions for the proliferation and contraction of glial cells. Most frequently used gases are sulfur hexafluoride, perfluoropropane or air. The duration of a tamponade can be from one day to two weeks. However, optimal duration of face-down postoperative positioning is unknown. Long-term prone position is very uncomfortable for a patient and could cause multiple problems, including back pain. B 2008. Claus Eckardt showed that, vitrectomy and air tamponade combined with 1 to 3 day face-down positioning produced an excellent rate of macular hole closure [2]. My preference is 20% SF6 gas with 1 day face-down position. Usually I combine vitrectomy with phacoemulsification, so problem of cataract development does not exist for my patients. At the same time I correct the refraction errors and relieve my patients from a long-time prone position.

Despite the advances in surgical techniques, however, some holes do not achieve complete closure. A continuing researches led to the development of another option for repair of large or chronic holes. They include use of biologic or pharmacologic adjunctive agents, aspiration of hole edges, macular massage and inverted ILM flap technique.

Various adjunctive agents such as transforming growth factor- β_2 , autologous serum and platelet concentrates has been used to improve macular hole closure rate. However, the initial optimism of the authors soon gave way to a more critical attitude toward agents injected into the eye and a doubt about their effectiveness. Nevertheless, autologous platelet rich plasma (PRP) is currently being applied with some success.

I don't use passive aspiration to the edges of the macular

hole because in my experience, it can cause damage to the retinal pigment epithelium and retinal tissue around the hole.

The inverted ILM flap technique was described in 2010 for treatment of larger macular holes [3]. A surgeon leaves a fragment of ILM attached to the margin of the macular hole, and this flap is folded over the hole in an inverted manner to cover the hole after gas tamponade. The theory is that the flap serves as a scaffold to induce and support glial cell proliferation, which leads to hole closure. This procedure has worked well in difficult cases. The problem of this method is possible flap instability on the first postoperative day and filling the hole with glial, rather than retinal tissue.

My favorite method is “macular massage” [4]. I use this technique for all cases of 3rd and 4th stages macular holes, for myopic eyes and holes with retinal detachment. After standard pars plana vitrectomy and ILM peeling I use soft-tip canula to smoothen the retina around the hole from the periphery to the center. The edges of the macular hole approximate as closely as possible by gentle manipulation with the soft-tip canula, and the hole becomes smaller. Circumstances “massage” changes the hole contour, first making it oval, then slit-like and eventually closes at the end of the procedure. Gas tamponade and the face-down position for 1 day helps to fix the hole edges together.

I've been using this technique with good results for a long time. “Massage” works for the operated holes in the eyes with no ILM. In most complicated cases, such as holes greater than 1000µm, I additionally perform the “inverted flap”.

CONCLUSION

Currently, there is a large variety of methods for treating macular holes. A surgeon chooses one technique over another according to anatomy of the hole and vitreous in order to obtain the best anatomical and functional result.

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