Internal limiting membrane peeling in Vitreoretinal Surgery

Essay

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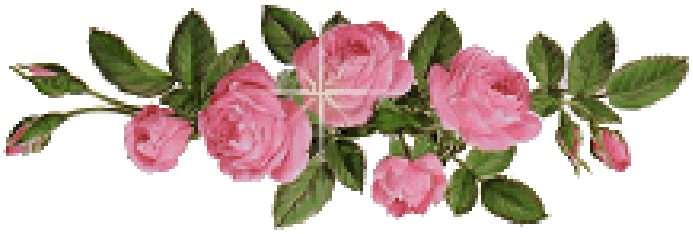

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List of abbreviations

١. **ILM**: Internal limiting membrane.
٢. **ERM**: Epiretinal membrane.
٣. **ELM**: External limiting membrane.
٤. **NFL**: Nerve fiber layer.
٥. **IMH**: Idiopathic macular hole.
٦. **PVD:** Posterior vitreous detachment.
٧. **RPE:** Retinal pigment epithelium.
٨. **OCT**: Optical coherence tomography.
٩. **CME:** Cystoid macular edema.
١٠. **ERM:** Epiretinal membrane
١١. **ETDRS:** Early treatment diabetic retinopathy study research group
١٢. **PVV :** pars plana vitrectomy
١٣. **CSME**: Clinically significant macular edema
١٤. **BRB:** Blood retinal barrier
١٥. **IRMA:** Intraretinal micro vascular abnormalities
١٦. **PDR :** Proliferative diabetic retinopathy
١٧. **PRP:** pan retinal photocoagulation
١٨. **DME:** Diabetic macular edema
١٩. **FAZ:** Foveal avascular zone
٢٠. **NVD:** Neovascularization at disc
٢١. **NVE:**Neovascularization elsewhere
٢٢. **PVR:** Proliferative vitreoretinopathy
٢٣. **ICG:** Indocyanine green
٢٤. **MF:** Myopic foveoschisis
٢٥. **FILMS**: Fluidic Internal Limiting Membrane Separation
٢٦. **EMP:** Epimacular proliferation
٢٧. **BSS:** Balanced salt solution
٢٨. **TB:** Trypan blue
٢٩. **IFCG:** Infracyanine green
٣٠. **BRAO:** Branch retinal artery occlusion
٣١. **IOP:**Intraocular pressure

Introduction

Internal limiting membrane(ILM) is formed by a basement membrane produced by footplates of Müller cells and constitutes the boundary between the retina and vitreous surface.ILM probaply acts as scaffold for cellular proliferation and may play a role in pathogenesis of several macular disorders including epiretinal membrane ,vitreomacular traction and idiopathic macular hole [١,٢].

ILM peeling has caused much controversy between ophthalmologists some of them support ILM peeling and believe in benefits that we can obtain after peeling .They conducted many studies which led them to conclude that ILM peeling improves visual and anatomic success in all stages of macular hole[٣]. They observed cellular proliferation on ILM and hypothesized that forces generated by contraction of these cells may enlarge macular hole size so they suggested removal of ILM and adherent contractile cells as a reasonable surgical approach to relieve tangential traction on prefoveal vitreous and to remove scaffold for cellular proliferation[٤]. They also concluded that ILM peeling has a great benefit in the treatment of diabetic macular edema [٥].

Other group of ophthalmologists object to ILM peeling and see no benefit behind it .They also conducted many studies which led them to conclude that ILM peeling does not seem to be useful for macular hole <٤٠٠ um in diameter and its benefit has to be investigated for larger macular holes .They reported that ILM peeling may cause retinal weakening by Müller cell damage, this may be followed by a structural breakdown and consequently hole formation [٦,٧]. They also concluded that vitrectomy in eyes with diabetic macular edema without ILM peeling was effective in reducing the retinal thickness and improving the visual acuity as eyes with ILM peeling [٨]. They found that viterctomy followed by gas tamponade without ILM peeling results in favorable visual and

anatomical outcome in cases of myopic foveschisis [٩].Also they concluded that the more eccentric from macula,the thinner and more adherent to retina is ILM, so the removal of peripheral ILM fraction may cause hole formation [١٠]. Lastly they reported that the new observation of retinal holes in macular area after ILM peeling is thought to be related to the removal of ILM itself [٧].

Methods of staining of ILM is indnocyanine green and trypan blue which enables the surgeon to distinguish between residual vitreous cortex and ILM to allow safer and easier removal of ILM.Trypan blue appears to be less toxic than indocyanin green[١١]. Nowadays the uses of dyes have been incrimated in causing iatrogenic damage to retina [٧].

Aim of the work

To review the literature regarding the indication, complication of different techniques of ILM peeling in vitreoretinal surgery and to review efficiency of these techniques as regards functional and anatomical outcomes.

Anatomy of internal limiting membrane

ILM forms the innermost layer of the retina and outer boundary of vitreous .The inner portion of ILM is known as hyaloid membrane of vitreous it gives the posterior retina a characteristic sheen when observed with ophthalmoscope.[١٢]

Structure:

Both retina and vitreous contribute to formation of this membrane which consists of ٤ elements:

١-Collagen fibrils

٢-Protoglycans (mostly hyalurnic acid) of vitreous

٣-The basement membrane

٤-The plasma membrane of Muller cells and possibly other Glial cells of the retina. (Fig .١)

The basement membrane stains positively with periodic acid Schiff and red with Mallory trichrome stain, however the vitreal contribution to ILM stains blue with Mallory trichrome, which is indicative of its collagenous nature , by electron microscope the collagen fibril of vitreous are seen enmeshed in the vitreal protoglycans and finally insert into the basement of Glial cells.[١٢]

In the flat preparation of retina the external portion of ILM exhibits a mosaic pattern that depicts the irregularities of foot process of Muller cells (Fig.٢). The irregularities form pockets which are filled by overlying basement membrane, these pockets are called basement facets. The vitreous portion of the membrane appears smooth in flat section of the retina, except at the periphery, where it may be irregular.[١٣]

Thickness:

In the posterior retina the ILM attains thickness of ٠.٥-٢.٠ micrometer, while in anterior retina the ILM attain thickness of ٢٠-١٠٠ nanometer. It is thickest at the fovea[١٣].

Continuation:

ILM Continues uninterrupted at fovea but is absent at the edges of optic disc. At periphery of retina, the membrane is continuous with the basal lamina of ciliary epithelium. The basal lamina shows breaks at the