Original Article

Spontaneous Internal Limiting Membrane Removal While Peeling Epiretinal Membrane

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Purpose: To determine the incidence of accidental internal limiting membrane removal in cases of Epiretinal membrane peel.

Material and Methods: It was a prospective observational study. The study was done at Eye unit III Mayo hospital Lahore from 1st January 2014 to 30th June 2014. Twenty patients (11 males and 9 females) of Epiretinal membrane peeling were included in the study. In all the cases Epiretinal peeling was done by a single surgeon. After Epiretinal membrane removal brilliant blue dye was used to stain the internal limiting membrane and the surgeon observed the characteristic of internal limiting membrane, that whether it was removed spontaneously during the peeling of Epiretinal membrane or not. The main outcome measured was status of the ILM after ERM peel.

Results: Out of 20 patients 11(55%) patients had spontaneous internal limiting membrane peeling during the removal of Epiretinal membrane, with only very minute remnants at some places. While 8 (40%) patients had intact ILM but it was damaged at various sites. While one patient had intact and undamaged ILM.

Conclusion: Internal limiting membrane is frequently removed during ERM peeling. Staining with brilliant blue G facilitates its identification.

Key Words: ILM Peel, Internal Limiting membrane, Epiretinal membrane.

An epiretinal membrane (ERM) is a relatively common retinal disorder with a prevalence of 3.5% to 6.9%.[1] It mostly occurs in elderly patients. It can be caused secondarily in various ocular conditions, such as uveitis, trauma, retinal detachment, or retinal vascular diseases. However, causative abnormalities are not found and are considered to be idiopathic in many cases. It is believed that migration of glial cells through defects of internal limiting membrane (ILM) into the vitreous cavity causes ERM development on the surface of ILM[2]. Clinically significant ERM ranges from dense opaque tissues to fine transparent membranes. Epiretinal membranes can cause tangential traction with retinal changes like thickening of retinal layers, surface wrinkling, or nerve fiber layer (NFL) fibrillation. These changes lead to reduction of visual acuity and metamorphopsia. Advanced forms of ERM with decrease of visual acuity and progression of clinical symptoms can be treated with pars plana vitrectomy and ERM peeling.[3]

Staining of these transparent tissues with vital dyes during vitrectomy greatly simplifies the procedure. Over the past decade, several substances, including indocyanine green (ICG), trypan blue, and brilliant blue G (BBG), have been used during vitrectomy as staining agents. Their staining capabilities have been confirmed, but concerns over retinal toxicity remain[4].

Vitrectomy is usually performed to remove the ERM in symptomatic cases. Recurrence after successful surgery has been reported to occur in 10% to 16.3% of cases.[5] ILM removal can be performed to

reduce the recurrence rate, because the ILM can act as a scaffold for glial proliferation after successful removal of the ERM.[6] Latest studies have shown that there is less chance of ERM formation if ILM peeling is done per operatively[7]. Our rational was to find that what are the chances of spontaneous ILM removal in cases of ERM peel surgery.

MATERIAL AND METHODS

It was a prospective observational study. The study was done at Eye unit III, Mayo hospital Lahore from 1st January 2014 to 30th June 2014. Twenty patients of Epiretinal membrane were included in the study. All patients had symptomatic visual loss. The patients were admitted from Outpatient department of Mayo Hospital Lahore. Eyes with idiopathic Epiretinal membrane were included in the study. Eyes with Epiretinal membranes following retinal detachment repair were excluded from the study. Eyes with intrinsic macular diseases that may have decreased visual acuity such as diabetic retinopathy, branch retinal vein occlusion, or pars planitis were also excluded.

A detailed pre-operative examination was carried out in all patients, with their visual acuity, pupil reaction, intraocular pressure, Slit lamp examination of anterior segment, slit lamp and indirect ophthalmoscopy of posterior segment. Informed consent was taken from all the patients.

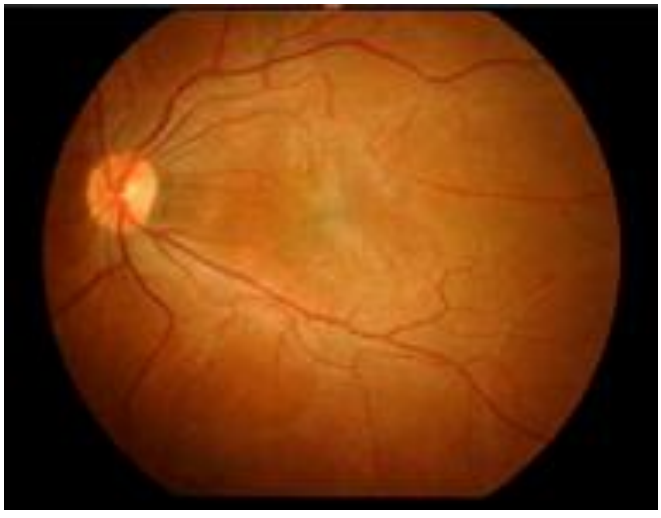

Fig. 1: Fundus photograph of Epiretinal membrane.

The surgical procedure consisted of 3-ports pars plana vitrectomy using 20 gauge instrumentations, which was followed by intravitreal triamcinolone acetonide to verify that the posterior hyaloid had been removed. The macular ERM was removed according to the surgeon's preferred technique. ERM was grasped directly with an intraocular forceps and was removed from the macular surface. Once the membrane was free from the retinal surface, it was removed from the eye. The surgeon then observed the characteristics of the underlying ILM by using brilliant blue G. The ILM was classified as A, absent; B, present and undamaged C, present and damaged. Peeling of the remainder of the ILM was performed in all the cases.

Patients were examined preoperatively and at 1 day, 1 week, 2 weeks, 1 month, and 2 months after surgery, and at different times thereafter. The follow-up examinations included: BCVA, slit-lamp examination of the anterior segment, intraocular pressure measurements, +90D lens – aided fundus biomicroscopy.

RESULTS

Out of 20 patients 11 (55%) patients had spontaneous internal limiting membrane peeling during the removal of Epiretinal membrane, with only very minute remnants at some places. While 8 (40%) patients had intact ILM but it was damaged at various sites. While one patient had intact and undamaged ILM. Peeling of the remainder of the ILM was performed in all the cases.

Fig. 2: After the removal Epiretinal membrane.

DISCUSSION

The ILM is a basement membrane, deriving from Muller cells. It is made up of the footplates of the

Müller cells and represents the interface between the retina and the vitreous. It is thinner in the periphery and thicker in the macula, with a mean width of 2.5 µm. Epiretinal membranes are avascular, fibrocellular membranes that proliferate on the inner surface of the ILM and produce various degrees of visual impairment.[8] Some ERMs may be hardly visible clinically and may have little or no effect on vision, while extensive ERMs cause secondary complications and marked visual loss.

Vitrectomy has become a common procedure for the treatment of visual loss due to Epiretinal membranes over the past 2 decades. ILM peeling is frequently performed to reduce ERM recurrence[9]. Removal of the ILM was expected to reduce the recurrence rates by limiting the myofibroblasts proliferation, consequently minimizing the development of a recurrent ERM. Researchers have also demonstrated that the surgical outcome is better and ERM recurrence is significantly lower in ERM patients undergoing ILM peeling compared with those without ILM peeling.[10]

A number of dyes are in use with different affinities for intraocular collagen and cellular elements. Commonly used dyes in clinical practice include indocyanine green (ICG), trypan blue (TB), and brilliant blue. We used brilliant blue G to stain the ILM.

The importance of ILM peeling in ERM surgery and its influence on visual acuity improvement was evaluated in previous studies[11]. Studies suggest that the interpretation of the ILM may be helpful to predict functional outcome. They have suggested that simultaneous ILM peeling showed a slower restoration of the retinal anatomy compared with eyes that had ERM peeling only. So there is less chance of ERM recurrence.

Since the evolution of optical coherence tomography, there have been several publications on the morphology of ERM and functional outcome after surgery. Spectral domain OCT (SD) is a recent, novel technique that provides dramatic increase of imaging speed; 50-times faster than standard resolution OCT. So contour of posterior hyaloid, traction forces of ERM and internal limiting membrane wrinkling are easier to identify. Due to non availability of Spectral domain OCT (SD) in our centre, we checked the characteristic of ILM by using brilliant blue dye Peroperatively, that whether ILM was spontaneously removed during the peeling of ERM or not.

Researchers have shown that during the removal of the ERM, the internal limiting membrane is spontaneously removed together with the ERM in about 40% of cases.[3] The rate of simultaneous removal of both the ERM and the ILM was 55% in our study. The focus of our study was to find that what are the chances of spontaneous ILM removal in cases of ERM peel surgery, and we found that in 55% of the cases it was removed along with the removal of ERM.

CONCLUSION

Our study showed that internal limiting membrane is frequently removed during the peeling of Epiretinal membrane.

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