Vitrectomy with or without Internal Limiting Membrane Peeling

for Each Stage of Myopic Traction Maculopathy

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Running title: Vitrectomy for myopic maculopathy

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Summary Statement:

The visual acuity significantly improved in eyes with macular retinoschisis and foveal detachment, but not with macular hole after vitrectomy with internal limiting membrane peeling. Vitrectomy with internal limiting membrane peeling may be effective for eyes with macular retinoschisis or foveal detachment with visual impairments.
Abstract

**Purpose:** To evaluate the effect of vitrectomy on the best-corrected visual acuity (BCVA) and on intra- and postoperative complications in highly myopic eyes with myopic traction maculopathy.

**Methods:** The medical records of 71 eyes of 64 patients with myopic traction maculopathy and high myopia (≤-8.0 diopters and axial length ≥26.0 mm) were reviewed. Twenty-six eyes had only a macular retinoschisis (MR), 30 eyes had a foveal detachment (FD), and 15 eyes had a macular hole (MH). The BCVA and complications were studied with or without internal limiting membrane (ILM) peeling.

**Results:** The postoperative BCVA at the final visit significantly improved in the MR and the FD groups (P=0.003, P=0.010, respectively), but not in the MH group (P=0.069). The BCVA with ILM peeling in the MR group and the FD group significantly improved at the final visit (P=0.003, P=0.010, respectively). The BCVA at the final visit was significantly correlated with age (P=0.026) and ILM peeling (P=0.034). A recurrence of tractional macular detachment developed significantly more frequently in eyes without ILM peeling (P=0.018).

**Conclusion:** These results indicate that vitrectomy with ILM peeling may be performed when the patients develop a macular retinoschisis or a foveal detachment with visual impairments.
Introduction

Pathologic myopia is a leading cause of visual impairment. In highly myopic eyes, the elongation of axial length of the eye and the development of a posterior staphyloma result in a thinning of the retina and choroid, which then lead to the development of different types of myopic traction maculopathy. Important causative factors might be related to the tangential traction caused by the premacular membrane or fibrosis and the inverse traction caused by the posterior staphyloma.

A non-rhegmatogenous retinal detachment in highly myopic eyes was first reported by Phillips and associates in 1958 as a posterior retinal detachment with no macular hole. Subsequently, optical coherence tomography (OCT) showed that myopic traction maculopathy was a combination of a foveal retinal detachment and a foveal schisis. Using OCT, Takano and Kishi reported that foveal retinoschisis or foveal retinal detachment occurs frequently in severely myopic eyes even in the absence of a macular hole. They suggested that the retinal detachment may precede the formation of a macular hole in highly myopic eyes. A foveal detachment and macular retinoschisis have been reported to be significantly associated with the presence of a posterior staphyloma.

Shimada et al showed the progression of a retinoschisis to a foveal detachment, and Sayanagi et al reported that a foveal detachment progressed to a macular hole retinal detachment (MHRD). A myopic tractional maculopathy has three stages of
development. It begins as a macular retinoschisis, referred to as macular retinoschisis instead of foveal schisis or foveoschisis, followed by the development of a foveal detachment which subsequently progresses to a macular hole and a MHRD.\textsuperscript{10-12} The myopic traction maculopathy was believed to cause by an anterior-posterior traction of the vitreous on the macula. More recent analysis by OCT showed that a tangential traction of the vitreous cortex behind a vitreous pocket contributed to the development of myopic traction maculopathy.\textsuperscript{3-5,7} Removal of the adherent vitreous cortex without removing the internal limiting membrane (ILM) has been shown to be effective in treating myopic traction maculopathy, suggesting that vitrectomy should be performed as a prophylactic treatment in highly myopic eyes at high risk of macular hole development.\textsuperscript{13-17}

Ikuno and associates\textsuperscript{18} reported that retinal microfolds are common in eyes with myopic macular retinoschisis after vitrectomy with ILM peeling, and the microfolds appeared to be generated by insufficient flexibility of the sclerotic retinal arterioles during axial length elongation in highly myopic eyes. They suggested that retinal arteriolar traction is a possible cause of myopic macular retinoschisis. Thus, posterior vitreous traction, epiretinal membrane, ILM traction, and inflexibility of the retinal vessels associated with posterior staphyloma are believed to be major causes of myopic macular retinoschisis and foveal detachment without retinal breaks.\textsuperscript{3}

Histological studies of excised posterior vitreous cortex in eyes with a MHRD in highly myopic eyes have shown that fibrous astrocytes made up the majority of cells, and the
cortical vitreous contained abundant newly-formed collagen including fibrous, long-spacing collagen surrounded by sparsely distributed native vitreous collagen. These findings indicate that removal of the vitreous cortex should reduce the tangential traction and resolve the myopic traction maculopathy.

Removal of the ILM has been reported to remove vitreous traction on the retina more completely. Ultrastructural study showed collagen fibers and cell debris on the inner surface of excised ILM in the eyes with myopic macular retinoschisis. However, removal of the ILM may increase the incidence of postoperative complications including development of macular hole and MHRD. In addition, there are no comparative studies as far as we have searched in PubMed that examined the efficacy of removing ILM on the BCVA and the anatomical outcome.

Thus, the purpose of this study was to evaluate the postoperative BCVA and complications after vitrectomy on eyes at different stages of myopic traction maculopathy. We also examined the effect of ILM peeling for postoperative visual outcome and the incidence of intraoperative and postoperative complications.

**Patients and Methods**

We reviewed the medical records of 71 eyes from 64 patients (14 men and 50 women) that had undergone vitrectomy for myopic traction maculopathy at the Kyorin Eye Center from September 1998 to February 2011. Vitrectomy was performed in patients with
myopic traction maculopathy who had signs of a progression of a decrease in the BCVA. Eyes with a refractive error (spherical equivalent) greater than -8.0 diopters (D) or an axial length longer than 26.0 mm were defined as eyes with high myopia. A myopic traction maculopathy was confirmed before surgery by OCT, and only cases with a follow-up period of at least one year were studied. A written informed consent was obtained from all patients after a full explanation of the purpose and possible complications of the treatment. The study protocol was approved by the Institutional Review Committee of the Kyorin University School of Medicine, and all of the patients approved the clinical review of their medical records. This clinical study has been registered with a reference number of NCT01658761 at http://www.clinicaltrials.gov.

The surgery was performed by one of the 3 retina specialists (KH, MI, AH). Core vitrectomy was performed with the creation of a posterior vitreous detachment if it was not present, and the vitreous was removed as completely as possible. ILM peeling was performed with an aid of 0.25% indocyanine green or triamcinolone acetonide crystals in eyes in which it could not be determined whether the posterior hyaloid was separated over the macular during vitrectomy. The lens was extracted from all patient aged >55 years, and all cataractous lenses were removed by phacoemulsification with an implantation of an intraocular lens. Gas tamponade with SF6 or C3F8 or silicon oil tamponade was used for the eyes with macular hole, retinal breaks, or presumable retinal breaks with severe foveal detachment or retinoschisis.

The subjects were examined preoperatively by OCT3 (Carl Zeiss Medic Inc., Dublin,
Vitrectomy for myopic traction maculopathy

California, USA), OCT4000 (Cirrus HD-OCT, Carl Zeiss Medic Inc., Dublin, California, USA), or Spectralis OCT (Heidelberg Engineering, Heidelberg, Germany). The eyes were divided into three groups according to the stage of the maculopathy determined by the preoperative OCT findings: a macular retinoschisis (MR) group included subjects with retinoschisis at the macula but without a foveal detachment; a foveal detachment (FD) group included subjects with tractional retinal detachment at the fovea with or without a macular retinoschisis; and a macular hole (MH) group included subjects with a macular hole with or without a macular retinoschisis or a foveal detachment. The MH group included only eyes with a full-thickness macular hole and eyes with lamellar hole or pseudo-hole were not included in the MH group.

The decimal BCVA was converted to the logarithm of minimum angle of resolution (logMAR) units for the statistical analyses. Forward stepwise regression analyses were performed to determine whether the age, sex, axial length, types of myopic traction maculopathy, and preoperative BCVA were significantly associated with the postoperative BCVA at the final visit. Intraoperative and postoperative complications in each group were evaluated from the medical records. A $P$ value of $<0.05$ was accepted to be statistically significant.

Results

The mean age of all patients was $65.5 \pm 8.6$ years with a range of 46 to 88 years, and the mean follow-up period was $27.7 \pm 25.9$ months with a range of 13 to 116 months. The
mean preoperative BCVA was 0.64 ± 0.41 logMAR units with a range of 2.0 to 0.0 logMAR units. The ILM was removed from 61 eyes, and a gas tamponade was used on 35 eyes. Thirty-one eyes were pseudophakic prior to the vitrectomy, and 33 eyes had their lens extracted with IOL implantation. Six eyes developed cataracts after vitrectomy and the lens was removed in 5 eyes. All of the eyes except 2 were pseudophakic at the final visit.

There were 26 eyes (37%) placed in the MR group, 30 eyes (42%) in the FD group, and 15 eyes (21%) in the MH group. A gas tamponade was used in 43 eyes, air in 6 eyes, SF6 in 33 eyes, and C3F8 in 4 eyes. Silicon oil was injected into 6 eyes of 6 patients because these patients had difficulty maintaining a prone position or had poor vision in the fellow eye.

Postoperative Visual Improvement in each type of myopic traction maculopathy

The mean preoperative BCVA was 0.67 ± 0.42 logMAR units, and the mean postoperative BCVA was 0.49 ± 0.38 logMAR units at one year and 0.43 ± 0.38 logMAR units at the final visit. The improvements in the BCVA were significant ($P = 0.0021$, $P = 0.0002$, Wilcoxon signed-rank test, respectively). In 11 eyes with reduced BCVA at the final visit, an unclosed macular hole was found in 2 eyes and a development of a macular hole in one eye in the MR group. A MHRD developed in one eye and an enlargement of a chorioretinal atrophy with or without choroidal neovascularization or progression of patchy atrophy in 3 eyes in the FD group and 1 eye in the MH group.
Glaucoma developed in one eye in the MR group, the cataract progressed without a need for surgery in one eye in the MR group, and a recurrent traction macular detachment developed in one eye of the MR group.

The age, axial length and preoperative BCVA were not significantly different in the MR, FD, and MH groups ($P = 0.206$, $P = 0.091$, $P = 0.303$, Kruskal-Wallis test, Table 1). At postoperative one year, the BCVA significantly improved in the MR and FD groups ($P = 0.043$, $P = 0.017$, respectively, Wilcoxon signed-rank test), but not in the MH group ($P = 0.208$, Figure 1). At the final visit, the BCVA significantly improved in the MR and FD groups ($P = 0.003$, $P = 0.010$, respectively), but not in the MH group ($P = 0.069$).

The incidence of postoperative BCVA of better than 20/40 at one year was significant in three groups; the MR group (54%), the FD group (48%), and the MH group (13%, $P = 0.032$, Kruskal-Wallis test; Figure 2). The incidence of postoperative BCVA of better than 20/40 was significantly higher in the MR and FD groups than that of the MH group ($P = 0.010$, $P = 0.021$, Steel test, respectively). The incidence of postoperative BCVA of better than 20/40 at the final visit increased in all groups; the MR group (62%), the FD group (53%), and the MH group (27%). The incidence of postoperative BCVA of better than 20/40 at the final visit was also significant in three groups ($P = 0.045$, Kruskal-Wallis test). The incidence of postoperative BCVA of better than 20/40 was significantly higher in the MR group than that of the MH group ($P = 0.029$, Steel test), but that of the FD group was not significant with that of the MH group ($P = 0.077$).
Visual improvements with or without internal limiting membrane peeling

The age, sex, axial length, types of myopic traction maculopathy, and incidence of cataract surgery were not significantly different whether the ILM was peeled or not peeled (Table 2). The mean preoperative BCVA was $0.75 \pm 0.15$ logMAR units in 10 eyes without ILM peeling and $0.67 \pm 0.42$ logMAR units in 61 eyes with ILM peeling ($P = 0.165$, Mann-Whitney U test). The mean postoperative BCVA in eyes with ILM peeling at one year was not significant with that in eyes without ILM peeling (mean; $0.45 \pm 0.36$ logMAR units, $0.70 \pm 0.43$ logMAR units, respectively, $P = 0.061$, Mann-Whitney U test). The BCVA in eyes with ILM peeling at the final visit was also not significant with that in eyes without ILM peeling ($0.40 \pm 0.36$ logMAR units, $0.65 \pm 0.48$ logMAR units, respectively, $P = 0.128$). The BCVA in eyes with ILM peeling was significantly better at one year and at the final visit comparing to that at baseline ($P = 0.001$, $P < 0.001$, respectively, Wilcoxon signed-rank test). In contrast, the BCVA in eyes without ILM peeling at one year or at the final visit was not significant with that at baseline ($P = 0.647$, $P = 0.386$, respectively).

The BCVA in the MR group with ILM peeling was not significant at one year with that at the baseline ($P = 0.050$, Wilcoxon signed-rank test) but was significantly better at the final visit ($P = 0.003$, Figure 3). The BCVA in the FD group with ILM peeling was significantly better at one year and at the final visit comparing to that at baseline ($P = 0.017$, $P = 0.010$, respectively). In contrast, the BCVA in the MH group with ILM peeling at one year or at the final visit was not significant with that at baseline ($P = 0.208$, $P = 0.386$, respectively).
Intraoperative complications

The incidence of intraoperative retinal breaks was 2 eyes (7.7%) in the MR group, 4 eyes (13.3%) in the FD group, and 2 eyes (13.3%) in the MH group ($P = 0.795$, Fisher exact probability test). These retinal breaks were located at the periphery or around the vascular arcade. A macular hole developed in 6.7% in the FD group but none in the MR group ($P = 0.282$, comparison in 2 groups). These macular holes in the FD group were found when the vitreous cortex was peeled.

Postoperative complications

Postoperative tractional macular detachment developed after resolution of myopic traction maculopathy without any sign of proliferative vitreoretinopathy in one eye (3.8%) in the MR group and 2 eyes (6.7%) in the FD group ($P = 0.795$, Fisher exact probability test; Figure 4). A postoperative macular hole developed in one eye (3.8%) in the MR group, 4 eyes (26.7%) in the MH group, and none in the FD group ($P = 0.003$). In 4 eyes in the MH group with a postoperative macular hole, the macular hole was not closed after the initial surgery with air or SF6 gas tamponade in 2 eyes and these eyes were followed without any surgical intervention. In the other 2 eyes in the MH group, the macular hole was closed after the initial surgery but reopened 1 and 5 months after the surgery with silicon oil or C3F8 gas tamponade. A MHRD developed in 4 eyes.
(13.3%) of the FD group and 4 eyes (26.7%) of the MH group, but none in the MR group ($P = 0.005$). When a macular hole developed postoperatively in the FD group, all of the eyes progressed to a MHRD. A retinal detachment developed in 2 eyes (6.7%) of the FD group from peripheral retinal break and one eye (6.7%) of the MH group from paravascular microholes ($P = 0.427$).

Of the 61 eyes in which the ILM was removed, a MHRD developed in 5 eyes (8%) at 2 to 4 weeks, a macular hole in 3 eyes (5%) at one month, and a rhegmatogenous retinal detachment in 3 eyes (5%) at postoperative 3, 7, and 9 months. However, a tractional retinal detachment did not develop in any eye after ILM peeling (Table 2).

Of the 10 eyes in which the ILM was not removed during vitrectomy, a MHRD developed in 2 eyes (20%) at postoperative one month, and a macular hole in one eye (10%) at postoperative 4 years. A tractional detachment developed in 2 eyes (20%) at postoperative 2 years and 2.5 years. A second vitrectomy with ILM peeling was performed on one eye with resolution of the tractional detachment and visual recovery. The other eye was not reoperated but followed. The incidence of tractional detachment was significantly lower in eyes with ILM peeling ($P = 0.018$, Fisher exact probability test) although the incidences of the other complications were not significantly different (macular hole; $P = 1.000$, MHRD; $P = 0.254$). In addition, postoperative formation of macular hole seemed to accelerate after ILM was peeled because all 3 eyes with postoperative macular hole developed at one month in eyes with ILM peeled and one eye at 4 years in eye with ILM not peeled ($P = 0.25$).
A MHRD developed within one month after surgery in eyes with and without ILM peeling. In contrast, a macular hole and a tractional detachment developed within a year after surgery in eyes with ILM peeling but more than 2 years after surgery in eyes without ILM peeling ($P = 0.859$, $P = 0.018$, respectively).

Relationships between patient baseline characteristics and postoperative vision at final visit

The patient baseline characteristics that were significantly associated with the BCVA at the final visit were age ($P = 0.026$) and ILM peeling ($P = 0.034$; Table 3). The sex, preoperative BCVA, axial length, type of myopic traction maculopathy, and preoperative BCVA were not significantly associated.

Discussion

A myopic macular schisis has been reported to be stable without affecting the visual acuity.\textsuperscript{12} However, the risk of a reduction of the BCVA is higher when the macular schisis was combined with a premacular epiretinal membrane or a residual attachment of the posterior hyaloid to the fovea.\textsuperscript{12} Eyes with a foveal detachment had better improvements in the BCVA after vitrectomy with ILM peeling for myopic traction maculopathy than eyes with a retinoschisis or a macular hole.\textsuperscript{25} Consequently, vitrectomy has been recommended when patients develop a foveal detachment with
symptomatic visual impairiments.\textsuperscript{25,26} The development of a macular hole or a MHRD is a major complication that is associated with poor postoperative vision.\textsuperscript{17,20}

Our results showed that a macular hole developed intraoperatively but not postoperatively in the FD group although a MHRD did develop postoperatively in this group. On the other hand, when myopic macular retinoschisis is combined with a foveal detachment, a macular hole developed frequently whether surgery is or is not performed.\textsuperscript{12}

Our results showed that vitrectomy was effective in treating myopic traction maculopathy with significant improvements of the postoperative BCVA. The improvement in the BCVA in the MR and the FD groups was significant at postoperative one year but not in the MH group. Ikuno and associates\textsuperscript{25} described significant visual improvements at 12 months after vitrectomy for myopic traction maculopathy in the FD group but was not significant in MR and MH groups. However the BCVA significantly improved in the MR and FD groups at the final visit in our study. When myopic traction maculopathy progressed to a MH stage, it is difficult to achieve a significant improvement in the postoperative BCVA.\textsuperscript{25}

In contrast, a postoperative BCVA $\geq 20/40$ was achieved more frequently in the earlier stage of myopic traction maculopathy. Thus, the incidence of eyes with a BCVA $\geq 20/40$ was found in the following order; MR type $>$ FD type $>$ MH type.\textsuperscript{10,11} The incidence of postoperative BCVA $\geq 20/40$ was significantly more frequent in the MR group than that of
the MH group at one year and the final visit. In addition, forward stepwise regression analyses showed that the postoperative BCVA at the final visit was significantly correlated with the patients’ age and also with ILM peeling but not with the preoperative BCVA and axial length. From these findings, we recommend that younger patients have vitreous surgery with ILM peeling when they develop a macular retinoschisis with reduced BCVA or symptomatic visual impairments. However, a better postoperative BCVA has been reported to be correlated with a better preoperative BCVA and a shorter axial length.\textsuperscript{25-27}

Macular hole detected intraoperatively in the FD group and these macular holes may have existed preoperatively, and the preoperative OCT failed to detect the macular holes covered with premacular fibrosis. The incidences of intraoperative and postoperative complications were not significantly different whether the ILM was peeled or not peeled but a recurrence of tractional macular detachment was significantly more frequent in eyes without ILM peeling. These recurrences were observed 2 to 2.5 years after the surgery. Additional vitrectomy involving the removal of the ILM was performed on one of the eyes, and no recurrence of tractional macular detachment was observed for up to 5 years after the second surgery. These recurrences may be caused by cellular proliferation on the residual ILM at long time after the surgery.

The recurrent premacular membrane that developed after the initial vitrectomy without ILM peeling consisted of the ILM and proliferated cells with many dense, intracytoplasmic granules, cytoplasmic processes, and basal lamina.\textsuperscript{28} These cells had
appearances of retinal pigment epithelial cells. The presence of a paravascular lamellar retinal hole has been reported to be frequent in eyes with high myopia with premacular fibrosis and paravascular full-thickness retinal breaks. These lamellar or full-thickness paravascular retinal breaks in highly myopic eyes may cause cellular proliferation on the ILM even after a complete removal of the vitreous cortex during the initial vitrectomy. Vitrectomy and ILM peeling and a gas tamponade led to a more rapid anatomical resolution of myopic traction maculopathy and greater improvement in BCVA than that without gas tamponade. These results can be explained by the effects of the gas tamponade for paravascular lamellar or full-thickness retinal breaks that led to a more rapid resolution of a myopic macular retinoschisis.

The limitations of this study were its retrospective design without randomization of the groups. In addition, the number of patients in each group was small and not equal. Therefore, further studies with larger sample sizes are needed to confirm these results.

In conclusion, the improvement in the BCVA was equal in each stage of myopic traction maculopathy. However, better postoperative BCVA was achieved significantly more frequently when the vitrectomy is performed at a MR or a FD stage of myopic traction maculopathy. ILM removal for myopic traction maculopathy led to significantly better BCVA and prevented recurrent tractional retinal detachment. However, the prevention of the development of intraoperative and postoperative macular hole and postoperative MHRD should be considered during and after surgery because postoperative formation of macular hole tends to develop at an earlier period after ILM is peeled. A new
surgical technique of fovea-sparing ILM peeling or foveola ILM non-peeling may protect to develop postoperative macular hole after ILM peeling. Further studies are needed to determine the indications of vitrectomy and predictive factors for postoperative visual outcome.
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References


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Figure legends

**Figure 1.** Postoperative visual outcome at each stage of myopic traction maculopathy. The best-corrected visual acuity (BCVA) in the macular retinoschisis (MR) group significantly improves at one year and the final visit comparing to that at baseline. The BCVA in the foveal detachment (FD) group also significantly improves at one year and the final visit. The BCVA in the macular hole (MH) group at one year or the final visit is not significant with that at baseline. N.S.: not significant.

**Figure 2.** Distribution of the postoperative best-corrected visual acuity better than 20/40 in each group. The eyes with macular retinoschisis (MR) had a higher incidence of postoperative best-corrected visual acuity (BCVA) at one year (A) and the final visit (B). FD: foveal detachment, MH: macular hole.

**Figure 3.** Postoperative visual outcome at each stage of myopic traction maculopathy with or without internal limiting membrane peeling. A: the macular retinoschisis (MR) group. The best-corrected visual acuity (BCVA) with internal limiting membrane (ILM) peeling significantly improves at the final visit comparing to that at baseline. B: the foveal detachment (FD) group. The BCVA with ILM peeling significantly improves at one year and the final visit comparing to that at baseline. C: the macular hole (MH) group. The BCVA with ILM peeling was not significant at one year and the final visit comparing to that at baseline. N.S.: not significant.
**Figure 4.** Postoperative complications after vitrectomy.

When the macular hole (MH) developed after the surgery in eyes with a foveal detachment (FD), the stage of myopic traction maculopathy progressed to macular hole retinal detachment (MHRD). Retinal detachment caused from peripheral retinal breaks in one eye and paravascular breaks in 2 eyes. MR: macular retinoschisis
Table 1. Comparison of each stage of myopic traction maculopathy

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<th>MR</th>
<th>FD</th>
<th>MH</th>
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<td>Numbers of eyes</td>
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<td>Sex (man: woman)</td>
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<td>9: 21</td>
<td>2: 13</td>
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<td>Axial length (mm)</td>
<td>28.4 ± 2.0</td>
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Cataract surgery

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<td>8</td>
<td>13</td>
<td>8</td>
<td>0.330 †</td>
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<td>13</td>
<td>13</td>
<td>5</td>
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<td>25</td>
<td>29</td>
<td>15</td>
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Preop BCVA (logMAR, mean ± standard deviation) 0.58 ± 0.26 0.73 ± 0.50 0.76 ± 0.30 0.303 *

Postop BCVA (logMAR, mean ± standard deviation)

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<td>at one year</td>
<td>0.44 ± 0.41</td>
<td>0.43 ± 0.35</td>
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<td>at the final visit</td>
<td>0.40 ± 0.40</td>
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Table 2. Comparison of surgical outcome and postoperative complications with or without internal limiting membrane (ILM) peeling

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<td>Sex (man: woman)</td>
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<td>Axial length (mm)</td>
<td>29.1 ± 2.0</td>
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<td>Stage of myopic traction maculopathy</td>
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<td>Cataract surgery before the initial surgery</td>
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<td>59 eyes (97%)</td>
<td>10 eyes (100%)</td>
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<td>Preop BCVA (logMAR, mean ± standard deviation)</td>
<td>0.67 ± 0.42</td>
<td>0.75 ± 0.15</td>
<td>0.165 ‡</td>
</tr>
<tr>
<td>Postop BCVA (logMAR, mean ± standard deviation)</td>
<td>0.45 ± 0.36</td>
<td>0.70 ± 0.43</td>
<td>0.061 ‡</td>
</tr>
<tr>
<td>at one year</td>
<td>0.40 ± 0.36</td>
<td>0.65 ± 0.48</td>
<td>0.128 ‡</td>
</tr>
<tr>
<td>Macular hole retinal detachment</td>
<td>5 eyes (8 %)</td>
<td>2 eyes (20 %)</td>
<td>0.254 †</td>
</tr>
<tr>
<td>Macular hole</td>
<td>3 eyes (5 %)</td>
<td>1 eye (10 %)</td>
<td>1.000 †</td>
</tr>
<tr>
<td>Tractinal macular detachment</td>
<td>0 eye (0 %)</td>
<td>2 eyes (20 %)</td>
<td>0.018 †</td>
</tr>
<tr>
<td>Rhegmatogenous retinal detachment</td>
<td>3 eyes (5 %)</td>
<td>0 eye (0 %)</td>
<td>1.000 †</td>
</tr>
</tbody>
</table>

Table 3. Forward stepwise regression analysis between patient baseline characteristics and postoperative best-corrected visual acuity (BCVA) at the final visit.

<table>
<thead>
<tr>
<th></th>
<th>Postoperative BCVA at the final visit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPRC</td>
</tr>
<tr>
<td>Age</td>
<td>0.274</td>
</tr>
<tr>
<td>Sex</td>
<td>0.030</td>
</tr>
<tr>
<td>Axial length</td>
<td>0.071</td>
</tr>
<tr>
<td>Types of myopic traction maculopathy</td>
<td>0.211</td>
</tr>
<tr>
<td>Preoperative BCVA</td>
<td>0.053</td>
</tr>
<tr>
<td>With or without ILM peeling</td>
<td>0.259</td>
</tr>
</tbody>
</table>

SPRC: standardized partial regression coefficients, ILM: internal limiting membrane