

Case Report

Rapid Regrowth of the Epiretinal Membrane after Macular Hole Surgery Using the Inverted Internal Limiting Membrane Flap Technique

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Abstract

We report a case of rapid regrowth of an epiretinal membrane (ERM) after macular hole (MH) surgery using the inverted internal limiting membrane (ILM) flap technique.

A 63-year-old woman presented with a large full-thickness macular hole (FTMH) with ERM in the right eye. We performed 27-gauge pars plana vitrectomy (PPV), and covered the fovea by inverting the upper ILM flap. After vitrectomy, the FTMH was closed. However, 1 month later, optical coherence tomography (OCT), showed ERM regrowth over a large area. We performed 27-gauge PPV with thorough ERM and ILM peeling. As of the 6-month follow-up, there has been no recurrence of ERM.

There is a risk of rapid ERM developing after MH surgery using the inverted ILM flap technique, especially when residual ERM persists on the inverted ILM flap itself. Vitrectomy enables additional ILM peeling to aid ERM removal and improves visual and anatomic outcomes. Thus, it is imperative to ensure complete ERM removal from the ILM before flap placement and consider which part of the ILM should be used. We think that postoperative inflammation may also contribute to rapid ERM formation, so strong anti-inflammatory therapy after surgery is needed.

ABBREVIATIONS

FTMH: Full-Thickness Macular Holes; PPV: Pars Plana Vitrectomy; ILM: Internal Limiting Membrane; MH: Macular Hole; ERM: Epiretinal Membrane; BCVA: Best-Corrected Visual Acuity; OCT: Optical Coherence Tomography

INTRODUCTION

Full-thickness macular holes (FTMH), generally occur as a result of vitreous-mediated anteroposterior or tangential forces on the retinal surface and lead to the loss of central vision [1]. At present, the pars plana vitrectomy (PPV), procedure with internal limiting membrane (ILM), peeling and intravitreal gas tamponade is considered the standard surgical technique for FTMH, and anatomic closure rates are reported to be high [2]. However, in large FTMH and FTMH with high myopia, the closure rate is reported to be low [3,4]. Michalewska et al., first reported the inverted ILM flap technique as a new surgical strategy that successfully treated a large macular hole (MH) [5,6]. Here, we report a case of a rapid regrowth of an epiretinal membrane (ERM), after FTMH surgery using the inverted ILM flap technique.

CASE PRESENTATION

A 63-year-old woman presented with ERM in the right eye. She had been referred to us because of decreasing visual acuity in the right eye over the previous 2 months. On examination at our center, best-corrected visual acuity (BCVA), was 20/125 in the right eye and 20/16 in the left eye. Fundus examination of the left eye was normal. A large FTMH was seen in the right eye with ERM (Figure 1). Optical coherence tomography (OCT) showed that the preoperative minimal and maximal FTMH diameters were 426 μ m and 858 μ m and ERM was continuous with FTMH. Moreover, the vitreous was adhered to ERM and the edge of FTMH (Figure 2).

Axial length was 24.4 mm. She underwent cataract surgery and 27-gauge PPV in the right eye. Core vitrectomy and ILM staining with Brilliant Blue-G dye (0.06%), were performed. We removed the ILM from only the lower side of the fovea and covered the fovea by inverting the upper ILM flap, which was overlaid with the ERM (Figure 3).

This was followed by tamponade with 20% sulfur hexafluoride gas. The patient was advised to maintain a face-down position.



Figure 1 Fundoscopy at the first visit showing full-thickness macular hole with epiretinal membrane.

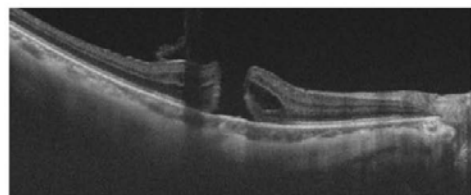


Figure 2 Optical coherence tomography images of the right eye showing stage IV full-thickness macular hole with epiretinal membrane (ERM) and the vitreous was adhered to ERM.

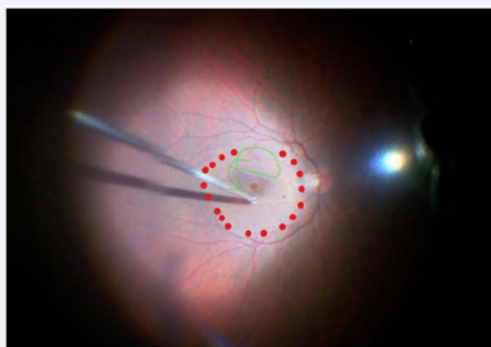


Figure 3 We removed the internal limiting membrane (ILM) from only the lower side of the fovea (●) and covered the fovea by inverting the upper ILM flap. (green area).

Three days after vitrectomy, the FTMH was closed. One week after vitrectomy, the flap covering the fovea was observed in OCT (Figure 4). At 1 month after vitrectomy, BCVA was 20/63 and the MH remained closed. However, OCT showed a regrowth and wide spreading of the ERM in the macula, possibly from residual ERM on the inverted ILM (Figure 5). Therefore, we performed 27-gauge PPV again. The ERM was regrowth only in the flap part of ILM. The ERM and ILM were firmly attached. The ILM remaining as a flap was stained with BBG and removed. At the

6-month follow-up, the BCVA had improved to 20/25 and ERM had not recurred (Figure 6).

DISCUSSION

The inverted ILM flap technique provides excellent MH closure results in refractory cases, including large MHs, MHs with high myopia, and MHs with retinal detachment [5,6]. The application of refractory MH surgery using ILM flap is thus expanding. In the current case, the inverted ILM flap technique was performed because the FTMH was large, 853 μm in diameter

Current modern vitreoretinal techniques for ERM generally involve small-gauge vitrectomy and the use of intraocular dyes to aid visualization and peeling of the posterior hyaloid, ERM, and ILM [7]. Kwok et al. reported similar visual outcomes between procedures with and without removal of the ILM, but a lower recurrence rate of ERM in eyes that had undergone ILM peeling [8]. They concluded that ILM peeling decreased the recurrence rate of ERM. Moreover, Park et al. reported that postoperative regrowth of the ERM occurs on ILMs that persist after ERM peeling, thereby acting as a scaffold for cell proliferation [9]. In our case, there might have been some residual ERM on the flap of the ILM. ERM peeling was not performed from the raised ILM flap due to the technical difficulties. Thus, this ILM might

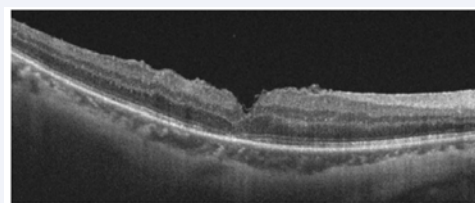


Figure 4 Optical coherence tomography showed that full-thickness macular hole was closed and internal limiting membrane flap covered the fovea.

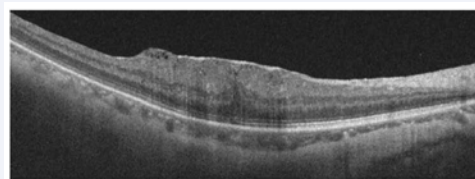


Figure 5 Optical coherence tomography showed a regrowth and wide spreading of the epiretinal membrane in the macula.

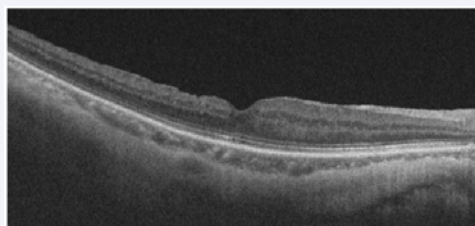


Figure 6 Epiretinal membrane had not recurred at 6 months after the second vitrectomy in optical coherence tomography.

have provided a foothold from which ERM could regrow. ERM formation was observed below the fovea as early as at 1 month after the surgery and coincided with the ILM flap site. It was technically difficult to perform ERM peeling on the upper area of the ILM, which we used as the flap. When choosing the ILM flap site, we should have used a part without ERM or to simply remove the ERM from the ILM before inversion. Although the final visual acuity was good in our case, the regrowth of the ERM could have reduced the visual acuity. If the adhesion between the retina and the ERM is strong, the retina may be damaged during the ERM peeling. In addition, postoperative inflammation may contribute to rapid formation of ERM. Therefore, it is important to apply strong postoperative anti-inflammatory therapy. With the increasing number of surgeries using ILM flap, such cases as ours may increase in the future.

There is a risk of ERM developing soon after MH surgery using the inverted ILM flap technique, especially when there is residual ERM. We believe that it is important not only to ensure complete ERM removal before placing the inverted ILM flap, but also to consider which part of the ILM should be used. Additionally, it is also important to strongly perform postoperative anti-inflammatory therapy.

DATA AVAILABILITY

The data sets used to support the findings of this study are available from the corresponding author upon reasonable request.

STATEMENT OF ETHICS

This research complies with the relevant guidelines for human studies and was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The study protocol was approved by the IRB of Jichi Medical University.

CONSENT

Patient consent to review his medical records was not required by the IRB, because the analyzed data does not contain any personally identifiable data.

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