Successful Closure of Iatrogenic Double Macular Hole Using Inverted Internal Limiting Membrane Flap Technique-Case Report

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Abstract

**Purpose:** To present a case study describing inverted internal limiting membrane flap technique used after failed treatment of double large full-thickness macular hole.

**Case presentation:** A 79-year-old woman presented large full-thickness macular hole after primary failed pars plana vitrectomy with internal limiting membrane (ILM) peeling and SF6 gas endotamponade. The corrected distance visual acuity (CDVA) was 0.1 (Snellen chart). Optical coherence tomography (OCT) revealed two full-thickness macular holes. The first one of central location 825 μm in based diameter, and the second of nasal location 575 μm in based diameter. For this reason the patient was performed 25G posterior vitrectomy with inverted internal limiting membrane flap technique. The follow-up examinations were performed on day 1,7,30,180 postoperatively. Finally visual acuity was 0.4 (Snellen chart). Postoperative OCT confirmed MHs closure with the preservation of foveal profile.

**Conclusion:** It seems, that in the case of full-thickness macular hole which was not closed after the first surgery and even there came to a complication and the formation of iatrogenic full-thickness macular hole, the use of inverted internal limiting membrane flap technique can be a good solution.

Keywords: Macular hole; Pars plana vitrectomy; Inverted ILM flap technique; Case series

Abbreviations  ILM: Internal Limiting Membrane; OCT: Optical Coherence Tomography; FTMH: Full Thickness Macular Hole; PPV: Pars Plana Vitrectomy; BCVA: Best-Corrected Visual Acuity; IOP: Intraocular Pressure

Background

Macular holes are an important cause of significant reduction in visual acuity. Macular hole surgery is a well-established method for the treatment of macular holes [1]. Vitrectomy for the treatment of macular holes was first described in 1991. Since then, numerous modifications of surgical technique have been applied, trying to get the best results after surgery. The inverted internal limiting membrane (ILM) flap (inverted ILM flap) technique has been proposed by Michalewska et al. to improve surgical treatment [2]. This technique was successfully applied for macular hole. The aim of this paper is to present the inverted ILM flap technique in iatrogenic double-full thickness macular hole.

Case Report

A 79-year-old female was referred to the Ophthalmology Department due to reduced visual acuity after ineffective surgery of full thickness macular hole (FTMH). 25 gauge pars plana core vitrectomy (PPV) was performed with internal limiting membrane (ILM) peeling and SF6 gas endotamponade. The best corrected visual acuity (BCVA) was 0.1 (Snellen chart). Postoperative optical coherence tomography (OCT) revealed two full-thickness macular holes. The first one of central location 825 μm in based diameter, and the second of nasal location 575 μm in based diameter (Figures 1A and 1B). For this reason the patient was qualified for another 25G posterior vitrectomy.

Surgical Technique

Posterior pole was stained during 25-gauge vitrectomy. A fragment of retinal internal limiting membrane was found on the nasal side (Figure 1B). After ILM separation from the retinal layers, it was inverted to cover both holes (Figure 1C).

Inverted internal limiting membrane flap technique was applied [1,3]. Then, fluid-air exchange was performed and 2 cm³ of SF6 were injected via pars plana to perform endotamponade. The patient was positioned for 24 h [4].

Results

The follow-up examinations were performed on day 1,7,30,180 postoperatively. Final visual acuity was 0.4 (Snellen chart). Postoperative OCT confirmed MHs closure with the preservation of foveal profile (Figure 1D).

Discussion

To the best of our knowledge this is first report of the successful treatment double large iatrogenic full thickness macular hole. Since its first description by Kelly and Wendel vitrectomy has been the gold standard of macular hole surgery [5]. Although an initial success rate of 68% was reported most surgeons currently achieve a success rate of...
90% to 98% [5-7]. Conventional vitrectomy with ILM peeling was internal limiting membrane peeling remains a method of choice for the repair of FTMH [8,9]. Large macular holes are less likely to be closed after pars plana vitrectomy. Michalewska et al. first presented the inverted ILM flap technique in 2009r [10]. They hypothesize that the inverted ILM flap technique stimulates proliferation of glial cells that fill macular holes, thereby enhancing closure, improving macular hole closure rate, and improving postoperative visual acuity [2]. All of the above approaches and the inverted ILM flap technique have one thing in common: They may induce glial cell proliferation, resulting in the macular hole filling with proliferating cells that enhance closure [2]. In idiopathic MH, ILM peeling relieves foveal traction from the retinal surface by complete removal of any epiretinal tissues and by stimulation of gliosis [11-13]. There are some complications after macular peeling including focal retinal haemorrhages and edema, which generally resolves spontaneously without the need of treatment [14-17].

**Conclusion**

It seems that in the case of full-thickness macular hole which was not closed after the first surgery and even there came to a complication and the formation of another full-thickness macular hole, the use of inverted internal limiting membrane flap technique can be a good solution.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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**Competing Interest**

The authors declare that they have no competing interests.

**Synopsis**

In certain cases of full-thickness macular hole which was not closed after the first surgery and even there came to a complication and the formation of iatrogenic full-thickness macular hole, the use of inverted internal limiting membrane flap technique can be a good solution.

**References**


