

Inverted Internal Limiting Membrane Insertion for Macular Hole–Associated Retinal Detachment in High Myopia



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- **PURPOSE:** To investigate the surgical outcomes of inverted internal limiting membrane (ILM) insertion in macular hole (MH)-associated retinal detachment (RD) in high myopia.
- **DESIGN:** Retrospective, interventional, consecutive case series.
- **METHODS:** This study was conducted at 2 medical centers. Consecutive cases of highly myopic eyes with MH-associated RD were included. Forty eyes were divided into 2 groups: Group 1 (20 eyes) received vitrectomy, ILM peeling within the arcade area, and air-fluid exchange, and Group 2 (20 eyes) received vitrectomy, inverted ILM inserted into the macular hole, and air-fluid exchange. Optical coherence tomography was used to observe the closure of the macular hole. Corrected visual acuity (VA) was also recorded. Two-sample *t* test and Mann-Whitney *U* test were used for statistical analysis to compare differences between the 2 groups.
- **RESULTS:** MH was closed in 35% of the eyes in Group 1 and in all eyes in Group 2 ($P < .001$). Significant improvement in VA in logarithm of minimal angle of resolution (logMAR) was achieved in both groups. There was no difference in the initial, final, or improvement of logMAR VA in the 2 groups.
- **CONCLUSION:** Inverted ILM insertion into a macular hole effectively helps close the macular hole in MH-associated RD in high myopia. This may prevent the possible re-detachment from the MH. A prospective study with a larger number of cases and longer follow-up may help validate our findings. (Am J Ophthalmol 2016;162:99–106. © 2016 by Elsevier Inc. All rights reserved.)

MACULAR HOLE (MH) WITH RETINAL DETACHMENT (RD) in high myopia is a challenging disease for vitreoretinal surgeons. Many surgical approaches to treat MH-associated RD have been

proposed, including gas injection, vitrectomy, and posterior hyaloid removal with or without internal limiting membrane (ILM) peeling using gas or silicone oil^{1–10} as internal tamponade. Macular buckling^{11–13} and vitrectomy with scleral imbrications¹⁴ have also been established as treatment options to increase the success rate of surgery. Although anatomic reattachment can be achieved in a high percentage of cases undergoing vitrectomy and ILM peeling, the MH closure rate varies among different investigators in highly myopic eyes complicated by RD. With modern surgical techniques, the success rate of MH closure ranges from around 50% to 70%.^{5,9,10} Although the success rate has increased, it is still not satisfactory compared with that in MHs without RD. An open hole in an eye with high myopia poses the risk of recurrent RD in addition to contributing to hindered central vision.¹⁵ Recently, Michalewska and associates proposed using an inverted ILM flap as a bridging tissue across an MH for treating large MHs, with MH closure being observed in 98% of cases.^{16–18} However, in cases with MH-associated RD, the ILM flap proposed for a refractory MH may detach from the hole during or after surgery in the presence of a wavy retinal surface and turbulent flow of subretinal fluid, therefore failing to facilitate hole closure. We hypothesized that an inverted ILM flap of a larger size may be trapped securely within the hole and may be less likely to be dislodged from the hole during and after surgery. This procedure may lead to a more effective bridging of the hole to prompt its closure. In this report, we retrospectively reviewed cases of highly myopic eyes with MH and RD treated with an inverted ILM flap inserted into the hole. We described the technique we used in detail, and, in comparison to standard vitrectomy with ILM peeling, we sought to demonstrate the advantages of this procedure.

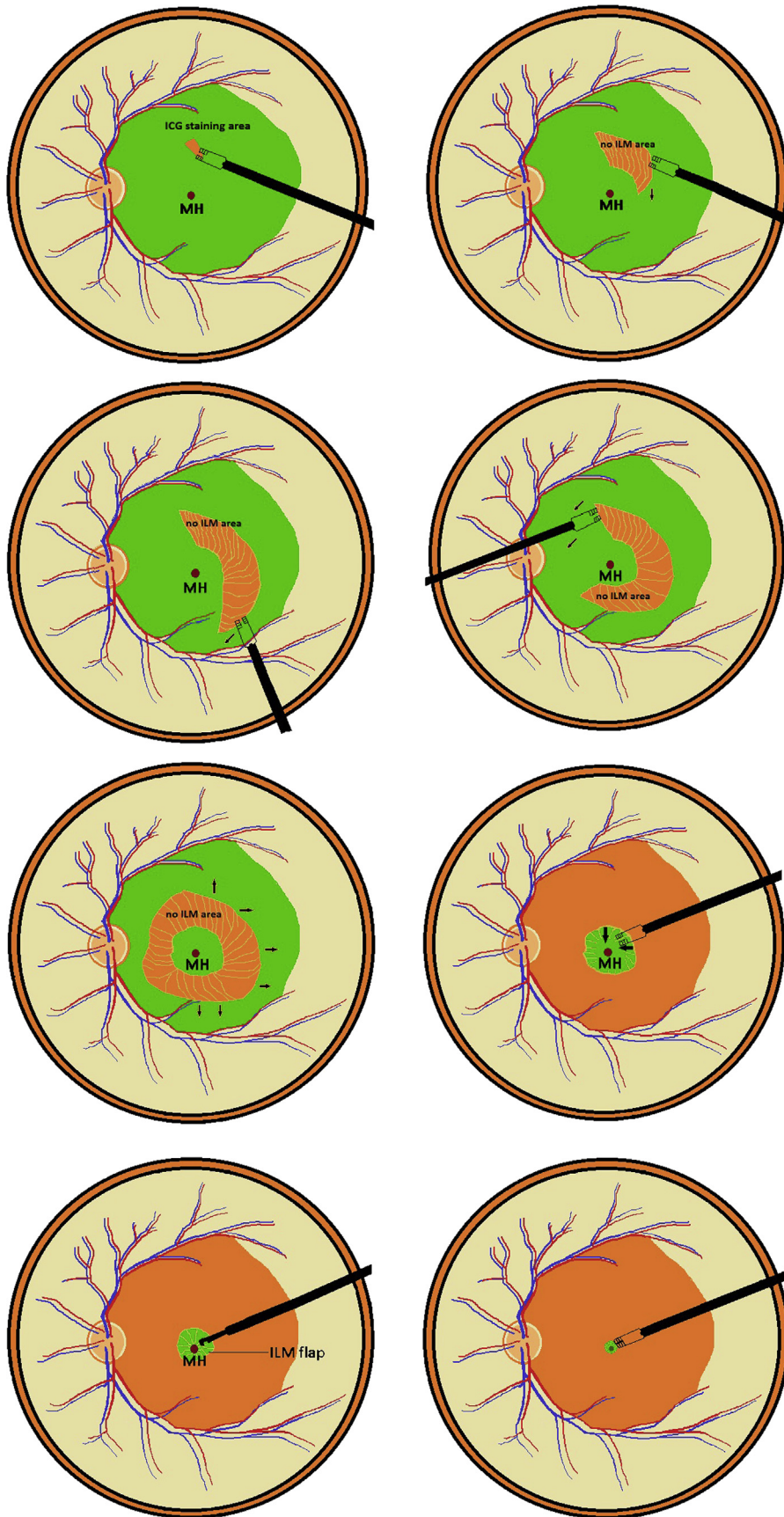
METHODS

THIS STUDY WAS CONDUCTED AT 2 CENTERS (CHANGHUA Christian Hospital and National Taiwan University Hospital) and included consecutive case series with surgical interventions. From January 2013 to February 2015, 40 cases of high myopia complicated by MH with RD treated with vitrectomy were retrospectively enrolled. Eyes were

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