8/01/2023 12:00 am

Surgery Symposium 4

Postoperative Anatomic and Visual Outcomes Comparing Internal Limiting Membrane Flap vs Peel in the Closure of Full-Thickness Macular Holes

- Sally Ong, MD
- Mallory Suarez

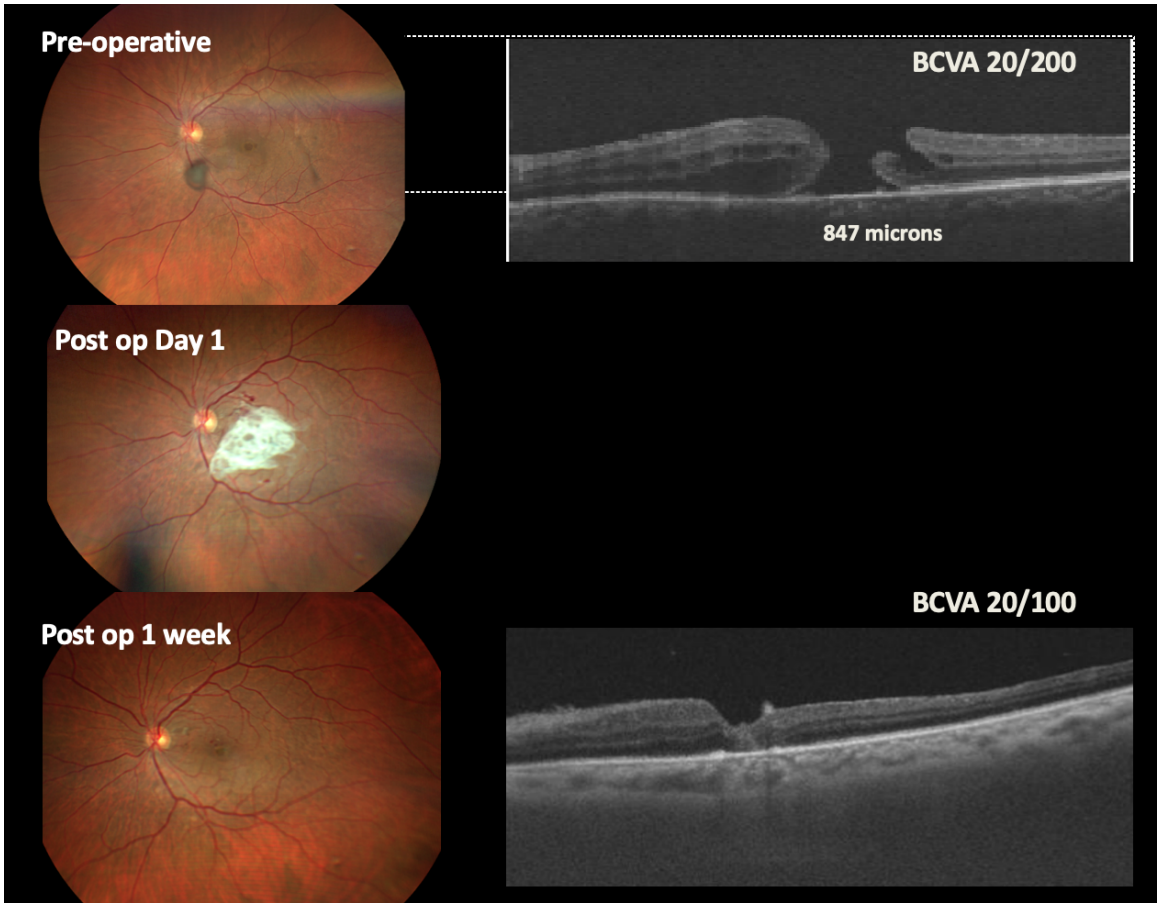
Objective: To compare postoperative visual outcomes of internal limiting membrane flap (ILMF) versus internal limiting membrane peel (ILMP) in the closure of full-thickness macular holes (FTMH).

Purpose: Multiple studies have shown that the ILMF technique results in higher anatomic type 1 closure rates and consequently, improved visual outcomes when compared to the ILMP technique in large (>400um) FTMH. However, it remains unclear if ILMF remains a superior technique for FTMH of all sizes, including smaller holes 400um or less in diameter. We performed multivariate analysis to compare visual outcomes in eyes with FTMH of all sizes that underwent the ILMF vs ILMP technique.
Methods: A retrospective chart review was performed to identify patients who have undergone pars plana vitrectomy with ILMF or ILMP to close FTMHs at the Atrium Health Wake Forest Baptist Medical Center. Patients were included if they had at least 3 months of follow-up from January 2012 to October 2022. Baseline preoperative characteristics, macular hole morphology, and surgical characteristics were compared between the two groups. Anatomic success was defined as successful type 1 FTMH closure after a single surgery and postoperative BCVA was analyzed in mean logMAR.

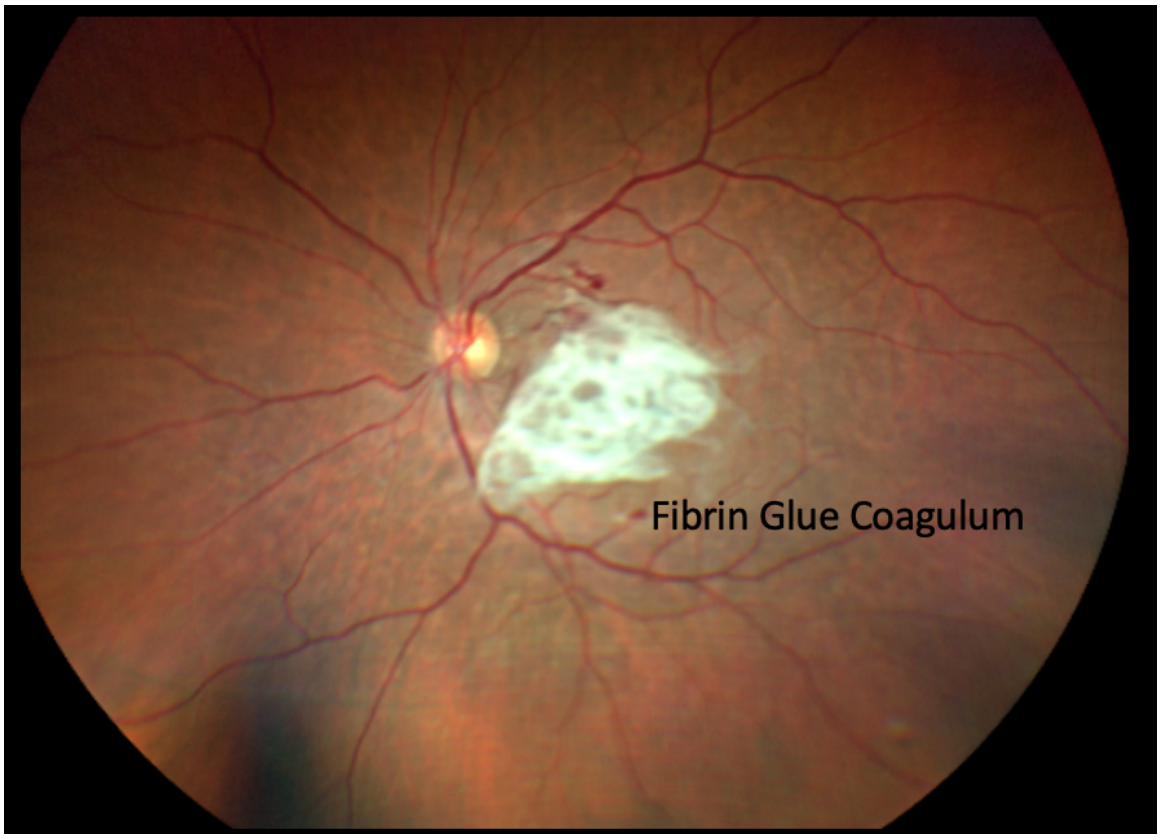
Results: 137 eyes (129 patients) including 32 ILMF and 105 ILMP eyes were included. In the ILMF group, 28 were inverted flaps without extra manipulation, 2 were free flaps draped over the hole with viscoelastic and 2 flaps were tucked into the hole. There were no significant differences in baseline characteristics including preoperative BCVA [ILMF: 0.93±0.38; ILMP: 0.99±0.44, p=0.5], stage of FTMH [ILMF: 59% (n=19) stage 2, 28% (n=9) stage 3, 13% (n=4) stage 4; ILMP: 52% (n=54) stage 2, 41% (n=42) stage 3 and 7% (n=7) stage 4; p=0.3], duration of MH (months±SD) [ILMF: 3.9 ±3.5; ILMP: 4.8 ± 8.3, p=0.8], and the minimum linear diameter (μm) [ILMF: (405 ±231); ILMP: (364 ±170); p=0.35] between groups. Successful primary hole closure was achieved in 94% (n=30) of the ILMF group and 95% (n=100) of the ILMP group (p=0.7). In holes that closed after a single surgery, multivariate analysis showed better estimated least squares mean BCVA at 1 year in ILMP (0.45 or approximately 20/50; 95%CI 0.37-0.53) compared to ILMF eyes (0.62 or approximately 20/80; 95%CI 0.47-0.77) (p=0.010). These results remained significant (p=0.025) after the removal of two ILMF eyes with flaps tucked into holes.

Conclusion: In this cohort of mostly stage 2 and 3 FTMH, ILMF and ILMP yielded similarly high hole closure rates. However, in eyes with successful primary hole closure, the ILMF technique was independently associated with worse BCVA at 1 year. These results remained significant even after the removal of two eyes with flaps tucked into holes, a technique that is thought to cause RPE disruption and yield worse visual outcomes. In smaller holes with a high likelihood of closure with either technique, the ILMF technique should be used with caution.

IRB APPROVAL Yes



Closure of macular hole at 1 week with complete resorption of fibrin glue



Post operative Day 1 with fibrin coagulum covering the hole

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Fovea-Sparing Internal Limiting Membrane Ring-Peeling Technique to Enhance Continuity of ILM Peeling in Myopic Foveoschisis Surgery

Peiquan Zhao, MD

Objective: It is challenging for surgeons to spare an ILM shield on fovea in myopic eyes that have deepened posterior pole and marked chorioretinal atrophy.

Purpose: To report a fovea-sparing internal limiting membrane (FSILM) ring-peeling technique in treating myopic foveoschisis through pars plana vitrectomy (PPV).

Methods: The technique was applied in 12 eyes with myopic foveoschisis. During PPV, we created 1DD (disc diameter) wide ILM flap with its inner edge at least 1/4DD from the foveola. Then, we consistently maintained the width of ILM flap with a tangential and parallel peeling along the inner retinal curvature around the fovea. We centrifugally extended the ILM flap when it became 1/2 its width. All eyes had air tamponade in the end of PPV.
Results: All 12 eyes had a 1/2-1DD ILM shield on fovea during a 23-gauge PPV. 9 (75%) eyes had a continuous ILM peeling based on one ILM flap and 3 eyes had ILM peeling after initiating an ILM flap twice. During 8.4±2.0 months of follow-up, 12 eyes had reduced schisis cavity and 10 eyes had a flat retina. None developed full thickness macular holes. All eyes achieved improved vision at the last follow-up.

Conclusion: This new technique may enhance the certainty and continuity of the FSILM peeling in myopic foveoschisis surgery and minimize iatrogenic trauma of initiating multiple ILM flaps.

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Surgery Symposium 4

Visual, Anatomic Outcomes, and Natural History of Retinal Nerve Fiber Layer Schisis in Patients Undergoing Epiretinal Membrane Surgery

- Danny Mammo, MD
- Aleksandra Rachitskaya, MD, FASRS
- Katherine Talcott, MD
- Rishi Singh, MD
- Matthew Russell, BS
- Justin Muste, MD

Objective: To evaluate the anatomic and visual outcomes of patients with epiretinal membranes (ERM) complicated by schisis of the retinal nerve fiber layer (sRNFL) in routine clinical practice.
Purpose: Microstructural features on SD-OCT may serve as prognostic indicators of visual outcomes after ERM surgery. sRNFL is a recently described phenomena which may accompany ERMs. This study describes the prevalence of sRNFL in ERM in routine clinical practice, time to resolution of sRNFL after surgery, and the visual prognoses of patients with sRNFL.
Methods: Design: Retrospective case control study.
Participants: Patients undergoing ERM surgery at Cole Eye Institute from 2013-2021.
Methods: Patients were grouped by the presence of absence of sRNFL prior to surgery. Preoperative and postoperative data was collected regarding VA, changes in central subfield thickness (CST) over time, and presence of cystoid macular edema (CME).
Main outcome measures: Frequency of sRNFL in patients undergoing ERM surgery.
Only patients with an SD-OCT including the papillomacular bundle 90 days prior to surgery were considered for further review. Additional exclusion criteria included any instances of the following: retinal vein or artery occlusion, diabetic retinopathy, history of retinal detachment, prior vitreoretinal surgery, concomitant retinal pathology affecting the RNFL (e.g, glaucoma), uveitis, use of steroid implant post operatively, and previous penetrating trauma to the presenting eye. 89 patients met criteria after these cutoffs.
Results: 48 of 89 patients (53.9%) presented with sRNFL. sRNFL patients presented with significantly decreased VA compared to those without (58.63 ± 12.48 vs 67.68 ± 7.84 ETDRS letters, $p<0.001$ respectively). At final follow-up after ERM removal, there was no significant difference in final VA in sRNFL patients compared to those without (71.16±2.93 vs 74.11±2.76, $p=0.467$). At presentation, sRNFL patients had greater CST than those without (454±10.01 vs 436±0.23, $p=0.23$). This difference persisted at 90-day follow-up after ERM removal (402 ± 8.08 vs 375± 10.19 μm, $p=0.043$). Resolution of sRNFL was reported at post-operative week 1 in 30 of 31 cases (96.7%). Protrusion of the sRNFL through the ILM (Spaghetti sign) was noted in 30 (62.5%) of cases. Patients with diffuse sRNFL were noted to have worse trending BCVA at follow-up visits although not significant.
Conclusion: sRNFL is a microstructural feature in greater than 50% of ERMs in routine clinical practice and carries visual significance on presentation and anatomic significance postoperatively. This study is the first to characterize sRNFL in a sizable patient cohort, to provide examples of natural history of sRNFL development, and relevant clinical outcomes up to 180 days after ILM peel. Patients with sRNFL had worse vision and CST at presentation. In particular, size of sRNFL was found to carry prognostic importance, as patients with diffuse sRNFL may represent a subset of sRNFL at increased risk of diminished improvement after ERM surgery. Higher powered cohorts are needed to further solidify the visual significance of sRNFL in patients presenting with ERMs.

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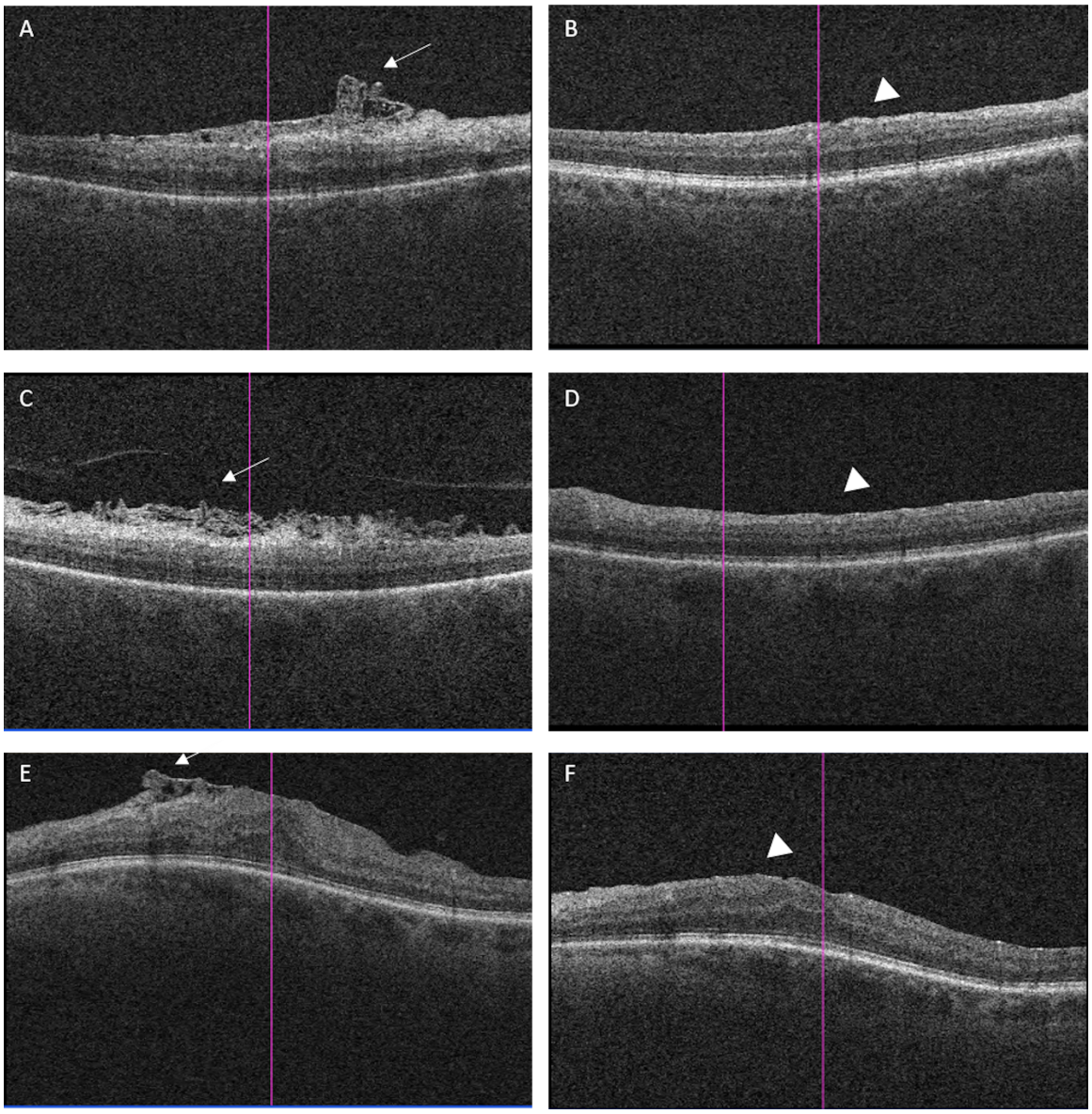

Patients with sRNFL before (A, C, E) and after ERM surgery (B, D, F)

Mean BCVA and CST over time based on pre-op sRNFL presence or absence

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Results of VItrectomy for Symptomatic Lamellar Macular Holes, Macular Pseudoholes, and Epiretinal Membrane With Foveoschisis

- John Thompson, MD
- Taariq Mohammed, MD

Objective: To evaluate the results of vitrectomy for eyes with decreased visual acuity from lamellar macular holes, macular pseudoholes and epiretinal membrane with foveoschisis
Purpose: A recent publication from a panel of experts developed an OCT definition of lamellar macular holes (LMH), macular pseudoholes (MPH) and epiretinal membrane with foveoschisis (EMF) with major and minor morphologic criteria based on OCTs and review of the literature concerning these entities. The goal of this study was to compare the results of vitrectomy in eyes in these three categories.
Methods: This was a retrospective, consecutive case series of 51 eyes with symptoms and decreased acuity treated with vitrectomy for LMH (30), MPH (14) or EMF (7). The preoperative visual acuities were compared with visual acuities at 3 months, 1 year and the final exam and converted from Snellen to logMAR values for analysis.

Results: The mean preoperative visual acuity in all eyes grouped together was 20/62 with a visual acuity of 20/56 at 3 months, 20/40 at 1 year and 20/44 at the final examination. The subgroup of eyes with LMH had modest improvement from 20/63 at baseline to 20/62 at 3 months, 20/43 at 1 year and 20/55 at the final exam (P=.38). In contrast, the eyes with MPH improved from 20/63 at baseline to 20/50 at 3 months, 20/40 at 1 year and 20/34 at final exam (P=.04). Eyes with EMF improved from 20/53 at baseline to 20/50 at 3 months, 20/30 at 1 year and 20/30 at the final exam (P=.02). Phakic eyes developed progression of nuclear sclerotic cataracts which may have underestimated the visual benefits of vitrectomy in these eyes.
Conclusion: Vitrectomy is beneficial for eyes with macular pseudoholes and epiretinal membrane with foveoschisis, but gives limited visual acuity benefit for eyes with lamellar macular holes using the new OCT based definition of these three subgroups. This classification system may help to select eyes that are most likely to benefit from vitrectomy.

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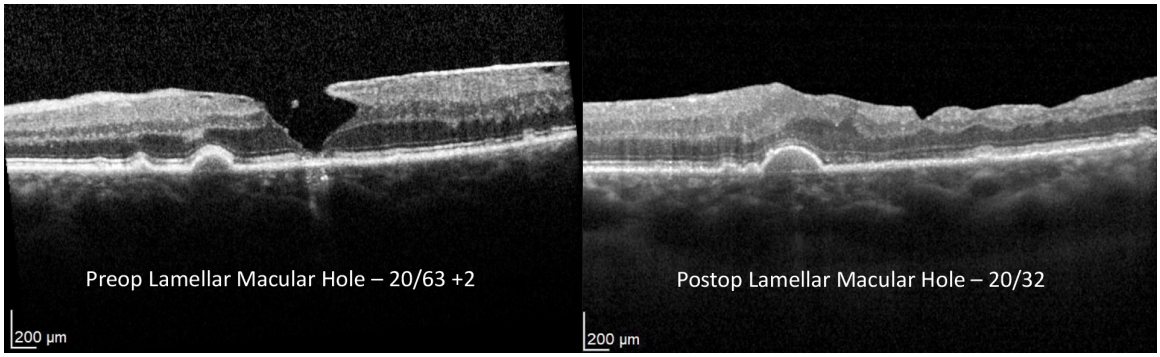

Vitrectomy for Lamellar Macular Hole with Improved Visual Acuity