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## INTRODUCTION

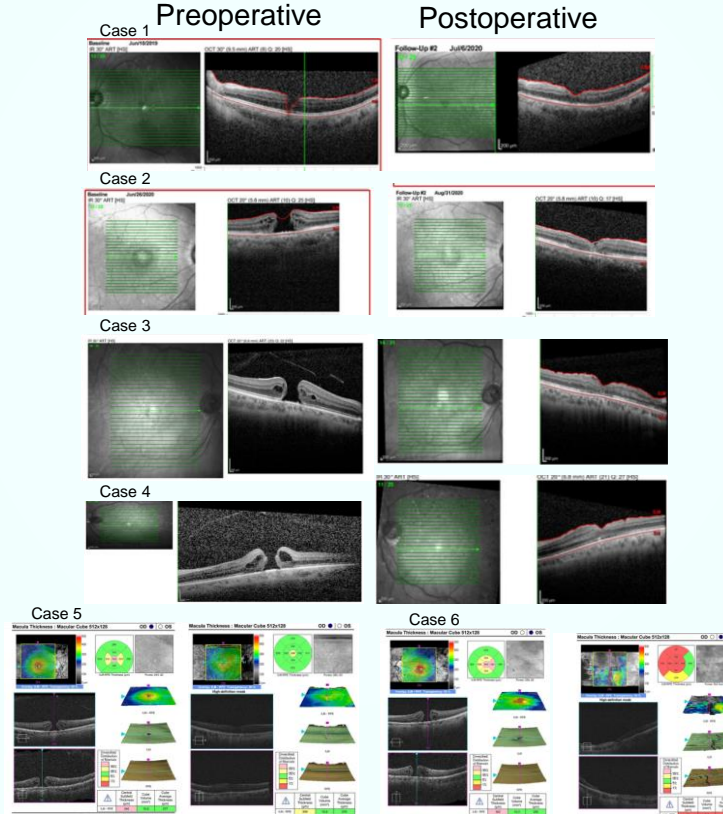
Idiopathic macular holes are a significant cause of central vision loss in elderly people. The original technique of closing macular holes described by Kelly & Wendel (1991), involves peeling the internal limiting membrane (ILM), pars plana vitrectomy, followed by gas or air tamponade. Prior to this surgical innovation, macular holes were considered an untreatable condition. Kadonosono *et al.*, would later go on to stain the ILM with indocyanine green (ICG), to allow for better visualization. Although this improved outcomes, a large number of these macular holes remain open or flat-open after their initial surgery. In 2010, Michalewska *et al.*, pioneered the inverted flap technique to address this issue. Instead of complete removal of the ILM, a circumferential remnant was folded over to cover the defect. This procedure was particularly successful for larger macular holes (>400  $\mu\text{m}$ ) or with high degrees of myopia.

## METHOD

In this case study we examine 6 eyes of 4 patients that underwent surgery for macular hole repair from May 2019 to October 2020. This study included 6 eyes of 4 patients that had a macular hole (>400 $\mu\text{m}$ ). Visual acuity was tested pre and post-operatively. Intraocular pressure and OCT scans were also performed pre and post-operatively. Exclusion criteria included high blood pressure at the time of surgery. All patients were informed that they may require a second procedure of silicone oil injection if the macular hole is unable to close with the technique.

Surgical technique: A 27 gauge pars plana vitrectomy internal limiting membrane peel with inverted flap technique was performed with C3F8 12%-14% gas

## RESULTS & DISCUSSION



## CONCLUSION

Successful closure of chronic macular holes has been improving over the last two decades, with success rates of 68% when ILM peeling assisted pars plana vitrectomy was first introduced. Today, patients can expect up to 98-100% closure of large macular holes with the inverted ILM flap technique. However, there are still limitations to this new procedure. In the original description, seven of 50 eyes reported spontaneous flap detachment during air-fluid exchange. Michalewska *et al.* modified the technique by only peeling the temporal aspect of the ILM, reducing the dissociation of the optic nerve fiber layer. The mechanism of how the inverted ILM flap technique repairs macular holes is thought to be through the actions of Müller glia. These cells serve to activate TNF- $\alpha$  and provide a scaffold for cell proliferation and guide photoreceptors to their correct location. OCT scans done post-operatively are consistent with this cellular hypothesis. Limitations of our study include no control group, small sample, and short follow up time. Given that there is no other technique to repair large macular holes (>400 nm) and that they are rare in the general population, future studies would include additional patients. Further studies would examine this technique with more patients with longer follow up time to assess complications.

## REFERENCES

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