

25-Gauge Macular Hole and Macular Pucker Surgery

Study analyzes visual results and complications of PPV in 290 eyes.

**BY JOHN O. MASON III, MD; THOMAS A. FINLEY, MD; JENNIFER OAKLEY;
RACHEL S. VAIL, COT; MILTON F. WHITE JR., MD; RICHARD M. FEIST, MD;
MARTIN L. THOMLEY, MD; MICHAEL A. ALBERT JR., MD;
TAREK O. PERSAUD, MD; AND JACOB J. YUNKER, MD**

To analyze the surgical outcomes and complications of 25-gauge vitrectomy (PPV) for macular hole and macular pucker, we performed a single-center, retrospective, noncomparative consecutive case series of 290 eyes undergoing 25-gauge PPV, 117 for macular hole and 173 for macular pucker. Mean follow-up was 12 months. Main outcome measures were best corrected visual acuity (BCVA) and surgery-related complications.

MACULAR HOLE OUTCOMES

Patelli et al,¹ using 25-gauge PPV for macular hole, reported that 68% of eyes gained greater than two Snellen lines, with a mean postoperative BCVA of 20/60. In our study, all 117 eyes undergoing 25-gauge PPV for macular hole underwent internal limiting membrane (ILM) peeling using indocyanine green (ICG) dye (Figure 1), SF₆ gas placement at the conclusion of surgery, and a minimum of 2 days of face-down positioning. Mean BCVA for macular hole at presentation was 20/80, and mean postoperative BCVA was 20/40. Figure 1 shows a preoperative optical coherence tomography (OCT) scan for one of the macular hole cases. Figure 2 shows the postoperative results of the same patient as in Figure 1. Postoperatively, 75% of eyes gained greater than two lines of vision. This compares favorably to the literature. Complications included two cases of retinal detachment, both of which were successfully repaired via 25-gauge PPV. Postoperative cataract resulted in 25 eyes. This also compares favorably with the literature.

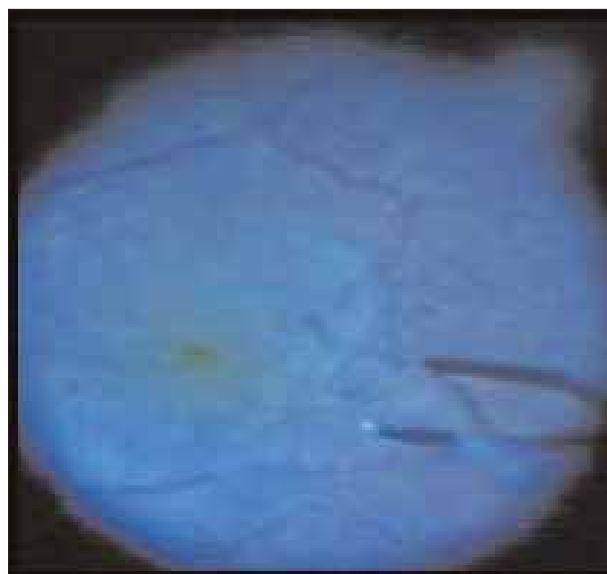


Figure 1. ILM peeling using ICG dye.

MACULAR PUCKER OUTCOMES

Patelli et al,¹ using 25-gauge PPV for macular pucker, reported a mean postoperative BCVA of 20/401. Rizzo et al,² using 25-gauge PPV for macular pucker, reported that 31% of eyes gained greater than two lines of vision. In our study, all 173 eyes undergoing 25-gauge PPV for macular pucker underwent not only macular pucker peeling, but also ILM peeling, in order to decrease macular pucker recurrence rate. Mean BCVA at presentation



Figure 2. Macular hole preoperative OCT.

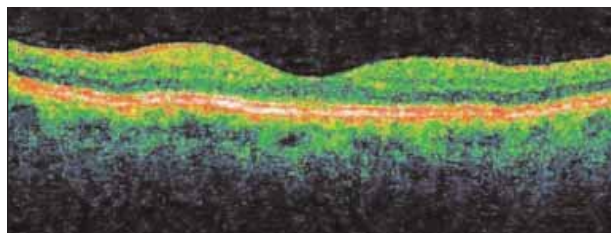


Figure 3. Macular hole posteroperative OCT.

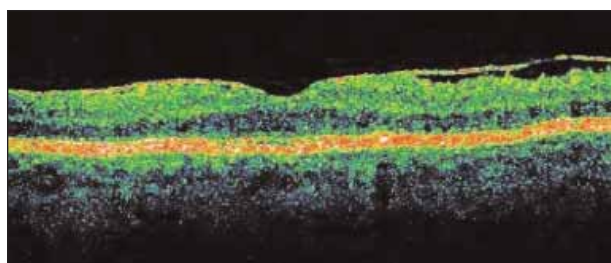


Figure 4. Macular pucker preoperative OCT.

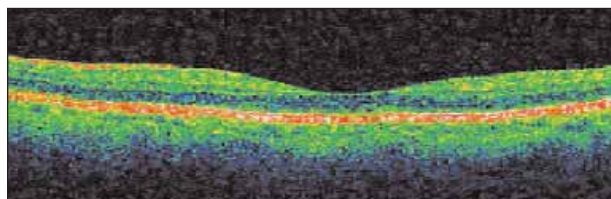


Figure 5. Macular pucker posteroperative OCT.

was 20/80. Figure 3 shows a preoperative OCT scan for one of the macular pucker cases. Figure 4 shows the same patient in Figure 3 postoperatively. Mean postoperative BCVA was 20/30 with 82% of eyes gaining greater than two lines of vision, which compares favorably with the literature. Complications included two eyes with retinal detachment, both of which were successfully reattached using 25-gauge PPV. Intraoperative retinal breaks occurred in six eyes, postoperative cataract developed in 25 eyes, and transient hypotony occurred in five eyes. These complications compared favorably to the literature for 20-gauge PPV for macular pucker.

BENEFITS OF 25-GAUGE SURGERY

Benefits of 25-gauge PPV relative to 20-gauge surgery include smaller sclerotomies, less astigmatism, no con-

junctival dissection, shorter operating times, less postoperative inflammation, and better postoperative appearance with quicker visual acuity recovery.³⁻⁵ The question that must be answered is whether 25-gauge PPV for macular hole and macular pucker is as efficacious as 20-gauge PPV with no increase in complications. We believe our series demonstrates that 25-gauge PPV for macular hole and macular pucker is as safe and efficacious as 20-gauge PPV.

POTENTIAL COMPLICATIONS OF 25-GAUGE SURGERY

Potential complications of 25-gauge PPV include early postoperative hypotony and possible increased risk of endophthalmitis relative to 20-gauge surgery.³⁻⁵ Scott et al⁶ and Kunimoto et al⁷ published reports of increased rates of endophthalmitis following 25-gauge PPV. We recently published a study, however, showing statistically similar rates of endophthalmitis with 20-gauge and 25-gauge PPV.⁸ We believe potential explanations for our study's low rate of endophthalmitis following 25-gauge PPV may relate to the following: (1) meticulous wound construction using 30° angled entry, (2) examining and removing vitreous wicks from sclerotomies, and (3) closely inspecting for watertight sclerotomy following canula removal, utilizing suture closure if needed.

SUMMARY

In summary, the 25-gauge PPV approach for macular hole and macular pucker repair is safe and feasible, and visual outcomes are excellent. Complications compared to historical 20-gauge PPV are low, and rates are comparable to, if not better than, 20-gauge PPV. ■

John O. Mason III, MD, is with Retina Consultants of Alabama, Birmingham, AL. The authors report no financial relationships with any company or product mentioned in this article. Dr. Mason can be reached at +1 205 918 0047.



1. Patelli F, Radice P, Zumbo G, Frisone G, Fasolino G. 25-gauge macular surgery. *Retina*. 2007;27:750-754.
2. Rizzo S, Genovesi-Elbert F, et al. 25-gauge sutureless vitrectomy and standard 20-gauge pars plana vitrectomy in idiopathic epiretinal membrane surgery: a comparative pilot study. *Graefes Arch Clin Exp Ophthalmol*. 2006;19:1-8.
3. Fujii GY, De Juan E Jr, Humayun MS, et al. Initial experience using the transconjunctival sutureless vitrectomy system for vitreoretinal surgery. *Ophthalmology*. 2002;109:1814-1820.
4. Lakhanpal RR, Humayun MS, de Juan E Jr, et al. Outcomes of 140 consecutive cases of 25-gauge transconjunctival surgery for posterior segment disease. *Ophthalmology*. 2005;112:817-824.
5. Ibarra MS, Hermel M, Prenner JL, Hassan TS. Longer-term outcomes of transconjunctival sutureless 25-gauge vitrectomy. *Am J Ophthalmol*. 2005;139:831-836.
6. Scott IU, Flynn HW, Dev S, et al. Endophthalmitis after 25-gauge and 20-gauge pars plana vitrectomy: incidence and outcomes. *Retina*. 2008;28:138-142.
7. Kunimoto DY, Kaiser RS, Wills Eye Retina Service. Incidence of endophthalmitis after 20- and 25-gauge vitrectomy. *Ophthalmology*. 2007;114:2133-2137.
8. Mason JO 3rd, Yunker JJ, Vail RS, et al. Incidence of endophthalmitis following 20-gauge and 25-gauge vitrectomy. *Retina*. 2008;28(9):1352-1354. Jul 28.