

Treatment of Persistent and Recurrent Macular Hole

Rationale for the use of heavy silicone oil tamponade.

BY STANISLAO RIZZO, MD

The failure of primary surgery for macular holes, which is estimated to account for 10% of all cases, may occur due to several factors, including residual epiretinal traction, insufficient gas endotamponade, and poor patient compliance in keeping a prone position. In some cases, however, there is no obvious cause.¹ Peeling the internal limiting membrane (ILM) has been shown to significantly decrease the incidence of macular hole reopening, which seems to be related to myopia and intraoperative tears from the first surgery.

Is it worth reoperation for reopened or persistent macular holes? A study by Valldperas and Wong² sought to answer this question. They found that reoperating on reopened full-thickness macular holes resulted in 100% anatomic closure and significant improvement in vision. They also found that reoperating on patients with initially unsuccessful surgery resulted in a lower anatomic closure rate and relatively poor final vision (even if the second surgery was successful).

MECHANISMS OF MACULAR HOLE CLOSURE

Currently, the treatment of persistent macular hole remains a significant challenge for vitreoretinal surgeons. Yamana et al³ performed a laboratory study to evaluate whether a dry environment is an important factor in whether macular holes close properly with surgery. They performed vitrectomy on 2 groups of rabbits. The first group received fluid-air exchange and SF₆ gas. The second group received only gas tamponade. During the observation period, macular holes in the first group that had received fluid fill remained open, while those in the gas group all closed within 7 days of vitrectomy.

The sealing of a persistent macular hole may begin from the bottom of the hole, and by the time the heavy

Heavy silicone oil follows the foveal contour and the edge of the posterior retina, providing an effective tamponade and leading to hole closure.

silicone oil is removed, the hole is completely closed. This process of healing from the bottom of the hole has been well demonstrated.⁴

There are some cases, however, in which this hypothesis does not apply. For example, Figure 1 shows a persistent macular hole in which the edges are elevated and that has a completely different healing process. At 1 day postoperatively, the process of healing begins in the middle of the retina. For 4 days, the edges of the silicone oil bubble are visible, but at 1 week, the hole has closed.

THE USE OF HEAVY SILICONE OIL

Normal silicone oil is lighter than water, and often, in cases of persistent macular holes with stiff edges, the silicone oil does not fit in the foveal depression and will not therefore provide effective tamponade. We therefore conducted a study to evaluate the efficacy of a heavy silicone oil tamponade.⁵

We operated on 23 patients with persistent macular hole after previous surgery, and including ILM peeling and long-acting gas endotamponade. We stained intraoperatively with brilliant blue dye, and if there was no residual ILM or traction (but contraction and stiffness of the edges of the hole), we used heavy silicone oil tamponade (Densiron 68; Fluoron, Ulm,

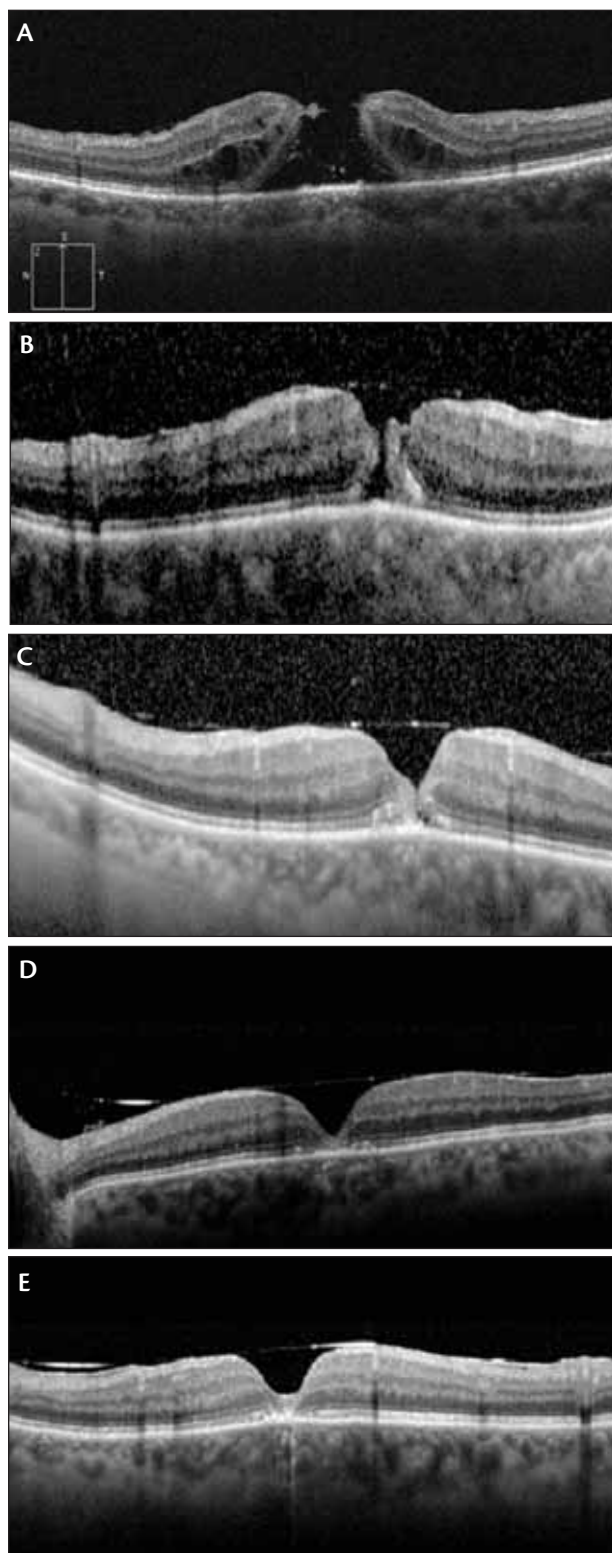


Figure 1. Persistent macular hole (A); 1 day after pars plana vitrectomy (PPV) (B); 2 days after PPV (C); 4 days after PPV (D); 1 week after PPV (E).

Germany) in the air-filled globes. After 3 months, we replaced the heavy silicone oil with balanced salt solution.

The difference with the heavy silicone oil compared with standard silicone oil is that it follows the foveal contour and the edge of the posterior retina, providing an effective tamponade and leading to hole closure, as was seen in 1 of the patients in our study.

The anatomic results showed complete sealing of the persistent macular hole in 20 eyes. In 2 eyes the holes remained unclosed, and in 1 of the eyes the hole was open but had flat edges. Regarding the functional results, 19 of the eyes (82%) showed a significant increase in visual acuity by at least 2 lines; 11 eyes (47%) gained at least 3 lines, 3 eyes remained unchanged (13%), and 1 eye deteriorated by 2 lines (4%).

SUMMARY

Our series currently contains the largest group of eyes affected by persistent macular holes treated with heavy silicone oil. As the optical coherence tomography findings showed, heavy silicone oil achieved effective tamponading on the foveal region in the sitting position. Additionally, retreatment with heavy silicone oil was safe and achieved encouraging anatomic and functional results. We believe that these data provide the rationale for the use of a longer-term endotamponade in cases of persistent macular hole. ■

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1. Kumagai K, Furukawa M, Ogino N, Larson E. Incidence and factors related to macular hole reopening. *Am J Ophthalmol.* 2010;149(1):127-132.
2. Valldeperas X, Wong D. Is it worth reoperating on macular holes? *Ophthalmology.* 2008;115(1):158-163.
3. Yamana T, Kita M, Ozaki S, Negi A, Honda Y. The process of closure of experimental retinal holes in rabbit eyes. *Graefes Arch Clin Exp Ophthalmol.* 2000;238(1):81-87.
4. Kang SW, Lim JW, Chung SE, Yi CH. Outer foveolar defect after surgery for idiopathic macular hole. *Am J Ophthalmol.* 2010;150(4):551-557.
5. Rizzo S, Genovesi-Ebert F, Vento A, Cresti F, Miniaci S, Romagnoli MC. Heavy silicone oil (Densiron-68) for the treatment of persistent macular holes: Densiron-68 endotamponade for persistent macular holes. *Graefes Arch Clin Exp Ophthalmol.* 2009;247(11):1471-1476.

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