Macular Hole Repair Without Face-down Positioning

A review of 15 years’ experience.

BY PAUL E. TORNAMBE, MD

When Kelly and Wendel described vitreous surgery for idiopathic macular holes in 1991, they advised face-down postoperative posturing for patients. Since that time, most retina specialists have adopted face-down positioning as a cardinal rule after macular hole surgery, although there is a lack of data showing its necessity.

At the American Academy of Ophthalmology meeting in Chicago in 1996, I presented the first paper to suggest that macular holes can be closed without face-down posturing. The single-operation success rate that my colleagues and I reported in that series was only 79%; however, 79% of patients in the series had stage 3 or 4 macular holes. At the same meeting we also suggested combining cataract surgery with macular hole repair surgery. The presentation was severely criticized at the meeting, and a resulting paper was rejected by *Ophthalmology* but subsequently published in *Retina* in 1997.

There was little interest in the concept of no face-down positioning for approximately the next decade, but since 2007 at least eight published, peer-reviewed papers have confirmed our finding that face-down posturing for any period of time after macular hole repair is not necessary.3-9

This paper reviews my experience with idiopathic primary macular holes not associated with high myopia, repaired without face-down positioning. The purpose of the review is to determine which techniques made a difference in outcomes.

My premise is that the purpose of the postoperative intraocular gas bubble is to isolate liquid vitreous from the macular hole, much like a Band-Aid, to allow the retina to heal. The buoyancy of the bubble plays no role at all. With the patient lying on his or her side, even a 75% fill seals a macular hole in the patient’s uppermost eye (Figure 1).

![Figure 1. A 75% gas bubble covers the macula with the patient positioned on his or her side and the operated eye uppermost.](image-url)
MACULAR HOLE EVOLUTION

This review is divided into three time periods, based on the surgical protocol used. The first period is the era before indocyanine green (ICG) staining was used, 1994 to 1999. We were still searching for a technique that would deliver the best results. Peeling of the internal limiting membrane (ILM) was limited, if performed at all. Serum was used as an adjuvant, and the gas bubble was predominantly long-acting C3F8.

Whether or not to advise face-down positioning of the patient was determined by the following protocol, which we still follow today. If the patient is pseudophakic, no face-down posturing is advised. Patients who are phakic and older than 50 years are advised to have lens replacement surgery at least 2 weeks before macular hole surgery or at the same time. Patients younger than 50 years with a clear lens who are willing to perform face-down posturing for 5 to 7 days are instructed to do so.

During this pre-ICG period, of 64 patients with primary macular holes who underwent surgery, 54 (84%) did not position face down postoperatively. Of these, 47 (87%) were successfully closed with a single operation, compared with eight of 10 eyes (80%) in the face-down group. Visual recovery to 20/50 or better was similar in the two groups (28% in the no-face-down group vs 20% in the face-down group), as was the retinal detachment rate (7% vs 10%, respectively).

The second segment of this review extends from 1999 to mid-2006. During this period, in every case ICG was used to stain and facilitate complete peeling of the ILM. No adjuvant was used, and 20% SF6 gas was used in most eyes. Positioning determination criteria were the same as above.

In this period, of 103 eyes that underwent primary macular hole repair, 85 (83%) did not perform face-down positioning. Single-operation success rate improved to more than 90% in both groups: 78 (92%) in the no-face-down group and 17 (94%) in the face-down group. A greater percentage of eyes in the face-down group attained 20/50 or better acuity (67% vs 36%), but this group included younger patients with smaller holes and better overall preoperative acuity. Retinal detachment rates were comparable, and better than in the pre-ICG period.

The third period begins in 2006 and extends to the review cutoff point in May of this year. All macular hole operations were performed with 23-gauge instrumentation, using predominantly the Dutch Ophthalmic USA (Exeter, NH) two-step system. All cases underwent ICG-assisted ILM peeling. No adjuvant was used, and the concentration of SF6 gas was increased to 25%, which provides about 7 days of bubble-hole contact with the patient in the upright position or lying with the operated eye uppermost. Criteria for face-down positioning were again as above.

In this period, of 37 eyes that underwent macular hole surgery, 36 (97%) did not position face-down; only one patient performed face-down positioning. One retinal detachment developed in the face-down group.

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My current approach is as follows. All eyes of patients older than 50 years are rendered pseudophakic. Complete 23-gauge pars plana vitreectomy is performed with a 23-gauge focused illumination probe at 80% power. A dilute concentration of ICG (1 mg/mL) is installed in two to three applications. The ILM peel is begun using the Tano diamond-dusted scraper to create a flap. Then a generous ILM peel of about one disc diameter around the hole is completed using forceps. Cryo or laser retinopexy is always applied posterior to the sclerotomy wounds. A complete fill of the vitreous cavity with 25% SF6 is imperative, and all wounds are sutured to prevent escape of gas.

In recently operated eyes, 1% pilocarpine is prescribed postoperatively to avoid lens capture. No face-down (or face-up) positioning is advised. The patient is instructed to sleep on his or her side with the operated eye uppermost for a week.

In the close to 15 years since our initial publication describing macular hole surgery without face-down positioning, the concept has moved from the fringe to achieve greater acceptance among retina specialists. It is hoped that as more experience with this protocol accrues, more surgeons will recognize the benefits this approach to postoperative management can bring for patients and surgeons.

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