

Reoperating Without Removing Silicone Oil: Interface Vitrectomy

BY STEVE CHARLES, MD



The editors of Retina Today are pleased to announce a new section, Retina Pearls, in which experts in the retina community are invited to share informative and exciting tips or “pearls” with regard to specific vitreoretinal surgical techniques, diagnostics, or therapeutics. The inaugural article features one of our most innovative and industrious colleagues, Steve Charles, MD. Dr. Charles is the founder of the Charles Retina Institute in Memphis and a distinguished leader in our field. We thank Dr. Charles for his contribution to this issue, and we welcome your suggestions for potential topics.



—Dean Elliott, MD; and Ingrid U. Scott, MD, MPH

Many surgeons unnecessarily remove silicone oil when reoperating for epimacular membrane or recurrent retinal detachment. For more than 20 years, I have operated “under” silicone oil when reoperating these eyes (now totaling more than 500).

Key advantages to this approach are (1) decreased surgical trauma—including less damage to the conjunctiva and Tenon’s capsule, (2) realistic assessment of traction relief, and (3) greatly decreased operating times. Reduced damage to the conjunctiva, Tenon’s capsule, and episclera is especially important if the patient has glaucoma and may require filtration surgery. Theoretically, there is less corneal endothelial cell loss with this technique than with silicone oil removal and replacement at the end of the case.

Silicone oil produces 50% less interfacial tension (surface tension) than air/gas; therefore, reoperation with oil in place gives a realistic assessment of the relative force due to interfacial tension and retinal surface contraction. Many surgeons have performed fluid-air exchange, endophotocoagulation, and air-silicone exchange for a proliferative vitreoretinopathy (PVR) case only to find that the retina was partially detached the next day because of the surface tension disparity.

I have also used two-port 25-gauge vitrectomy for reoperation in eyes with silicone oil for the past 3 years and the 20/25 technique during the prior 2 years since 25-

gauge technology became available. The 20/25 technique is performed by connecting the Alcon Viscous Fluid Control (Alcon Laboratories, Inc., Fort Worth, Texas) containing 1,000-centistoke silicone oil to a short piece of tubing connected to the infusion cannula; this is an ideal method for surgeons who prefer 20-gauge surgery. The now-preferred 25-gauge two-port method is performed using the MedOne Viscous Fluid Injector (MedOne Surgical, Inc., Sarasota, Florida) 25-gauge cannula to sequentially inject oil after internal drainage of subretinal fluid reduces the intraocular pressure (IOP). The two-port method is effective because the viscosity of the oil prevents reflux out of the cannulas and resultant decreased IOP during instrument exchange.

WORKING WITH SILICONE IOL

Forceps membrane peeling, scissors segmentation/delamination, cutter delamination, retinectomy, internal drainage of subretinal fluid, removal or resection of subretinal traction elements, retinectomy, and endophotocoagulation all work well with silicone oil in place. It is often necessary to remove a preretinal fluid layer and add silicone oil before initiating epiretinal membrane dissection. A vacuum setting of 600 mm Hg is required for cutter removal of residual vitreous or cutter delamination. A maximum linear vacuum setting of 600 mm Hg is required for internal drainage of subretinal fluid unless extreme care is taken to keep silicone oil out

of the soft-tip cannula. PVR and diabetic traction retinal cases often require retinectomy; this is accomplished by removing contracted, stiff retina, epiretinal membrane, and subretinal fluid or oil together with the cutter. Large vessels should be coagulated first with bipolar diathermy with the tip in contact with the vessel. This is because, unlike infusion fluid, silicone oil is not conductive.

Surgery with silicone oil in place is a subset of a concept I have used for years, now referred to as *interface vitrectomy*. For 3 decades, I have performed removal of residual vitreous traction, retinectomy, epiretinal membrane peeling/segmentation/delamination, subretinal surgery, and bipolar diathermy under air. Air stabilizes the retina because of the inherent spring-like properties of a compressible gas. Air also reduces unwanted retinal motion, confines bleeding to the air-retinal interface, and prevents infusion fluid from flowing into the subretinal space. Silicone oil dampens unwanted retinal motion due to epiretinal membrane dissection by virtue of its high viscosity. Perfluorocarbon liquids (PFO) such as N-perfluorooctane can be used for interface vitrectomy in addition to being essential for giant break repair, as Stanley Chang, MD, reported. Hugo Quiroz Mercado, MD, initially developed PFO-perfused vitrectomy to provide oxygenation to the retina during periods of nonperfusion for tumor resection but noted that retinal detachments usually disappeared during vitrectomy under PFO. The high specific gravity of PFO (approximately 2X mass) produces both inertial stabilization and gravitational stabilization (approximately 2X gravitational force) of the retina as first reported by the author. Laser energy settings are usually less when treating under PFO because the subretinal fluid is completely gone unlike fluid-air exchange and internal drainage of subretinal fluid. ■

Dean Elliott, MD, is Professor of Ophthalmology and Director of Clinical Affairs, Doheny Eye Institute, Keck School of Medicine at the University of Southern California, Los Angeles. Dr. Elliott is also a member of the Retina Today Editorial Board. He may be reached at deliott@doheny.org; phone: +1 323 442 6582; fax: +1 323 442 6766.

Ingrid U. Scott, MD, MPH, is Professor of Ophthalmology and Public Health Sciences, Penn State College of Medicine, Hershey, Pennsylvania. Dr. Scott is also a member of the Retina Today Editorial Board. She may be reached at iscott@psu.edu; phone: +1 717 531 4662; fax: +1 717 531 5475.

Steve Charles, MD, is the founder of the Charles Retina Institute, one of the world's foremost retinal clinics, specializing in vitreoretinal diseases and surgery, located in Memphis. Dr. Charles states that he is a paid consultant for Alcon. He may be reached at scharles@att.net; phone: +1 901 767 4499.

