Silicone oil (SO) is a long-term intraocular tamponade used for a variety of retinal disorders. In aphakic eyes with an intact iris, the use of an inferior peripheral iridectomy prevents SO prolapse into the anterior chamber, thereby preventing glaucoma and keratopathy. We have developed a technique for preventing SO from entering the anterior chamber in aphakic eyes with iris loss. The technique involves placing 10-0 prolene sutures (SO retention sutures) across the anterior chamber to simulate an iris diaphragm. The sutures act as a barrier between the SO and aqueous, preventing SO-corneal contact. Images of this phenomenon were obtained by high-frequency ultrasound biomicroscopy with patients in the supine position. Silicone oil retention sutures may be an effective means to prevent SO-corneal touch in aphakic eyes with iris loss.

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METHODS

The technique uses 10-0 prolene sutures on an STC-6 needle (model 1713; Ethicon, Somerville, New Jersey) that are placed across the anterior chamber from sulcus to sulcus. In aphakic eyes with an intact iris, an inferior peripheral iridectomy effectively prevents prolapse of SO into the anterior chamber, thereby preventing keratopathy and glaucoma. However, in aphakic eyes with iris loss, SO is considered a relative contraindication because it usually enters the anterior chamber. Silicone oil is frequently needed in severe trauma cases with retinal injury; however, associated iris damage often precludes its use.

The purpose of our article is to describe a technique used to prevent SO from entering the anterior chamber despite loss of an intact iris diaphragm. Our technique involves placing sutures across the anterior chamber to simulate an iris diaphragm. We refer to these sutures as SO retention sutures and demonstrate their ability to prevent SO-corneal touch using high-frequency ultrasound biomicroscopy with patients in the supine position.

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Our unit operated at 50 MHz and achieved a tissue resolution of approximately 50 µm. Scanning was performed with the patient in the supine position using a 20-mm eye cup placed on the eye and filled with a 2.5% methylcellulose-saline combination after receiving topical anesthesia. The ultrasound probe was placed in the coupling medium approximately 2 to 3 mm from the ocular surface. Images were captured on a video printer, with particular attention given to imaging the SO-aqueous interface and the SO retention sutures.

Three patients are described who had SO retention sutures placed for traumatic retinal detachment and total iris loss. All patients had 5000-centistoke SO tamponade for retinal reattachment repair. The case reports and surgical procedures were performed with informed consent and adhered to the tenets of the Declaration of Helsinki and all the guidelines of the New York Eye and Ear Infirmary institutional review board.

REPORT OF CASES

CASE 1

A 50-year-old man received an open globe injury of the right eye during a motor vehicle accident. After primary repair was performed, the iris was noted to be absent, and B-scan ultrasonography revealed a dense vitreous hemorrhage with retinal detachment. Visual acuity was light perception. Ten days after the primary repair, the patient underwent retinal reattachment, and SO retention sutures were placed horizontally and vertically (Figure 1). Three months after surgery, visual acuity improved to 20/100, intraocular pressure was normal, and the retina was attached. The SO remained at the plane created by the retention sutures. Ultrasound biomicroscopic images demonstrated the ability of the retention sutures to prevent the SO from entering the anterior chamber and contacting the corneal endothelium (Figure 2).

CASE 2

A 47-year-old woman received a perforating BB injury to the right eye with the entrance site at the nasal limbus and the exit site at the macula. After primary repair was performed, the iris was noted to be absent, and B-scan ultrasonography revealed a dense vitreous hemorrhage with retinal incarceration in the posterior exit wound. Visual acuity was bare light perception. Two weeks after surgery, the SO remained posterior to the plane formed by the sutures with associated anterior chamber fibrin. Ultrasound biomicroscopic images demonstrated the SO-aqueous interface with intervening retention sutures and anterior chamber fibrin (Figure 3). The fibrin organized into a fibrous membrane on the suture-SO-aqueous plane (the retention sutures presumably served as the scaffold for the fibrous membrane). Four months later, the patient had repeated corneal transplantation, and holes were created in the fibrous membrane to simulate a pupil and a peripheral iri-
dectomy (Figure 4). Four months postoperatively, visual acuity improved to 20/160, intraocular pressure was 6 mm Hg, and the retina remained attached. The SO remained behind the new pupil with no SO-corneal touch.

**COMMENT**

Silicone oil is toxic to the corneal endothelium, and with prolonged contact, the cornea will develop severe edema and/or band keratopathy. Procedures to prevent SO from entering the anterior chamber are important to avoid these complications. In 1985, Ando described the use of an inferior peripheral iridectomy in aphakic eyes to prevent the prolapse of SO and pupillary block. The aphakic inferior iridectomy allows aqueous to enter the anterior chamber and prevents SO from touching the cornea. This procedure requires the presence of an intact iris diaphragm to be effective.

Many trauma cases, however, involve iris damage, and when an intact iris diaphragm is not present, SO may easily enter the anterior chamber and prevents SO from touching the cornea. This procedure requires the presence of an intact iris diaphragm to be effective.

Retention sutures are not new to ophthalmology. Although not commonly performed, anterior segment surgeons have used them to protect the corneal endothelium during lens implantation, corneal transplantation, and after glaucoma surgery. He described using a 9-0 or 10-0 nylon suture inserted through the peripheral cornea 1 mm anterior to the limbus and placed across the anterior chamber. Other variations of this technique have been described for preventing tube-corneal touch in eyes with an anterior chamber Molteno tube (Molteno Ophthalmic, Dunedin, New Zealand).
In summary, SO retention sutures can contain oil posteriorly because of the high SO-aqueous interface surface tension. This phenomenon was imaged by high-frequency ultrasound biomicroscopy with patients in the supine position. Silicone oil retention sutures may offer a means to prevent SO-corneal touch in aphakic eyes with iris loss.

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REFERENCES


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