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Silicone Implants for Treatment of Retinal Detachment: Computed Tomographic Appearance

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The use of silicone rubber implants for repair of retinal detachments has become a common mode of therapy in recent years. Medical-grade silicone rubber is nonallergenic, easily cut to an appropriate size with scissors, and does not support bacterial growth. Several patients with these implants were studied recently by computed tomography. The characteristic computed tomographic appearances of these implants are discussed.

The use of silicone rubber implants for repair of retinal detachments has become a common mode of therapy. Although laser or cryotherapy is used in the treatment of retinal tears in which there is essentially no subretinal fluid accumulation, other methods are required for the treatment of detached retinas in which there is subretinal fluid and for retinal tears in which there is persistent traction by the vitreous. Recently, we encountered several patients with silicone rubber implants who were studied by computed tomography (CT).

Surgery

The surgical technique of scleral buckling for repair of retinal detachment (fig. 1A) involves the creation of an indentation of the sclera toward the vitreous. This provides apposition of the sclera and detached parts of the retina and allows healing of the retinal tear without necessitating surgical entry into the globe. A variety of materials have been placed against the sclera to create this indentation. Absorbable materials such as native fascia lata, human donor sclera, and gelatin (partially hydrolyzed pigskin collagen) have been used [1]. Gelatin is the most frequently used absorbable material.

Nonabsorbable materials include silicone rubber and silicone sponge and are used more often than the absorbable materials. The silicone implants provide a smooth buckle without the problems of scleral erosion or implant softening that may be seen with the absorbable materials. Medical-grade silicone rubber is a firm, nonallergenic, bacteria-resistant material that is easily cut to desired shape. Silicone sponge is easier to mold than silicone rubber; however, there are many small air spaces within the sponge that may become damaged during the modeling process and may provide a nidus for infection. Because of this, silicone sponge is usually soaked in antibiotic solution before implantation.

The scleral buckling procedure may be performed in two ways. A pocket may be created in the sclera at the site where the buckle is to be made. Within the pocket is placed the material that is now called an implant. The sclera is then oversewn, creating a buckle (fig. 1B). Alternatively, the buckling material may be placed against and sutured to the sclera as an explant (fig. 1C). Generally, the procedure and material are chosen on the basis of experience and preference of the ophthalmologic surgeon. In addition to the placement of an implant or explant, a circling band of silicone rubber or sponge is usually used. This band of silicone, measuring 2–2.5 mm wide and about 0.6 mm thick, is placed around the globe in

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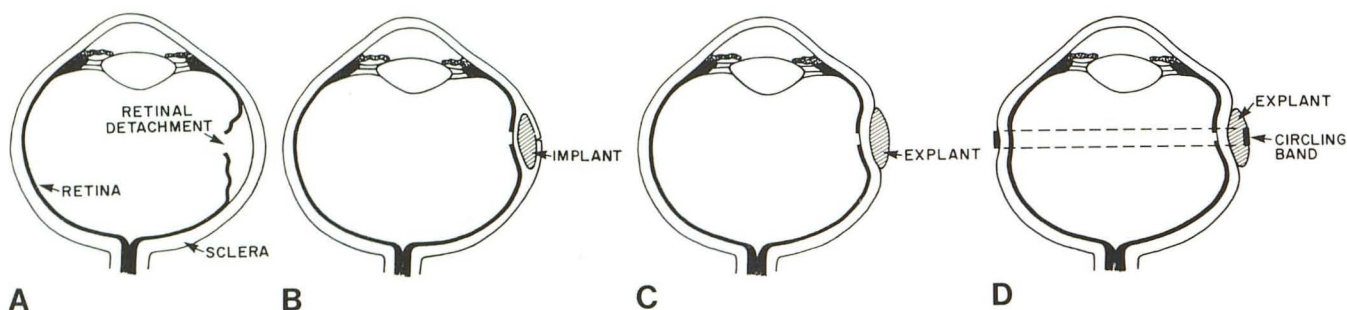


Fig. 1.—A, Retinal detachment. Detached part of retina and ocular wall are brought into apposition either by placement of implant into scleral pocket (B) or by positioning explant adjacent to outer margin of sclera (C). D, Circling band is frequently added to increase height of buckle and to make buckling more permanent. Although demonstrated with an explant, this may also be used with an implant.

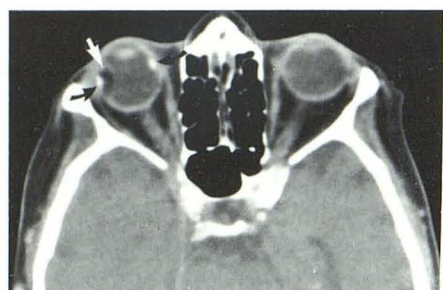


Fig. 2.—Laterally placed lucent silicone sponge explant (white arrow) is accompanied by dense silicone rubber circling band seen in cross section (black arrows).



Fig. 3.—Silicone sponge circling band seen in cross section (A, arrows) and tangentially (B). Silicone sponge explant cannot be differentiated on scan from circling band. Hemangioma is present in anterior part of same orbit.

the coronal plane (fig. 1D). This device increases the depth of the buckle and is thought to make buckling more permanent [1]. Complications of the buckling procedure include erosion of the globe by the implant/explant, postoperative loss of the desired buckle, deformation of the globe by a tight circling device, and infection [1, 2]. Currently, we are evaluating a series of patients to ascertain the value of CT in the detection of postoperative complications.

Computed Tomography

At Temple University, only silicone rubber and sponge are used for scleral buckling procedures. On CT silicone rubber appears dense relative to other intraorbital structures, while silicone sponge appears lucent and has a density similar to intraorbital fat. Silicone explants appear on CT as focal oval or comma-shaped structures that indent the sclera on one

side of the globe (fig. 2). One would expect silicone scleral implants to have a similar appearance. Their density will depend on whether silicone sponge or rubber is used. Circling bands surround the globe in the coronal plane. If cut in cross section, the band appears as two oval structures on either side of the globe (figs. 2 and 3A). When cut tangentially, the band will be seen crossing the globe (fig. 3B). The circling band causes a very slight hourglass configuration of the globe (fig. 3A). More severe deformation may be indicative of an excessively tight band [1].

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