Office-based Temporary Scleral Buckle

New in-office approach to retina reattachment offers potential advantages over existing methods.

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The scleral buckle is an elegant and proven method to reattach the retina. Although scleral buckling was described well over 60 years ago and has several important drawbacks, very little innovation in this procedure has been seen since its inception. Undoubtedly, this plays a role in the declining popularity of scleral buckling.

By indenting the retina underlying a break, scleral buckling is believed to alter intraocular fluid currents, dissuade the passage of liquefied vitreous into the subretinal space, and allow the retinal pigment epithelium to remove the existing subretinal fluid and reduce a retinal detachment (RD) to a retinal tear. With this concept in mind, there is no reason to think that, once the fluid is resorbed, the retinal tear should be treated any differently than a tear never associated with subretinal fluid.

Consider, for example, a young, phakic, myopic woman with a history of refractive surgery making her uncorrected visual acuity 20/20 in both eyes. If she were to present with a superotemporal RD due to atrophic defects in lattice with fluid well away from the macula, what would be your repair procedure of choice? Despite a high level of success, all current RD repair options—which include pneumatic retinopexy, Lincoff balloon, permanent scleral buckle, and pars plana vitrectomy—have potential drawbacks.

Pneumatic retinopexy is generally limited to use with superior RDs with a single or small group of tears, and the procedure can be difficult in young patients with a formed vitreous. The Lincoff balloon procedure had great results, with reattachment rates exceeding 90% in some studies, but it is currently not commercially available in the United States, is difficult to insert, and can be uncomfortable for the patient. Permanent scleral buckle requires a trip to the operating room, and complications can include scleral perforation, postoperative refractive error, and muscle imbalances. Vitrectomy, also an OR procedure requiring expensive equipment and single-use packs, accelerates cataract development in many cases and introduces the risks of intraocular surgery, including endophthalmitis.

With the aim of overcoming some of these drawbacks, we have developed a temporary scleral buckle that can be implanted in the office.1,2
IMPORTANT ADVANTAGES

A temporary external scleral buckle can offer important potential advantages over current RD repair options. The device is minimally invasive; it can manage pathology in any quadrant, including inferior quadrants; it avoids the patient fear-factor induced by pneumatic retinopexy; and it can be done in the office, with resultant savings of time and money.

The device is a variation of the Lincoff balloon, which was also a temporary, sutureless buckle, but which never gained wide acceptance. The Lincoff balloon was difficult to insert and position, and the external cannula irritated the surface of the eye causing poor patient tolerance. In addition, the balloon sometimes leaked, therefore providing less push than expected.

However, the concept was brilliant, and we wondered whether the device could be improved with modern materials and technology. Can an exoplant be designed with the benefits of the Lincoff balloon but without the downsides? We believe the answer is yes.

The current design is a football-shaped device that can be inserted in the office under local anesthesia through a simple conjunctival incision. The solid, compressible material has a hollow central catheter that can aid in insertion and a textured surface to minimize slippage. The football, as we call it, comes in 4 sizes, mimicking the sizes of the inflatable Lincoff balloon (Figure 1).

This device addresses many of the shortcomings of the Lincoff balloon. It is easy to insert, either by using a blunt-tipped needle inserted into the central catheter or simply by grasping the device with a sturdy pair of forceps. There is no cannula hanging out of the eye to irritate the patient. There is no leakage possible from the solid football, giving it a much more predictable push. Furthermore, the device can be customized at the bedside for each individual case by trimming as needed (Figure 2).

RESULTS AND CONCLUSION

This exoplant has to date been used in 6 cases with only a single success. In 2 cases the football was too small to create the desired push. We have developed larger football sizes to address this. In another case the football migrated, and we are working to develop additional surface coatings and designs to minimize slippage. In 2 cases the footballs extruded, and we now believe that suturing the conjunctiva with a limbal incision will prevent this.

In the 1 successful case, the conjunctiva was sutured to maintain stability of the exoplant, the football was placed circumferentially, and the retina reattached.

Clearly this device is a work in progress. We continue to work on modified designs and to develop new shapes and configurations. Other innovations may include a customized shooter for insertion and to facilitate placement of the device, and a tether to facilitate removal. The use of other expansile and absorbable materials is also being investigated. Finally, customized conjunctival incisions are being designed to help maintain stability of the exoplant.

We believe there is no reason our device cannot emulate the high reattachment rates seen with the Lincoff balloon once we discover the right design. As Voltaire once said, “No problem can overcome the assault of sustained thinking.” We look forward to presenting our ongoing results at future meetings.

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