

Subretinal Aspiration to Repair Retinal Detachment

Device uses coaxial concentric vacuum for fixation, aspiration.

BY MICHAEL A. SINGER, MD

In retinal detachment (RD), fluid can accumulate in the subretinal space, between the sensory retina and the retinal pigment epithelium (RPE). Current treatments for RD include scleral buckling, pneumatic retinopexy, and vitrectomy with tamponade.

In complex cases of RD, aspiration of subretinal fluid may be performed to allow immediate apposition of the detached retina. A range of cannula sizes can be used for aspiration of subretinal fluid. Current 39- or 40-gauge cannulas can leave behind a self-sealing retinotomy, but they do not allow efficient aspiration of fluid.

In selected cases of RD, I have begun using the iScience Subretinal Aspiration Cannula (iSRAC; iScience Interventional, Menlo Park, CA), which is a Class 1 device in the United States. The device uses a concentric coaxial vacuum design, attaching to retinal tissue with an outer 25-gauge vacuum ring while using an inner 40-gauge vacuum cannula to aspirate subretinal fluid (Figure 1).

FLUID DRAINAGE

The main application for the iSRAC is for drainage of subretinal fluid, used in conjunction with standard three-port vitrectomy. At the end of a complex case—for example, vitrectomy in a diabetic patient with a long-standing tractional retinal detachment—there may still be a reservoir of chronic subretinal fluid. In that situation, the iSRAC can be used to drain the fluid with minimal trauma and without the need to create any laser burns.

A very small hole is made with the beveled tip of the 40-gauge cannula (125 μ m) that forms the core of the iSRAC. The outer 25-gauge cannula keeps the retina engaged, elevated, and stabilized under an annulus of suction, while the inner coaxial suction allows aspira-

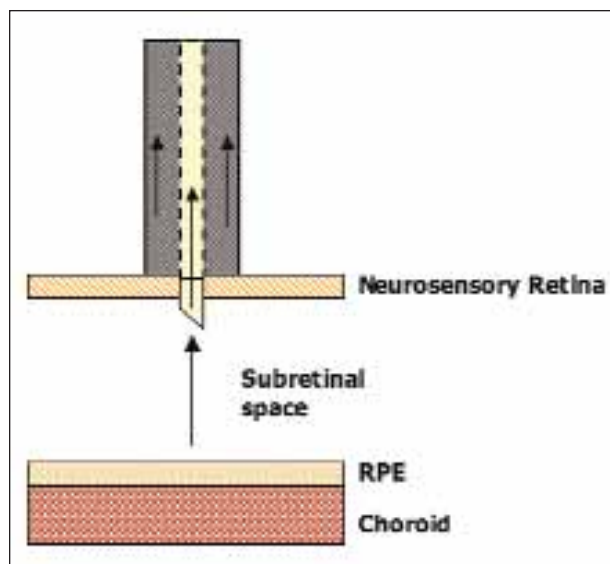


Figure 1. The iSRAC uses a concentric coaxial vacuum design, attaching to retinal tissue with an outer 25-gauge vacuum ring while an inner 40-gauge vacuum cannula is used to aspirate subretinal fluid.

tion of the subretinal fluid through the 40-gauge cannula. The device is extremely atraumatic in terms of causing scotomas; it makes very small scars with hardly any bleeding (Figures 2-6).

The iSRAC may not be needed in every case, but it can be valuable in selected situations. For instance, it may be called into play after a normal suction device has been used for the majority of a case. After drainage of most of the subretinal fluid, a pool of subretinal fluid may be seen to have tracked posteriorly. A drainage hole can be made to drain the residual fluid, but a big hole in the posterior retina is undesirable. In

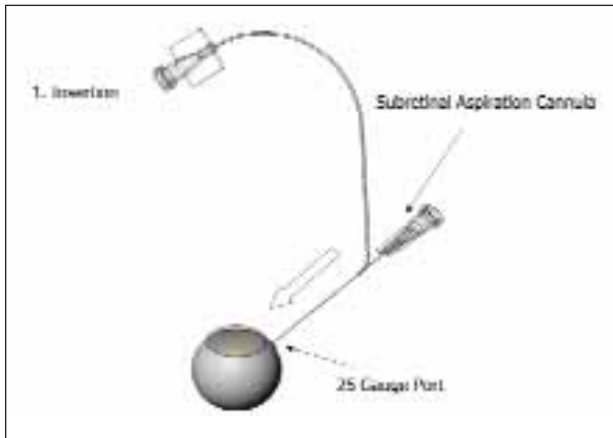


Figure 2. The iSRAC is inserted through a 25-gauge port.

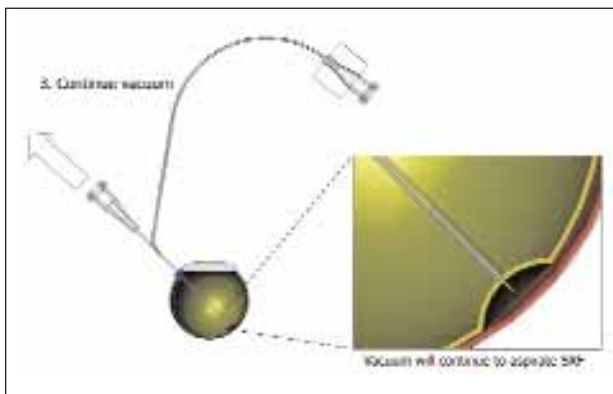


Figure 4. Continued vacuum aspirates subretinal fluid.

a case like this, with a small pocket of residual fluid, the 40-gauge inner cannula is perfect because it is so atraumatic. The iSRAC is also helpful for making drainage spots very close to the macula when needed, without the need to place extra laser spots in that crucial area.

Many times, when a soft-tipped cannula is used to aspirate fluid through a retinal hole, the surgeon can spend more time engaging and disengaging the retina around the hole than actually aspirating the fluid. The result can be a widening of the original hole, as well as a risk of hemorrhage. The iSRAC instrument has the advantage that it is not as traumatic to the retina. The sides of the retinotomy stay the same, and the resulting hole is smaller and in most cases does not need extra laser.

The device is easy to use, operated basically the same as a standard aspiration cannula. The surgeon must get used to the proportional control of suction with the foot pedal. Also the 40-gauge cannula takes longer to aspirate fluid than a standard suction instrument; however, this is

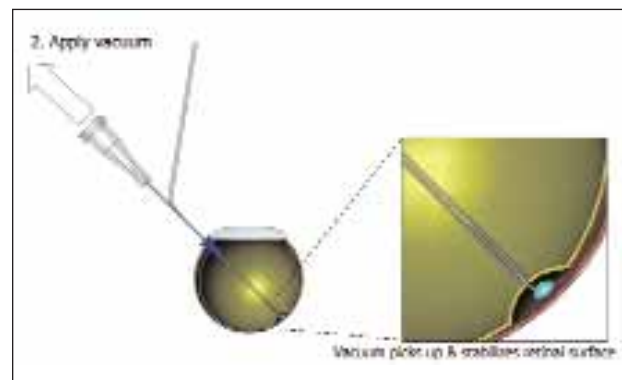


Figure 3. Vacuum is applied to stabilize the retinal surface.

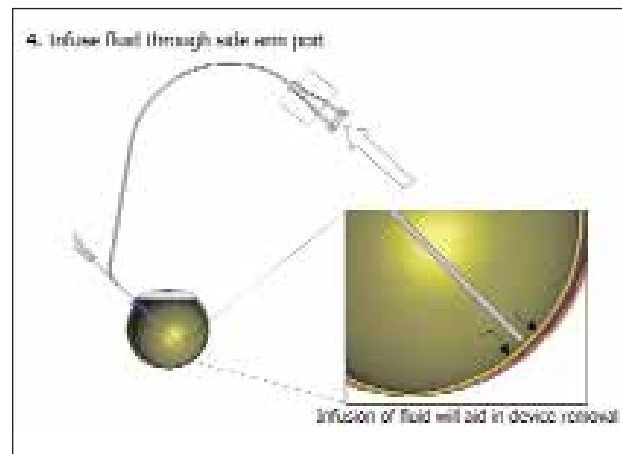


Figure 5. Fluid can be infused after aspiration to ease removal.

a fair tradeoff for the ability to achieve minimally traumatic drainage of subretinal fluid.

SUBRETINAL BIOPSY

I have recently used the iSRAC to perform a subretinal biopsy.¹ A 48-year-old man presented with lesions in the lungs and both ocular fundi. The device was used to obtain subretinal aspirates with minimal trauma to the retina.

A diagnosis was made in this complex case through multiple biopsies and wedge resections. The iSRAC was a small part of the case, but it was a good illustration of the ability to adapt this new instrument to novel uses. The film shows how easy the device was to use and how small the resulting scars were. On an area of flat retina, only a tiny scar was left, with a very small hemorrhage.

PROMISE FOR THE FUTURE

The iSRAC is a handy tool to have in one's surgical arsenal. It may not be deployed for every case, but in

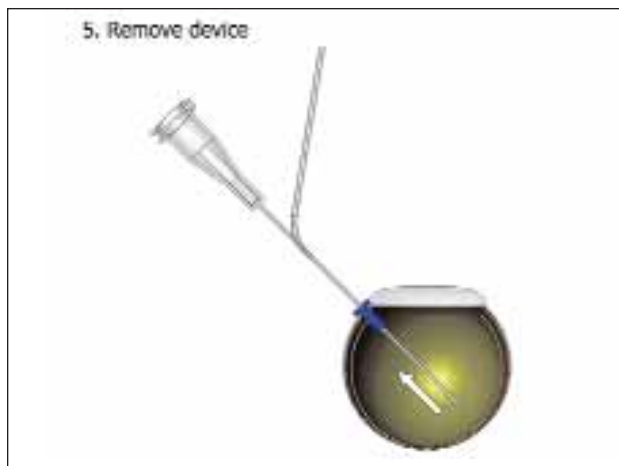


Figure 6. The device is removed from the eye.

selected cases it definitely has value.

The device brings a host of potential benefits to the management of RD. It allows efficient and thorough removal of subretinal fluid with improved tissue reapproximation. It broadens the current treatment options for RD to include more complex detachments, inferior detachments, and the potential for removal of subretinal tamponading agents. It reduces trauma from the surgical procedure, with the possibility of multiple minimally traumatic retinotomies. It also may simplify postoperative management and expedite visual rehabilitation.

iScience Interventional is currently working on additional applications for the iSRAC. Over time, as surgeons learn to take advantage of the instrument's abilities, more and more creative uses for the device will emerge. ■

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1. Singer MA, Bell DJ. A new minimally invasive retinal biopsy technique. Film presented at: Retina Congress 2009 Film Festival; September 30-October 4, 2009; New York, NY.



Dr. Singer's award-winning video, *A New Minimally Invasive Retinal Biopsy Technique*, is now available on the **Retina Channel** at <http://www.eyetube.net>. The video is located within the **Therapeutic Drug Delivery** selection.