# FIBRIN GLUE IN RETINA SURGERY

This tried-and-true tool may be a valuable tamponade alternative.

BY LAWRENCE CHAN, MD; TANNER FREDIANI, MD; AND GAURAV K. SHAH, MD

Fibrin glue, a biologic tissue adhesive that recreates the final step of the coagulation cascade, has been a common tool in ophthalmic surgery for decades. It consists of fibrinogen and thrombin, and when the two components are combined, they quickly polymerize into a fibrin clot. That clot forms a temporary scaffold that adheres tissues together.[1] Fibrin glue is often used in anterior segment surgery, such as conjunctival closure in strabismus surgery, conjunctival autografts in pterygium surgery, sealing wounds and perforations in corneal surgery, and amniotic membrane transplantation for ocular surface disease.[2-6]

The use of fibrin glue in vitreoretinal surgery is more recent and still evolving. Surgeons have used it as a localized hemostatic agent in the setting of trauma, iatrogenic retinal breaks, and diabetic neovascularization, and as a form of retinopexy/tamponade to treat rhegmatogenous retinal detachment (RRD).[7-13]

Here, we share the surgical steps and considerations for using this tool in your retina OR (Video).

## THE PROBLEM WITH TRADITIONAL TAMPONADES

Tamponade agents such as gas (eg, air, $SF_6$, $C_3F_8$), silicone oil, and perfluoro-n-octane (PFO) are effective, but they come with several constraints and potential complications. They often require postoperative positioning, can significantly reduce vision for weeks or months, prevent patients from flying or traveling to high elevations, carry risks such as elevated IOP, and, in the case of silicone oil, require a second surgery for removal.[14,15]

## WHEN TO CONSIDER GLUE

Using fibrin glue shifts the strategy from filling the eye to mechanically seal a break toward directly sealing the break itself without the need for tamponade. Using this strategy, the eye could be filled with balanced salt solution at the end of the case, resulting in clearer postoperative vision—which is particularly helpful for monocular patients—and allowing for air travel or driving to high elevations. In addition, fibrin glue self-dissolves in approximately 1 to 2 weeks, which is enough time for the chorioretinal adhesion from laser to form.

Patients with RRD who may benefit from fibrin glue include those who are poor candidates for gas tamponade, such as those who are monocular, unable to tolerate postoperative positioning, or who must travel by air or to high elevations. Others who may do well with fibrin glue include those with RRDs involving inferior retinal breaks and complex proliferative vitreoretinopathy requiring large retinectomies or giant retinal tears, where stabilization of the retinal edges is needed to prevent slippage (Figure 1).

Patients who can benefit from fibrin glue's hemostatic properties include those with uncontrolled bleeding from

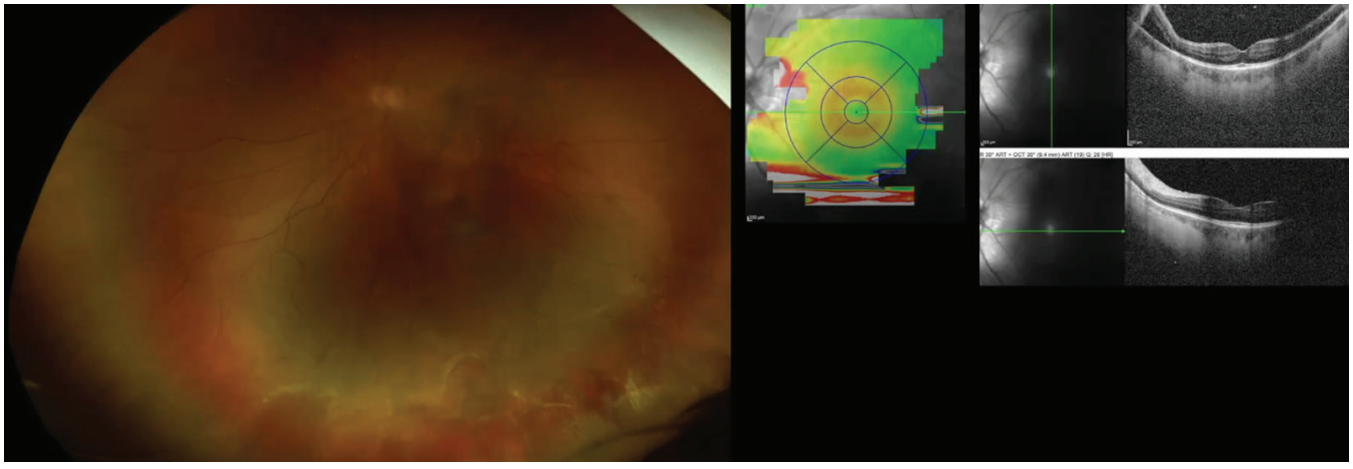

Figure 1. A 41-year-old man presented with a persistent inferior RD after scleral buckling surgery. In lieu of a traditional long-lasting tamponade, the surgeon applied fibrin glue.

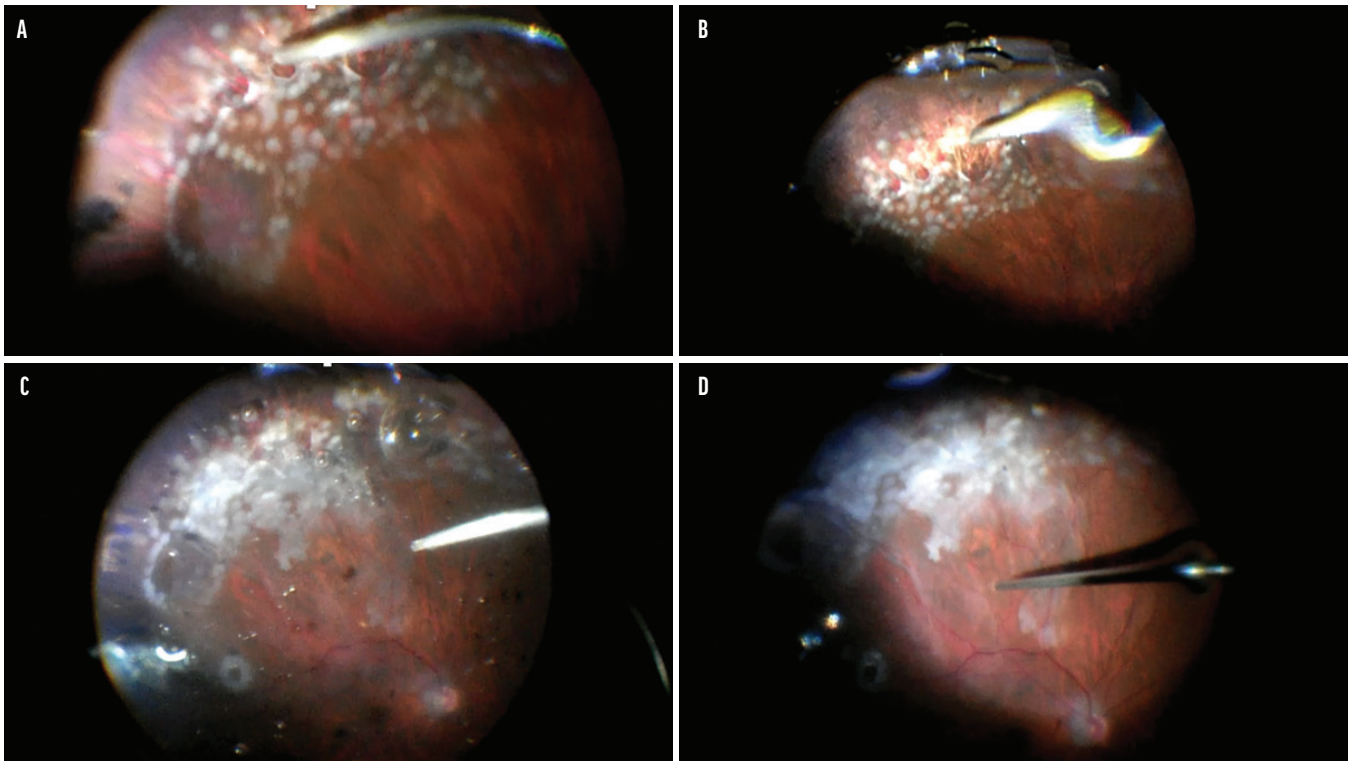


**Figure 2. When applying fibrin blue, surgeons must instill the thick component (A) followed by the thin component (B). In this patient's case, the retina remained reattached when tested under fluid (C), and fluid-air exchange was repeated (D).**

neovascularization (eg, proliferative diabetic retinopathy/tractional RDs) and bleeding from trauma, anticoagulation, or intraoperative iatrogenic causes.

Fibrin glue has also been successfully used to assist with macular hole closure and optic disc pit-related macular detachments.[7,11,16]

## THE SURGICAL STEPS

The early steps are similar to a standard RD repair: core vitrectomy, induction of posterior vitreous detachment (if needed), meticulous peripheral shaving, flattening of the retina with fluid-air exchange or drainage through the break or a retinotomy, and endolaser around the break(s).

The retinal surface must be carefully dried under air, which is an important condition for the fibrin glue to work. The thick component of the glue is applied first, followed by the thin component shortly after (Figure 2). It is important to avoid using excessive amounts of glue. Only a drop at a time is necessary for each of the thick and thin components, and you can always apply more if needed. The polymerization occurs within seconds and is evident when the glue turns opaque.

The eye may need to be tilted toward the target area to minimize the amount of glue migrating posteriorly to the disc and macula. Sometimes, forceps can be used to pick up the partially formed coagulum from the posterior pole and move it back to the target area.

## PITFALLS OF FIBRIN GLUE IN THE RETINA

The techniques described here are off-label applications of fibrin glue. Potential complications include displacement of the glue posteriorly, subretinal migration, and epiretinal membrane or proliferative vitreoretinopathy formation because fibrin can act as a scaffold. Intraocular inflammation is also possible because fibrin glue is a biologic product. There is a theoretical risk of viral or bacterial transmission because the glue is derived from pooled plasma, although modern processing techniques minimize this risk.[17]

## USE WITH CARE

Fibrin glue's ability to provide localized adhesion, hemostasis, and temporary support without the limitations of gas or oil make it an appealing option in select cases. Used judiciously, this tool, already a mainstay in most ORs, can be a valuable adjunct in the retina OR, offering flexibility when traditional tamponades are infeasible or less desirable. ■

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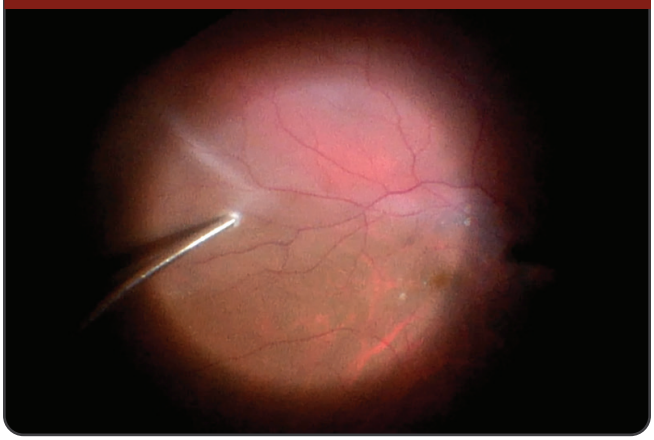
## WATCH IT NOW

**Video. Fibrin Glue-Assisted RD Repair**



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