Commentary: Fibrin glue in rhegmatogenous retinal detachment repair—Are we there yet?

Tissue adhesives have a long history of use in ophthalmology. The concept of using fibrin as a biologic adhesive was introduced nearly a century ago. And its use in ophthalmic surgery dates back to the early 1940s.[1] Both the synthetic tissue adhesives such as cyanoacrylate glue and the biologic adhesives such as the fibrin glue have found extensive application in ophthalmology. They are mainly used in corneal and ocular surface surgeries as adhesives, for wound apposition and as structural fillers. They are also being increasingly used in squint surgeries, lid and adnexal surgeries, glaucoma surgeries, and so on.

However, their use in vitreoretinal surgery has been limited to conjunctival closure, and sclerotomy closure. Of late, it gained wide application as an adjunct to fixate the haptics of a scleral-fixated intraocular lens (IOL). But intraocular use of tissue adhesives has been limited so far to only a few animal studies and a few case reports.[2-5] The first report of an animal study using cyanoacrylate glue for the closure of retinal breaks appeared in 1986, and although it produced strong adhesion between the retina and the retinal pigment epithelium (RPE), it also led to localized retinal necrosis around the adhesive causing full thickness retinal breaks or retinal atrophy.[6]

Fibrin glue, on the contrary, is biologically derived, and the commercially available product manufactured meticulously to exclude any possible contamination or infective organism inclusion has been found to be safe for human use. It has two components: a fibrinogen component and a thrombin component. When mixed together, the thrombin activates the fibrinogen leading to formation of fibrin which on polymerization leads to long fibrin strands causing adhesion. Nasaduke and Peyman[2] in 1986 and later Coleman *et al*.[3] in 1988 reported the use of fibrin as sealant for retinal breaks in animal eyes. They found it nontoxic, noninflammatory, and effective in sealing breaks.

Over 30 years have passed but fibrin glue has not got any current application in vitreoretinal surgery. Barring a few case reports for macular hole closure[4] and management of optic pit associated detachment,[5] it has not been used as a sealant for retinal breaks. This requires some pondering over.

In this issue, Al Sabti *et al*.[6] report their experience of using fibrin glue along with laser photocoagulation to close the retinal breaks. In the five patients that they have reported, the authors could achieve closure of breaks in all with no tamponade and no postoperative positioning. As the fibrin glue causes instantaneous adhesion, no tamponade is needed. The obvious advantages of this procedure are that the complications associated with tamponade with either gas or silicone oil, such as cataract, secondary glaucoma, and corneal decompensation, are avoided. Many patients find maintaining the prone position quite challenging and thus would prefer this option. Also, a second surgery for silicone oil removal is not needed. The authors also claim that there can be early visual recovery with this technique. Avoidance of tamponade and the postoperative positioning are two huge advantages of this technique.

However, one needs to look at the possible unfavorable consequences also. Fibrin glue has been known to produce epiretinal proliferation.[7] The glue can be seen subretinally around the retinal break on histopathological exam.[8] There is a possibility of the glue migrating subfoveally leading to subnormal visual recovery. The possibility of excess contraction of the glue leading to proliferative vitreoretinopathy (PVR) changes cannot be ruled out. Also, it remains to be seen whether the glue can be effective in sealing large retinal breaks, multiple breaks in different quadrants, or breaks in the presence of preexisting PVR. In case of residual vitreous which might be adherent to the breaks, the fibrin glue might lead to firm vitreous adhesions and contraction which might precipitate unfavorable complications. Furthermore, the toxicity and/or possibility of infection needs to be extensively studied. The authors have used laser photocoagulation for creating retinal adhesion, and the glue seems to have been used as a barrier to fluid and a cover for the exposed RPE.

Although this small series shows the proof of concept that fibrin glue can work well as a sealant for retinal breaks without the need for tamponade or head position, we are still a long way off from replacing our existing time-tested methods of retinal reattachment repair with fibrin glue. It requires a larger study with proper controls and a long follow-up to identify potential problems and drawbacks and to confirm its usefulness.

Kumar Anshuman, Dhanashree Ratra

Department of Vitreoretinal Diseases, Medical Research Foundation, Sankara Nethralaya, 41/18, College Road, Chennai, Tamil Nadu, India

Correspondence to: Dr. Dhanashree Ratra,
Department of Vitreoretinal Diseases, Medical Research Foundation,
Sankara Nethralaya, 41/18, College Road,
Chennai - 600 006, Tamil Nadu, India.
E-mail: dhanashreeratra@gmail.com

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Quick Response Code:

Website: www.ijo.in

DOI: 10.4103/ijo.IJO_104_19

Cite this article as: Anshuman K, Ratra D. Commentary: Fibrin glue in rhegmatogenous retinal detachment repair—Are we there yet? Indian J Ophthalmol 2019;67:683-4.