Giant Retinal Tears: Size Does Matter

Pearls for managing a variety of surgical scenarios.

BY MANISH NAGPAL, MS, DO, FRCS(UK)

In this issue of Retina Today, *Manish Nagpal, MS, DO, FRCS(UK), describes the surgical management of giant retinal tears with various grades of PVR as well as with a dropped nucleus.*

We extend an invitation to readers to submit pearls for publication in Retina Today. Please send submissions for consideration to Dean Eliott, MD (dean_eliott@meei.harvard.edu); or Ingrid U. Scott, MD, MPH (iscott@hmc.psu.edu). We look forward to hearing from you.


— Dean Eliott, MD; and Ingrid U. Scott, MD, MPH

A giant retinal tear is defined as a retinal break that is larger than 3 clock hours (Figure 1). Most giant retinal tears are idiopathic in etiology, although risk factors include trauma, high myopia, aphakia, pseudophakia, and young age.[1-3] These tears may also be associated with hereditary conditions such as Marfan syndrome and Stickler syndrome.

Giant retinal tears pose a challenge to vitreoretinal surgeons, as they are unique in their presentation as well as in their management. Because of their size, giant retinal tears tend to roll back posteriorly and have radial extensions (Figure 2), leading to a higher incidence of proliferative vitreoretinopathy (PVR; Figure 3).[4] The incidence of PVR associated with giant retinal tears is higher than that following conventional retinal detachment surgery

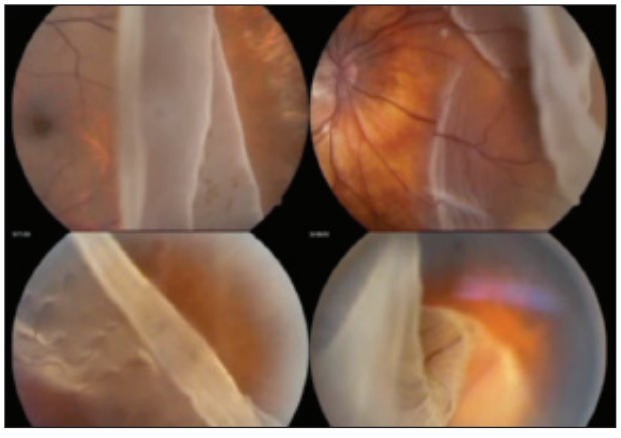

Figure 1. Giant retinal tears are larger than 3 clock hours.

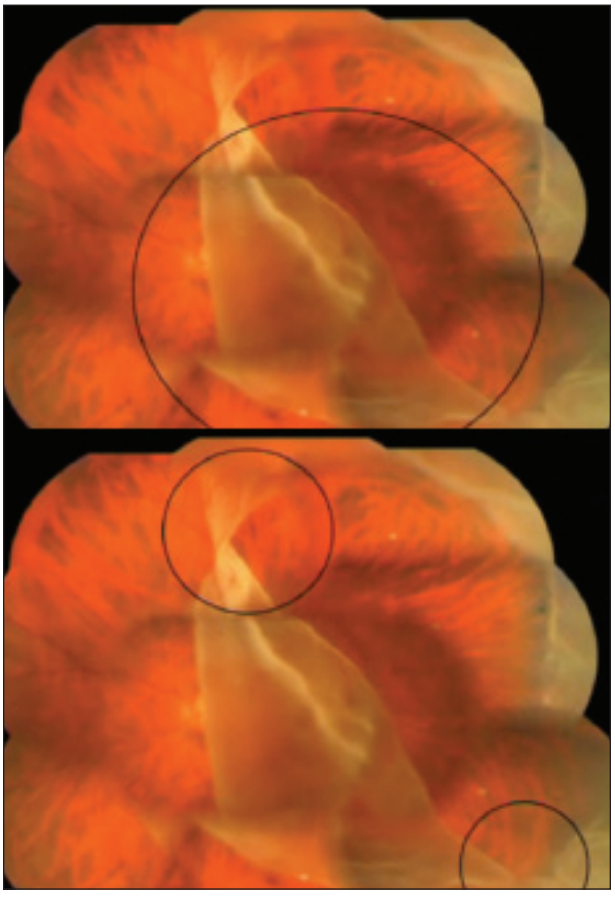

Figure 2. Because of their size, giant retinal tears tend to roll back posteriorly and have radial extensions.

Figure 3. Giant retinal tears carry significant risk of PVR development.

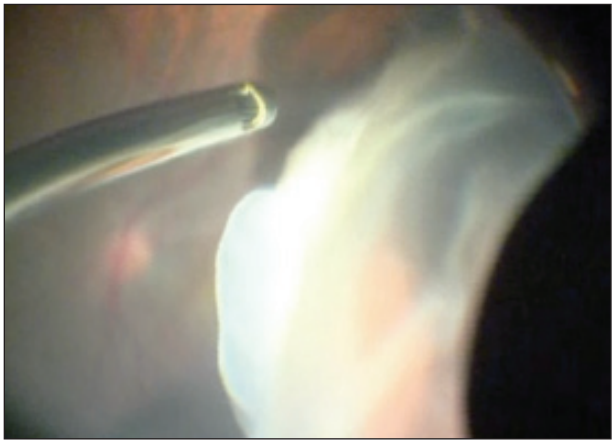

Figure 4. External indentation is used to achieve better visualization of peripheral vitreous attachments.

and has been reported to occur in 12% to 15% of eyes.[5,6] PVR is a primary cause of surgical failure.[4]

Before the use of perfluorocarbon liquid (PFCL) was introduced in the 1980s, giant retinal tears were managed using an expanding gas bubble and scleral buckling or with vitrectomy and fluid-gas exchange with the patient in prone positioning. The more recent use of PFCL facilitates the unfolding and stabilization of the retina during the management of giant retinal tears. Wide-angle visualization systems and endolaser are also useful in these cases.

This article describes a variety of surgical scenarios related to the management of giant retinal tears with various grades of PVR, and in one case, a dropped nucleus. For a video demonstration of these procedures, visit eyetube.net/?v=wunoz.

CASE NO. 1

In a classic case of a fresh giant retinal tear with a mobile flap, an encircling buckle with low indentation can be placed to support the vitreous base and the peripheral edges of the tear. This is followed by a core vitrectomy and removal of the condensed vitreous along the anterior edge of the retinal tear. Meticulous removal of the peripheral vitreous is performed. External indentation is used to achieve better visualization of peripheral vitreous attachments (Figure 4). The anterior flap is excised with the cutter to prevent reproliferation.

At this stage, PFCL is gradually injected over the optic disc, which displaces subretinal fluid anteriorly and unfolds the flap. Meniscus can be gradually increased up to the peripheral edges of the giant retinal tear. The edges can then be gently unrolled under PFCL using a blunt spatula. Endolaser is applied in multiple rows posterior to the edges of the tear; it is further extended as a 360° endolaser barrage (Figure 5) and followed by a fluid-air exchange beginning at the edge of the tear to keep the edges dry and hence avoid a slippage. PFCL is then aspirated, and silicone oil is injected. Alternatively, a direct PFCL-silicone oil exchange can also be done.

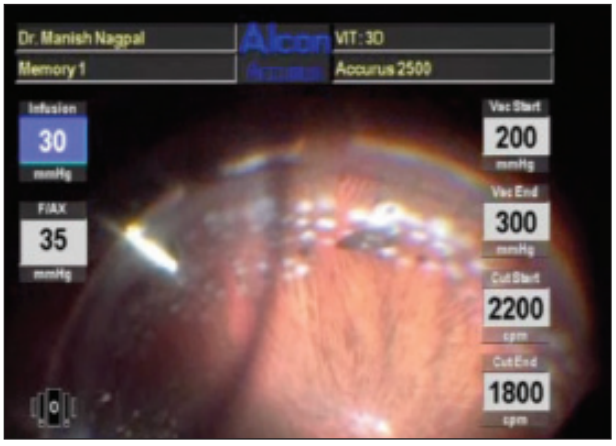

Figure 5. Endolaser is applied in multiple rows posterior to the edges of the tear and further extended 360°.

CASE NO. 2

In a case of a giant retinal tear with some PVR changes, a total vitrectomy is performed. PFCL is injected to flatten the retina (Figure 6). Epiretinal membranes are teased with a spatula and removed to release traction. Residual retinal folds are ironed out with a flat spatula, followed by a 360° endolaser application. This would be followed once again by a PFCL-air exchange and eventually replaced by silicone oil.

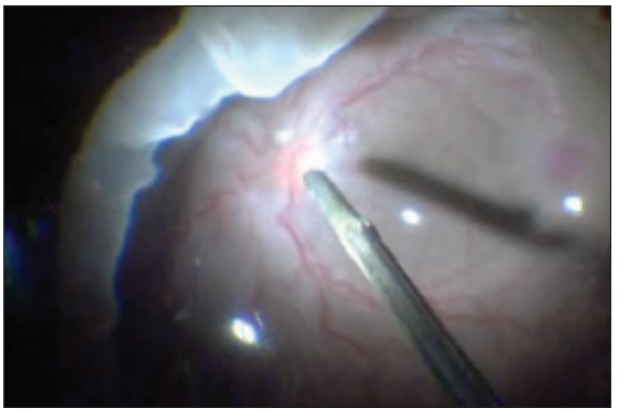

Figure 6. PFCL is injected to flatten the retina.

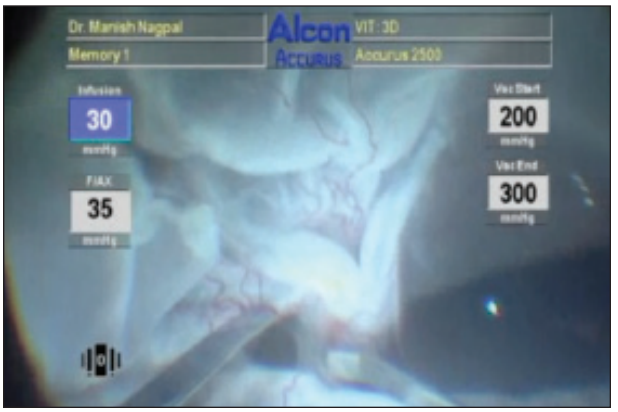

Figure 7. In the case of 360° giant retinal tear with extensive PVR, a bimanual technique is used to facilitate the membrane removal.

CASE NO. 3

For a giant retinal tear with extensive PVR, a total vitrectomy is performed once again. Minimal PFCL is injected gently up to the edges of the traction; this acts as a third hand and supports the underlying retina as well as helps in judging the amount of traction. The epiretinal membranes are then removed. If residual traction persists despite membrane dissection, relaxing retinotomy may be performed. Preparatory endodiathermy is done, followed by retinotomy. Once the retina is flattened, a 360° endolaser barrage is carried out.

CASE NO. 4

In the case of 360° giant retinal tear with extensive PVR, a bimanual technique is used to facilitate the membrane removal (Figure 7). This approach also helps flatten the stiff folds of the retina. After removing all visible posterior membranes, the retinal detachment regains mobility, and PFCL helps flatten the retina. Eventually, a 360° endolaser barrage is executed.

CASE NO. 5

Another complex situation involves a nucleus drop with an associated giant retinal tear. In this case, a core vitrectomy is performed. This is followed by PFCL injection, aimed below the nucleus so as to lift it as well as to stabilize the detached retina. After, the nucleus is removed using phacofragmentation. The ragged edges of the tears can be gently aligned with the help of a spatula, and then endolaser is carried out.

Silicone oil is commonly used as a long-term tamponade in these cases. Once the retina is well attached for a period of 3 to 6 months, oil removal must be performed. Silicone oil removal is achieved using a 3-port pars plana approach and followed by a fluid-air exchange. Inspection of the periphery is necessary to confirm that the tear edges are well scarred.

CONCLUSION

With the advent of wide-angle visualization systems, PFCL, and endolaser, good results can be achieved even in challenging scenarios of giant retinal tears. Idiopathic giant retinal tears have a high incidence of retinal pathology in the fellow eye; therefore, it is necessary to examine the fundus of these eyes as well, and any offensive lesions observed should undergo prophylactic laser. ■

Manish Nagpal, MS, DO, FRCS(UK), is Senior Consultant, Retina & Vitreous Services, at the Retina Foundation & Eye Research Centre in Gujarat, India. He is a Retina Today *Editorial Board Member. Dr. Nagpal states that he has no financial relationships to disclose. He may be reached at drmanishnagpal@yahoo.com.*

Dean Eliott, MD, is Associate Director of the Retina Service, Massachusetts Eye and Ear Infirmary, Harvard Medical School, and is a Retina Today *Editorial Board member. He may be reached by phone: +1 617 573-3736; fax: +1 617 573-3698; or via email at dean_eliott@meei.harvard.edu.*

Ingrid U. Scott, MD, MPH, is a Professor of Ophthalmology and Public Health Sciences, Penn State College of Medicine, Department of Ophthalmology, and is a Retina Today *Editorial Board member. She may be reached by phone: +1 717 531 8783; fax: +1 717 531 5475; or via email at iscott@hmc.psu.edu.*

1. Mehdizadeh M, Afarid M, Haqiqi MS. Risk factors for giant retinal tears. *J Ophthalmic Vis Res.* 2010;5(4):246-249.
2. Chang S, Lopez JM. Giant retinal tears and proliferative vitreoretinopathy. In: Ryan SJ, ed. *Retina.* 4th ed. St. Louis: Mosby; 2006: 2345-2351.
3. Aylward GW, Cooling RJ, Leaver PK. Trauma-induced retinal detachment associated with giant retinal tears. *Retina.* 1993;13:136-141.
4. Chang S, Lincoff H, Zimmerman NJ et al. Giant retinal tears: surgical techniques and results using perfluorocarbon liquids. *Arch Ophthalmol.* 1989;107:761-766.
5 Ie D, Glaser BM, Sjaarda RN, et al. The use of perfluoro-octane in the management of giant retinal tears without proliferative vitreoretinopathy. *Retina.* 1994;14:323-328.
6 Mathis A, Pagot V, Gazagne C, et al. Giant retinal tears: surgical techniques and results using perfluorodecalin and silicone oil tamponade. *Retina.* 1992;12:7-10.