

Surgical Repair of Traction Retinal Detachment due to Severe PDR

In viscodissection, a suitable space is created to dissect fibrovascular tissue.

BY ANDRES AMAYA ESPINOSA, MD



In this issue of Retina Today, Andres Amaya Espinosa, MD, describes the details of an technique that is used to treat traction retinal detachment due to severe proliferative diabetic retinopathy.

We extend an invitation to readers to submit surgical pearls for publication in Retina Today. Please send submissions for consideration to Dean Elliott, MD (deliott@doheny.org), or Ingrid U. Scott, MD, MPH (iscott@psu.edu).



We look forward to hearing from you.

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

Traction retinal detachment (TRD) secondary to proliferative diabetic retinopathy (PDR) is one of the most challenging situations for a vitreoretinal surgeon. Intraoperative complications such as iatrogenic breaks and intraocular bleeding can be quite frequent, even in the hands of an experienced surgeon.¹ Classic surgical techniques include segmentation and delamination described by Charles,² and en bloc technique described by Abrams.³ New advances in ocular instrumentation have permitted the development of improved vitrector tips in terms of safety and efficiency, and microsurgical vitreoretinal tools for bimanual surgery that facilitate vitreoretinal procedures with fewer intraoperative complications. In order to facilitate surgery for diabetic TRD, viscodissection and perfluorodissection were introduced.^{5,6} In both techniques the goal is to separate the posterior hyaloid from the subjacent retina using viscoelastic substances or perfluorocarbon liquids, creating a space suitable for dissection of fibrovascular tis-

sue. This article describes our surgical technique using viscodissection to treat TRD secondary to severe PDR.

DESCRIPTION

I use a BIOM wide-angle viewing system (Oculus, Optikgeraete, Germany) with a Carl Zeiss Meditec (Jena, Germany) microscope and the Accurus Surgical System (Alcon Laboratories, Inc., Fort Worth, TX) with the 3D vitrectomy setting. Twenty-gauge or 23-gauge instrumentation is used to perform surgery in these cases. Initial vitrectomy is performed in the central vitreous cavity. After all central vitreous is removed, and in order to eliminate all anteroposterior traction, an opening in the posterior vitreous cortex is made. This opening should be made over an area of attached retina, typically in the midperiphery, and then a circumferential truncation of the posterior vitreous cortex is extended for 360°. Truncation of the posterior vitreous cortex releases all bonds with the anterior vitreous and permits a safe dissection of

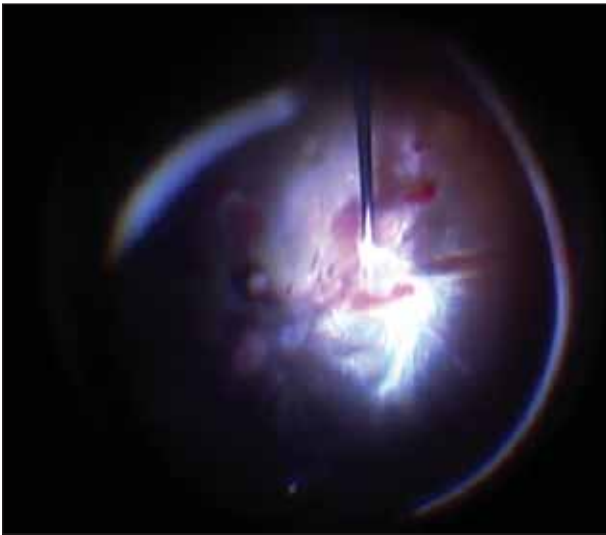


Figure 1. A small hole is created in the posterior hyaloid, preferably near the optic disc, and cohesive-dispersive viscoelastic is injected.

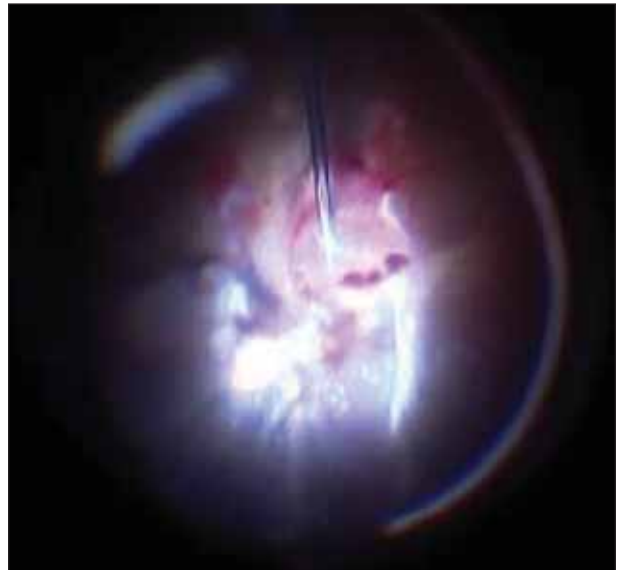


Figure 2. Viscoelastic creates a space between the retina and the posterior hyaloid.

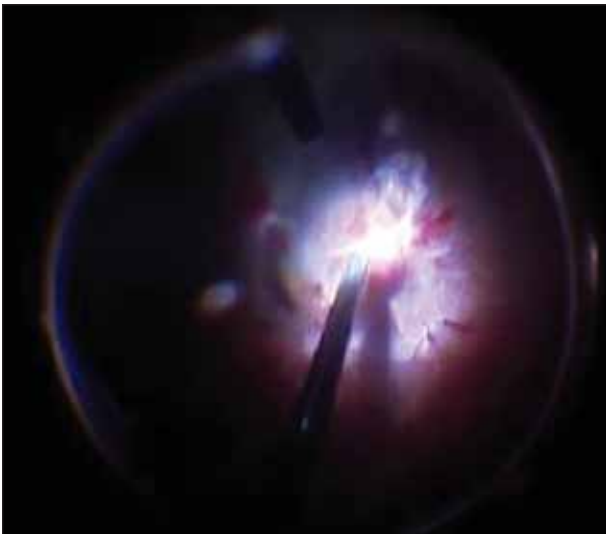


Figure 3. Segmentation is pursued, freeing tangential traction. Viscodissection permits this surgical approach with less danger of iatrogenic retinal breaks and intraocular bleeding. After tangential forces are released, delamination is performed using the vitrector tip to remove the remaining fibrovascular tissue.

fibrovascular tissue without risk of inadvertent traction at the vitreous base. Blood behind the posterior vitreous cortex is removed using a soft tip Charles cannula. After all anteroposterior traction is released, epiretinal membrane segmentation and delamination is begun.

The main purpose of epiretinal peeling is to liberate

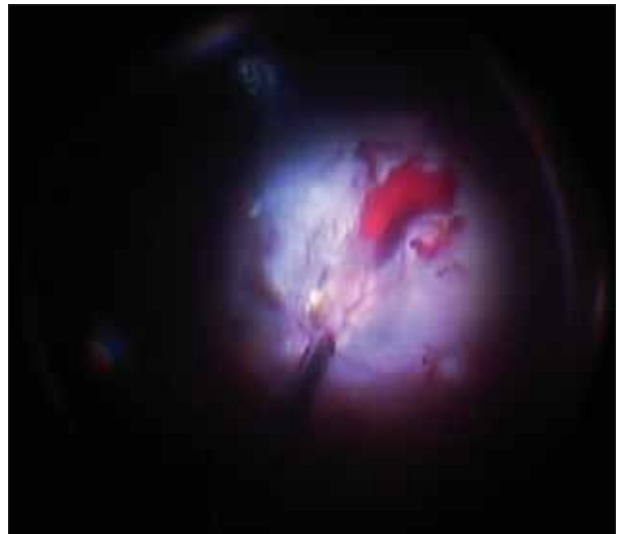


Figure 4. Anteroposterior and tangential traction are released. The retina is completely attached.

all tangential traction between the retina and the posterior hyaloid, including fibrovascular proliferation. In order to facilitate the dissection, a small hole is created in the posterior hyaloid, preferably near the optic disc, and a cohesive-dispersive viscoelastic is injected (DisCoVisc, Alcon Laboratories, Inc.). The viscoelastic creates a space between the retina and the posterior hyaloid that allows segmentation of the connections between fibrovascular epicenters, thereby freeing tangential traction (Figures 1-4). Viscodissection permits this surgical approach with less danger of iatrogenic

Surgery for traction retinal detachment secondary to PDR is one of the most challenging procedures for a retinal surgeon.

retinal breaks and intraocular bleeding. After tangential forces are released, delamination is performed using the vitrector tip or horizontal scissors to remove the remaining fibrovascular tissue. Newer designs of vitrector tips, particularly 25- and 23-gauge, allow safer segmentation and delamination because the opening of the vitrector is closer to the tip. This permits working near the retina with less risk of iatrogenic retinal breaks. If tangential traction has been removed, but the retina is very atrophic or fibrovascular proliferations are extremely vascularized, delamination is not pursued. Epicenters can be left in place, trying to eliminate cut edges that are capable of leading to glial repopulation. Although this approach is acceptable, delamination techniques are preferred because these allow complete removal of fibrovascular proliferation.

Once all traction is released, complete panretinal photocoagulation and careful inspection of the periphery are performed. Intraocular fluid-gas exchange is performed only if retinal breaks are observed.

DISCUSSION

Diabetes mellitus has many ocular complications. These may include vitreous hemorrhage and traction retinal detachment. Although visual acuity outcomes after vitrectomy in such cases are favorable compared to the natural course, they are still poor compared with the potential efficacy of preventive measures such as improved glycemic control and timely application of laser photocoagulation.⁷ All too often, the final visual outcome is limited after surgery even though the anatomic objectives are achieved.

Surgery for TRD secondary to PDR is one of the most challenging procedures for a retinal surgeon, and intraoperative complications such as bleeding from fibrovascular proliferation, damage to the optic nerve due to high intraocular pressure, and iatrogenic retinal breaks can impair final anatomic and visual outcomes. The retinal surgeon must keep in mind the precise goals of surgery so that complications may be avoided and objectives achieved with less risk and greater efficiency.

Surgical goals in vitreoretinal surgery for complica-

tions of PDR are to clear the media, reattach the retina, release surface traction, and perform panretinal photocoagulation. Clearing the media should be done with vitrectomy, following the steps described above. Reattaching the retina is performed by releasing anteroposterior and tangential surface traction, and, in combined retinal detachments, by draining subretinal fluid and performing fluid-air exchange. Truncation of the posterior vitreous cortex is sufficient to release anteroposterior traction, and segmentation and delamination techniques will release tangential traction. Because delamination and segmentation carry substantial risks of iatrogenic retinal breaks and intraocular bleeding, viscodissection facilitates these surgical steps by creating a space between the retina and the posterior hyaloid. Being heavier than water, viscoelastic substances can help to limit intraocular bleeding and facilitate adequate visualization. Due to the increased risk of inadvertent retinal breaks at the vitreous base, I do not recommend en bloc techniques.

Advances in ocular instrumentation permit bimanual surgery to be performed. For example, lighted pincers and forceps can help to dissect fibrovascular proliferation in a manner similar to viscodissection. One of the main disadvantages is the narrow field offered by these instruments, because the light source is close to the instrument tip. This potential disadvantage can be managed by using chandelier light(s), which improve visualization.⁸ However, visualization provided by a single 20- or 23-gauge light pipe and a xenon light source is still superior.

Newer vitrector tips, such as 25- and 23-gauge, are designed to have their openings closer to the tip, which is a substantial advantage over 20-gauge vitrector tips.⁹ These new vitrector tips permit working near the retina with less risk. Even fibrovascular proliferation can be delaminated using only the vitrector tip and no horizontal scissors. New vitrectomy machines, such as the Constellation Vision System (Alcon Laboratories, Inc.), represent significant advances in surgical instrumentation. High-speed cutting and duty cycle control, combined with advances in illumination and intraocular pressure stability, enable vitreoretinal surgeons to improve safety and efficiency in every procedure.

In conclusion, viscodissection is a novel technique that facilitates surgery in diabetic cases by creating a space suitable for dissection of fibrovascular tissue. Safer segmentation and delamination, combined with newer and improved instrumentation, will aid vitreoretinal surgeons to optimize anatomic results. ■

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