

Radial Anterior Capsular Tear

Causes and management.

BY D. MICHAEL COLVARD, MD

No matter how experienced or skilled one is at performing the capsulorhexis, once in a while, a tear begins to “take off” peripherally. Upon perceiving this problem, the surgeon must instantly stop and attempt to redirect the leading edge of the capsulotomy before it progresses beyond recovery. This article discusses the causes of radial anterior capsular tears and how to manage them.

CAUSES AND CONTROL

The most common reason for the radialization of a continuous capsulotomy is forward bowing of the anterior lens capsule. When a capsulorhexis begins to extend peripherally, the surgeon should immediately attempt to flatten the anterior capsular plane with the most cohesive ophthalmic viscosurgical device (OVD) available. I prefer Healon5 (Abbott Medical Optics Inc., Santa Ana, CA) in this situation because, in my opinion, it is the most highly retentive of all OVDs at zero shear. Healon5 creates a virtual cast of the anterior chamber and provides the most stable environment possible in which to redirect an errant tear. If poor visualization is a factor, the surgeon can add trypan blue under the dome of Healon5 without losing anterior chamber volume.¹ If the radialized tear is in an awkward position and hard to reach effectively with the standard Utrata-style forceps through the primary incision, he or she may introduce a microforceps (available, for example, from Microsurgical Technology [Redmond, WA]) through a sideport incision. These tiny, very efficient forceps can be enormously helpful, because they allow the surgeon to approach an errant tear at the optimal angle from which to redirect it. Redirection of a radialized tear is most reliably accomplished by performing the tear-out rescue maneuver, described by Little et al.²



Figure 1. Diagrammatic representation of an errant capsulorhexis with radial extension beyond the pupillary margin.

An OVE is used to unfold the capsular flap so that it lies flat against the lens capsule. The leading edge of the radialized tear is then grasped with a forceps, and the force is then directed in the horizontal plane of the capsule and backward in the direction of the path of the completed portion of the capsulorhexis. This maneuver virtually always redirects the tear toward the center of the lens. If the capsular tear does not redirect easily, however, the maneuver should be abandoned in order to avoid creating a “wrap around” capsular tear.

STRESS MANAGEMENT FOR THE CAPSULE

If a tear has radialized beyond recovery, the surgeon must make every effort to prevent it from extending around the lens equator. An attempt may be made to complete the capsulotomy from the opposite direction, but once a tear is truly “lost,” I believe that the best approach is to create additional tears in the anterior

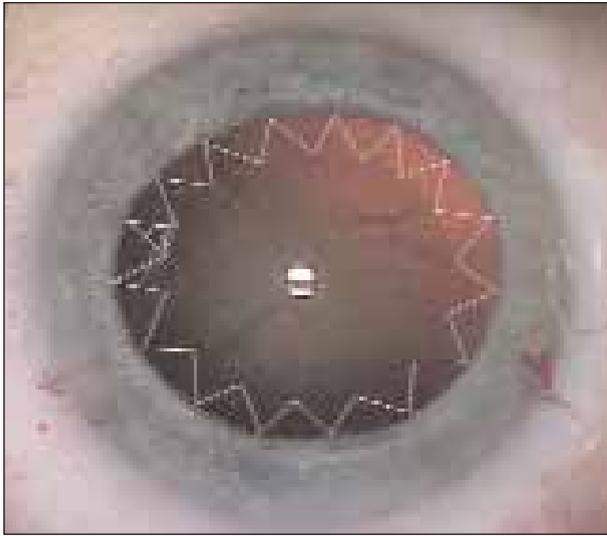


Figure 2. If recovery of a radial tear is not possible, creating additional radial tears redistributes capsular stress and helps to prevent further extension of the capsulorhexis.

capsule, thereby redistributing stress on the capsular margin (Figures 1 and 2).

Long before the development of the capsulorhexis, phaco surgeons successfully extracted the cataract by means of several variants of the can-opener capsulotomy. This basic technique utilizes many small radial tears; the equal and simultaneous distribution of forces on all of the tears prevents destabilization of the posterior capsule. Once a single, large radial tear has developed, I use a modified can-opener capsulotomy technique in which I create several radial tears in the capsular margin with a cystotome or microscissors. I use Healon5 to stabilize the anterior chamber during this maneuver to keep the chamber from becoming shallow, which will cause the single large tear to extend.

ADVICE ON PERFORMING PHACOEMULSIFICATION

The goal is to remove the cataract as gently as possible without placing unnecessary stress on the capsule, either directly or by allowing the anterior chamber to shallow or deepen excessively. The surgeon should perform hydrodissection and hydrodelineation but with very small aliquots of balanced salt solution in a controlled fashion. He or she should allow the nucleus to rise up only a tiny bit before relieving the forces of capsular block by gently tapping it back down again. The surgeon must be certain to mobilize the nucleus before starting phacoemulsification. I like to use a chopper to spin the nucleus before beginning phacoemulsification. This step ensures that hydrodissec-

tion is complete and that the nucleus rotates easily. Pushing ahead with the phacoemulsification before the nucleus is freely moveable will place undesirable stress on the capsule.

The bottle height should be lowered, especially in highly myopic eyes or those with a history of vitrectomy, to prevent sudden deepening of the chamber. The surgeon should use continuous flow to prevent intermittent, inadvertent “shallowing” of the chamber and then proceed with phacoemulsification using his or her preferred technique.

LOSS OF CAPSULAR SUPPORT

By following the aforementioned guidelines, the surgeon can usually successfully complete the cataract procedure without allowing a radialized tear to “zip around the equator.” He or she must be vigilant, however, for any clue that posterior support of the lens has been lost. A sudden unexplained deepening of the chamber with momentary dilation of the pupil or a sudden increase in the difficulty of manipulating the nuclear material are subtle but worrisome signs that the radial tear has progressed around the equator and that the posterior capsule’s integrity has been compromised.³ Upon observing such signs or more obvious evidence (eg, tipping, lateral, or downward movement of the nucleus), the surgeon must assume that the posterior capsule has been compromised. He or she should then follow the advice presented in this issue of *Cataract & Refractive Surgery Today* by Lisa Brothers Arbisser, MD, in her article on posterior capsular tears.

SUMMARY

Efforts to rescue an errant anterior capsular tear are facilitated by deepening the anterior chamber with an OVD, improvement of visualization with trypan blue, if necessary, and optimization of access. The tear-out rescue maneuver is an important aid in recovering a radialized tear. Preventing of a wrap around tear is the surgeon’s primary goal if a radialized tear is lost to recovery. ■

Dr. Michael Colvard, MD, is a clinical professor at the University of Southern California Keck School of Medicine and clinical director of the Colvard Eye Center in Los Angeles. He is a consultant to Abbott Medical Optics Inc. Dr. Colvard may be reached at eyecolvard@earthlink.net.



1. Osher RH. Trypan blue and Healon5: a new technique for capsular staining. *Cataract & Refractive Surgery Today*. March 2005;5(3):47-48.
2. Little BC, Smith JH, Packer M. Little capsulorhexis tear-out rescue. *J Cataract Refract Surg*. 2006;32:1420-1422.
3. Chang DF. Anterior vitrectomy for the cataract surgeon. *Review of Ophthalmology*. http://www.revophth.com/index.asp?page=1_677.htm. Accessed September 23, 2009.