Managing Subincisional Cortex

BY WILLIAM J. FISHKIND, MD, FACS; ROBERT LEHMANN, MD, FACS; ARTHUR WEINSTEIN, MD; AND MARK PACKER, MD

WILLIAM J. FISHKIND, MD, FACS
I do not think there is a surgeon anywhere who has not struggled to eliminate subincisional cortex. I begin by attempting to ensure that hydrodissection cleaves the cortex and that the fluid wave extends into the subincisional area. During phacoemulsification of the epinucleus, much of the cortex is simultaneously removed. Often, however, a small quantity of cortex is located below the incision, where it is hardest to hydrodissect. The cortical cleaving hydrodissection loosens—if it does not entirely lyse—the cortical connections to the capsular bag.

Prior to inserting the IOL, I use a posterior capsular polisher (Terry Squeegee, No. 8065428220; Alcon Laboratories, Inc., Fort Worth, TX) to clean the posterior capsule of adherent cortex and lens epithelial cells. Simultaneous irrigation loosens any residual cortex. After IOL implantation, a 0.3-mm I/A tip will quickly and efficiently remove the subincisional cortex. If the cortex is recalcitrant, rotating the IOL 360º will further loosen it, at which point the material is typically easily removed. Because the IOL functions as a barrier between the I/A tip and the posterior capsule, it prevents inadvertent damage to the capsule and maintains a deep anterior chamber within which to work.

ROBERT LEHMANN, MD, FACS
The best way to manage subincisional cortex is with thorough hydrodissection. Cortical cleaving hydrodissection is most effectively accomplished with a flattened irrigation cannula or with the curved Chang Hydro Dissection Cannula (American Surgical Instruments Corporation, Westmont, IL). I have found the latter instrument to be especially useful for rotating the nucleocortical complex within the capsular bag in order to further loosen the cortical-capsular attachments. I recently used another such instrument, the Akahoshi Hydrodissection Cannula (American Surgical Instruments Corporation).

Nuclear removal is completed by either phacoemulsification or liquefaction. My experience with the latter technology leads me to believe that it leaves behind slightly less cortex. Nevertheless, removing subincisional cortex can be challenging in cases in which classic single-incision lens extraction is employed.

In my earlier days, I advised starting cortical cleanup at the subincisional area and postulated that the remaining cortex allowed the surgeon easier, more complete access by helping to hold the capsular bag open. Today, I employ an angled silicone I/A tip (Alcon Laboratories, Inc.) that facilitates cortical removal from the subincisional recesses. Although reusable, this tip has a limited life expectancy, which adds some cost to the procedure. I find that the soft silicone tip more than compensates for this expense in spared posterior capsules and efficient cortical cleanup.

European colleagues have known for years that bimanual incisions provide 360º access to the cortex. I have found that bimanual access is hardly ever necessary, however, with the efficiency, high performance, and safety of the silicone I/A tip.

If the patient’s IOP is unexpectedly high postoperatively but the eye is otherwise quiet, I recommend dilating the pupil sufficiently to ascertain that no cortex remains. Although this material may be absorbed over time and is certainly more friendly to the cornea than a small chip of nucleus, retained but hidden cortex can contribute to sustained IOP elevation.

ARTHUR WEINSTEIN, MD
One instrument that can be invaluable in removing subincisional cortical material is the bent Simcoe cannula (Storz E4969; Bausch & Lomb, Rochester, NY). This curved, 23-gauge cannula is placed on a 3-mL syringe...
filled with BSS. Inserting the cannula through the paracentesis enables me to reach the cortical material easily. I inject a small amount of BSS as I insert the cannula in order both to maintain the anterior chamber and to inflate the capsular bag at the equator. The reverse cannula is then placed in the cortical material and rotated superiorly in order to engage the anterior cortical leaf. Gentle aspiration of the syringe pulls the cortex centrally where it may be removed according to the surgeon’s usual technique. I prefer a manual Simcoe I/A tip, although the automated systems work equally well.

Although adequate cortical cleaving hydrodissection facilitates cortical removal, it can still be a challenge to remove the subincisional cortex. If the posterior leaf is inadvertently pulled during cortical removal, the stripping of the cortex will be incomplete; fine cortical fibers will remain attached to the posterior capsule and will require either vacuuming or capsular polishing. To reap the maximum benefit of the reverse-cannula technique, it is important to engage the anterior leaf of cortex (Figure 1). Irrigating as the cannula is being introduced will maintain a deep anterior chamber and allow access to the anterior cortical leaf. Once mastered, this technique provides a time-saving, effective, and safe method of removing subincisional cortex.

**MARK PACKER, MD**

The best way to defeat subincisional cortex is to delete the unique subincisional region. For the last 18 months, I have been performing bimanual microincisional cataract extraction in 100% of my cases. One of the greatest advantages I have found with this technique lies in the flexibility of having two symmetric incisions available. By switching hands, I avoid those troublesome intraocular gymnastics.
that can lead to aspiration or rupture of the posterior capsule. In the event of a breach of the posterior capsule, the separation of infusion from aspiration enables me to remove residual lens material without causing vitreous prolapse. By maintaining infusion high up in the chamber, I can keep constant hydraulic pressure against the vitreous face and simultaneously use the aspiration tip to remove lens material below the anterior capsule.

Performing cortical cleaving hydrodissection and managing the epinucleus with trimming and flipping (as described by I. Howard Fine, M.D.1) often eliminates the need for I/A removal of cortex as a separate step. If cortex remains in the subincisional area, however, it is easily removed with the bimanual technique. The flow of irrigation from an open-ended irrigator actually aids cortical aspiration by blowing the material in the direction of the aspiration port (Figure 2). Another benefit of separating irrigation from aspiration is it allows me to use the stream of fluid to expand the capsular bag, thus placing the posterior capsule on stretch while tenacious subcapsular plaques are scrubbed clean (Figure 3).

In order to maintain chamber stability throughout the case, I do not remove the irrigating chopper after phacoemulsification. Instead, I rotate the chopping element horizontally and continuously maintain the flow of irrigation until all of the cortex is removed. I then simultaneously remove the aspiration tip and inject viscoelastic as I pull the irrigation tip out of the eye. In this way, the chamber is never lost, and collapse is avoided—an important safety feature whenever vitreoretinal complications are a consideration (e.g., in eyes with longer axial lengths).

Figure 2. The irrigation probe (left) creates a current that assists in the bimanual aspiration of subincisional cortex.

Figure 3. Retroillumination shows the bimanual removal of cortex.

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