A Simple, Safe Bimanual Technique for Subincisional Cortex Aspiration

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Abstract. We developed a bimanual manipulation technique to facilitate the removal of the subincisional lens cortex in small-incision phacoemulsification cataract surgery. A separate aspiration handpiece, not connected to an aspiration tube, is passed into the anterior chamber through a side-port corneal incision. Under irrigation with a standard infusion/aspiration (I/A) handpiece through a tunnel incision, the cortex is stripped off with the separate handpiece and removed with the I/A handpiece. In 227 eyes, subincisional cortex removal and subsequent capsule polishing was performed safely with the separate handpiece. Rupture of the posterior lens capsule occurred in 3 high-risk eyes. [Ophthalmic Surg Lasers 2002;33:337-339]

INTRODUCTION

Phacoemulsification and aspiration (PEA) through a small tunnel incision is a popular technique in cataract surgery, but when the continuous curvilinear ear capsulorhexis (CCC) is small, it can be difficult to remove the subincisional lens cortex. Many modified standard infusion/aspiration (I/A) tips have been made and bimanual techniques with different handpieces have been developed.1-10 With use of a single-handed I/A handpiece, any attempt to reach the subincisional cortex is usually associated with a partial withdrawal of the tip. This withdrawal tends to cause occlusion of the irrigation sleeve9 and produce inconsistency in the anterior chamber depth. With bimanual handpieces, instrument exchange is unavoidable. When a separate irrigation cannula is thin enough to pass through a corneal side-port incision, eg, 23 G in diameter, excessively strong aspiration (a tendency of inexperienced surgeons) and insufficient inflow rate through the thin cannula can cause fluctuation and eventually rupture of the posterior capsule.11 Thus, attention to setting inflow and outflow parameters of an I/A system is vital with use of bimanual handpieces.12

Safe subincisional cortex removal entails: 1) avoidance of instrument exchange; 2) easy access to the subincisional cortex; 3) gentle aspiration; and 4) adequately strong irrigation flow. In our previous report, we modified Isakov's7 and Colvard's9 methods to develop a simple, safe bimanual technique.13 In this report, we confirm the technique's usefulness and safety in a larger population and its advantage as the first step in bimanual manipulation.

PATIENTS AND METHODS

After CCC of the anterior capsule, PEA of the lens nucleus and lens cortex aspiration with a straight tip of a standard I/A handpiece (AMO Blackmax or AMO Diplomax, Allergan Medical Optics, Irvine, CA) are performed through a small, scleral, tunnel incision of 3 mm width. The subincisional cortex is then aspirated. While the straight tip of an I/A handpiece is kept inside the anterior chamber with a continuous irrigation, a separate aspiration cannula (23 G) from bimanual handpieces (AE7-0117, ASICO, Westmont, IL) is passed into the anterior chamber...
eyes as grade 5. Two experienced surgeons (TS, NY) performed the new technique on 185 eyes, and two relatively inexperienced surgeons (SA, Kl), who each had performed cataract surgery on fewer than 10 eyes, treated 45 eyes.

RESULTS

In 227 eyes, the subincisional cortex was removed safely and without difficulty while maintaining the depth of the anterior chamber and expansion of the capsular bag. Posterior capsule polishing was done safely as well. Rupture of the posterior capsule occurred in 3 patients during polishing despite the surgeon's experience. The 3 patients included a 59-year-old man with a severely myopic eye (Emery's grade 4), an 84-year-old woman with pseudoexfoliation syndrome (Emery's grade 3.5), and an 82-year-old woman with pseudoexfoliation syndrome (Emery's grade 2.5).

DISCUSSION

When the separate aspiration cannula is passed into the anterior chamber without being connected to an aspiration tube, the difference between intraocular and atmospheric pressure produces a gentle fluid outflow through the cannula port. Since irrigation is continued through the standard I/A handpiece, the intraocular pressure is determined by the height of the irrigation reservoir. When the port of the aspiration cannula is advanced to the subincisional cortex, the port is occluded by the cortex. The aspiration is strong enough to strip off the cortex from the capsular fornix and the stripped cortex is then carried to the aspiration port of the standard I/A handpiece and removed easily. The dull tip of the separate aspiration cannula and the expanded posterior capsule bag enabled us to polish the posterior capsule safely. Rupture of the posterior capsule occurred in 3 patients. However, in each of these 3 patients, a weak capsule was a risk factor for rupture: 1 patient had severe myopia and 2 had pseudoexfoliation syndrome. Thus, the cause of the rupture is considered the fragility of the capsule itself rather than a maneuver involving the aspiration cannula.

The greatest advantage of our technique is its safety. Although the technique involves bimanual manipulation, the standard I/A handpiece is fixed in place at the tunnel incision and the surgeon can concentrate on the tip of the separate handpiece. Additionally, because irrigation is continued with the standard I/A
handpiece, the copious inflow fluid maintains consistency of the anterior chamber depth and expansion of the capsular bag. The gentle aspiration of the separate handpiece is another advantage. These factors made incidental capture of the posterior capsule and subsequent capsule rupture less likely. Thus, our technique is good for educational purposes for a surgeon learning bimanual manipulations in PEA cataract surgery and for relatively inexperienced surgeons.

REFERENCES