Improving Anterior Chamber Stability

Using a second bottle of balanced saline solution and continuous irrigation during MICS can keep the anterior chamber from collapsing.

BY GUY SALLE, MD, FEBOPHT

With the goal of safer refractive cataract surgery and refractive lens exchange, surgeons must continuously strive to reduce the risk of intra- and postoperative complications. The array of possible complications ranges from anterior chamber instability and intraoperative floppy iris syndrome to dropped nuclei and posterior vitreous detachment (PVD), to name a few. This last, PVD, can lead to floaters, a visually disturbing side effect that the demanding patients of today do not readily accept. PVD can occur due to loss of hyaluronic acid and destabilization of the vitreous body—events that weaken the adhesions between the vitreous cortex and the retinal internal limiting membrane and can cause the posterior vitreous to detach from the retina.¹ PVD can induce peripheral retinal breaks and eventually lead to retinal detachment.

Figure 1. View of the phaco table, the phaco handpiece, and the bimanual I/A probe with two irrigating ports and one aspiration port.

Figure 2. Phaco set-up to improve anterior chamber stability includes two bottles of balanced saline solution and two irrigation lines.
In a study of 188 eyes, Mirshahi et al² found that 20% of eyes developed PVD 1 week after state-of-the-art phacoemulsification and IOL implantation, 31% had developed the condition 1 month after, and another 7% 1 year after surgery. Additionally, the incidence of retinal detachment increases from 1 in 10,000 per year in the normal population to 1 in 1,000 per year after cataract surgery.³⁴ Retinal detachment is often correlated with PVD.

AVOID ANTERIOR CHAMBER COLLAPSE

Given the high incidence of PVD 1 month after cataract surgery, surgical trauma must be considered a risk factor for PVD. Anterior chamber collapse is a risk factor for destabilization of the vitreoretinal interface. Strategies to improve the stability of the anterior chamber and thus reduce forces on the posterior vitreous include use of newer phaco machines with less surge and better fluidics, microincision cataract surgery (MICS), and dispersive ophthalmic viscosurgical devices (OVDs).

Below we describe our MICS technique, designed to improve anterior chamber stability throughout surgery. A video of our typical MICS procedure may be viewed at http://eyetube.net/?v=porov.

Our technique is based on the observation that anterior chamber depth is not always maintained during certain steps of the phaco procedure. To avoid anterior chamber collapse, we use a second bottle of balanced saline solution, connected with a continuous irrigating probe (Figures 1 and 2), to bypass these moments of anterior chamber instability.

The phaco procedure starts with creation of a 1.2-mm sideport incision. The anterior chamber is then filled with a dispersive OVD to facilitate a stable anterior chamber during the first part of the phaco procedure, which includes creating the main incision (2.2 mm) and the capsulorrhexis as well as performing hydrodissection. Afterward, microcoaxial phacoemulsification is used to remove the nucleus. Once emulsification is complete, the nucleus rotator or chopper is removed from the anterior chamber, and the phaco tip remains in the eye under continuous irrigation.

Before withdrawing the phaco tip, the second bottle of balanced saline solution is opened, and continuous irrigation is introduced through the sideport (Figure 3). This cycle of continuous irrigation maintains a stable anterior chamber after phaco tip removal. Bimanual cortical removal is then performed. When changing hands, we...
keep the eye inflated under continuous irrigation with one of the bottles of balanced saline solution and its continuous irrigating probe.

INSERTING THE LENS

Before IOL insertion, we fill the eye with a cohesive OVD under continuous irrigation and reduce the flow inside the anterior chamber by lowering the bottle height from between 80 and 100 cm to 30 cm (Figure 4). The lower bottle height reduces the flow through the irrigating port while the OVD steadily fills the capsular bag and anterior chamber.

After IOL insertion, the OVD is aspirated bimanually with the irrigating probe through the sideport incision. The probe remains in the sideport during hydration of the main incision to keep the anterior chamber stable (Figure 5).

CONCLUSION

Using a second bottle of balanced saline solution and continuous irrigation throughout the phaco procedure avoids momentary collapse of the anterior chamber when instruments are withdrawn from the eye. Improving anterior chamber stability may prevent destabilization of the vitreous body and may decrease the risk of PVD. This can be of special importance in high-risk eyes, such as young patients and those with high myopia, peripheral retinal degeneration, or a history of retinal detachment.

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