

Blind Chopping: Managing Small Pupils Without Pupil- Expanding Devices

Adapting your phaco technique may eliminate the need for certain tools.

BY JÉRÔME C. VRYGHEM, MD

For the surgeon, visual control during cataract surgery is essential to obtain safe results without complications. When confronted with a small pupil, some less-experienced surgeons may lose confidence, as certain manipulations in the eye must be performed underneath the iris, without direct visual control. Two solutions, pupil-stretching techniques and implantation of pupil-expanding devices, can be used to ease surgical maneuvers in small pupils; however, each has potential disadvantages.

Pupil-stretching techniques and viscomanipulation enable the surgeon to obtain a degree of mydriasis in small pupils, but these techniques often result in slightly dilated and irregular pupils postoperatively due to iris sphincter damage. Lax pupils can induce halos and glare, especially in eyes in which multifocal IOLs are implanted. Pupil-expanding devices enable more stable perioperative mydriasis, but they require multiple microincisions and more manipulation in the anterior chamber. Additionally, they are not always easy to insert, especially when the surgeon wants to maintain the use of a small main incision.

TAKE-HOME MESSAGE

- After a learning curve, blind chopping using the Vryghem irrigating chopper can relieve the surgeon of the challenges associated with small pupils and reduce surgical time.
- Blind chopping carries little risk of zonulolysis or capsular rupture, as long as the Nagahara tip of the Vryghem irrigating chopper is introduced underneath the rhexis.

This article describes a chopping technique, dubbed *blind chopping*, that enables the surgeon to perform cataract surgery in eyes with small pupils without the use of pupil-expanding devices, thereby eliminating the challenges associated with their use.

MICROINCISION SURGERY

My technique for microincision cataract surgery (MICS), which has been previously described in these pages (See *Small-Incision Bimanual Phaco Chop*; April 2008 issue; pgs 57-58), has evolved from divide-and-conquer to stop-and-chop to phaco chop with a bimanual approach, and I now use the Signature phaco system (Abbott Medical Optics Inc.).

To ensure a good anterior chamber depth and a high flow rate, I use a titanium irrigating chopper that I developed. It has an ultrathin wall (50 μm), a larger lumen than other choppers, and a Nagahara tip. The Vryghem Chopper (A.R.C. Laser GmbH; Figure 1) provides irrigation at 80 mL/minute, without increasing the irrigation bottle height.

For MICS, a 0.8-mm straight MST phaco tip with a 30° bevel (MicroSurgical Technology) is inserted through a 1.0-mm sideport incision, located 135° from the 1.4-mm main incision, through which the irrigating chopper is placed. This positioning provides easy access to all parts of the anterior chamber and allows perfect control of the eye.

BLIND CHOPPING

Before chopping commences in the blind chopping technique, the phaco probe is used to remove some



Figure 1. The Vryghem chopper has an ultrathin wall, a larger lumen than other choppers, and a Nagahara tip.

cortex and superficial nuclear layers from the side of the nucleus, contralateral from where the chopper will be inserted. This provides some control of nuclear rotation.

The Nagahara tip of the Vryghem irrigating chopper is then used to chop the nucleus. First, the tip is rotated perpendicular to the surface of the nucleus and moved centrifugally under the margin of the capsulorhexis, toward the equator of the lens. There is no risk of zonulolysis as long as the surgeon is certain that the probe has been introduced underneath the rhexis. When the equator is reached, the tip is then turned downward in the direction of the optic nerve, and the equator of the lens is captured by the inner side of the tip of the chopper.

If the pupil is not well dilated, this maneuver is not always performed under direct visual control; hence the term *blind chopping* (Figures 2 through 4). The lack of visualization may seem intimidating in the beginning, and this is why this method of chopping should be first exercised in eyes with well-dilated pupils.

Chopping is achieved by moving the Nagahara tip of the irrigating chopper centripetally toward the tip of the phaco probe. In this phase, the surgeon should ensure that no cortical remnants have obstructed the lumen of the irrigating chopper. Should this happen, irrigation is interrupted and the anterior chamber can collapse. Therefore, any remnants should be emulsified using the phaco probe. The two nuclear halves that have been created by the first chop are then separated by pushing them apart using the two tips. The same maneuvers are repeated after rotation of the two nuclear halves, and these halves are chopped into quadrants.

INSTRUMENTATION

Appropriate instruments are needed when using smaller incisions for MICS. The MST Duet Capsulorhexis forceps (MicroSurgical Technology) provide perfect control of the rhexis, even through a small incision. During irrigation and aspiration of the cortical remnants and removal of the ophthalmic viscosurgical

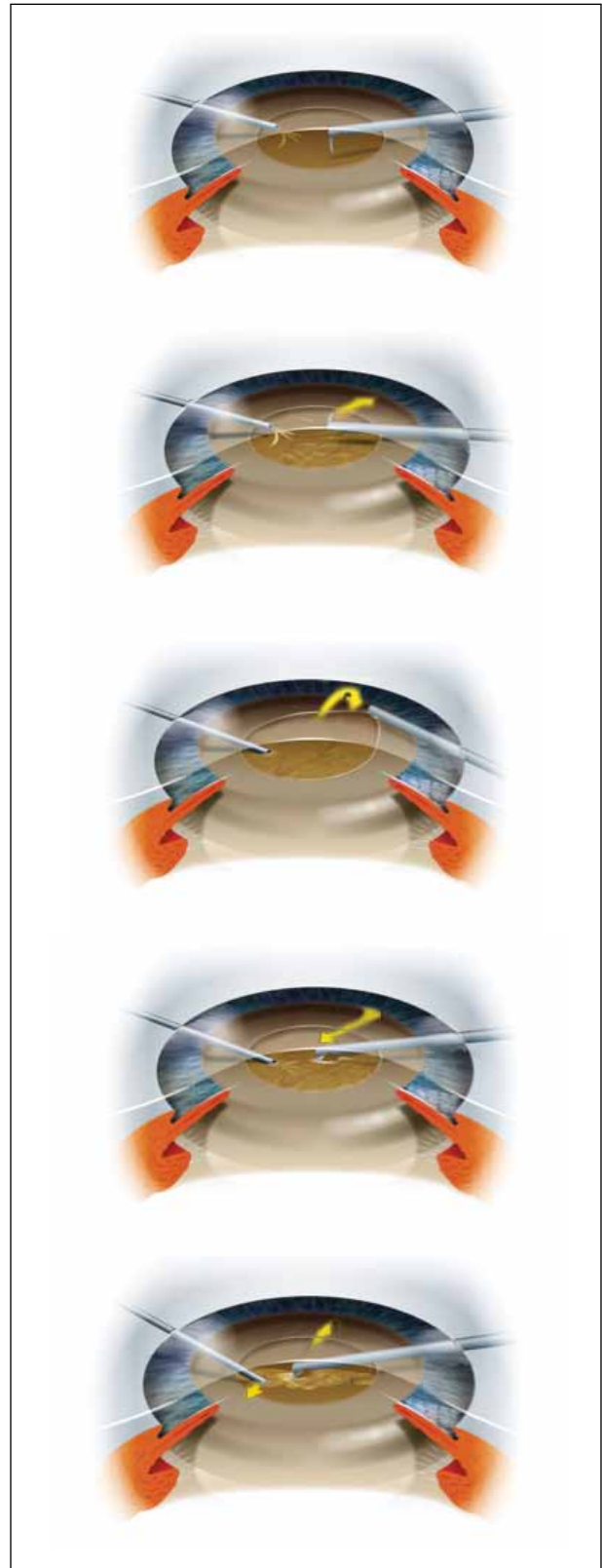


Figure 2. Blind chopping, step by step.



Figure 3. Blind chopping in a well-dilated pupil.



Figure 4. Blind chopping in a small pupil.



Figure 5. The Wehner spoon.

device, I use a Wehner spoon (Figure 5) surrounded by an accordion-like Wehner sleeve (both by A.R.C Laser GmbH) to avoid leakage through the main incision and maintain anterior chamber stability, especially after the main wound is enlarged to 1.9 mm for IOL implantation.

IOLs for MICS must have a suitable design for stability in the capsular bag and a normal-sized optic (at least 6.0 mm). To avoid damaging the IOL during MICS, I prefer injection using a Medical Viscoject 1.8-mm cartridge (Medical AG), which is docked into the incision without penetration of the tip into the anterior chamber.

In these cases, I use hydrophilic acrylic IOLs, such as the monofocal Micro AY or the trifocal FineVision (both by PhysIOL). Both of these lenses yield excellent visual results and are stable over time. I believe that the differences in induced astigmatism between a broader, 2.2-mm incision and a MICS incision are insignificant. Since first performing my small-incision bimanual phacoemulsification technique, I have been able to fine-tune my phaco parameters so that I feel more in control of these parameters now than when I used a broader incision, and I now perform MICS in all cases.

CONCLUSION

After a learning curve, blind chopping using the Vryghem irrigating chopper gives the surgeon the

advantage of no longer being bothered by small pupils. The ability to manage these cases without special instruments and other preparations will save a lot of time. This is illustrated in two accompanying videos. The first (eyetube.net/?v=nofil) illustrates blind chopping in a well-dilated eye; in the second (eyetube.net/?v=lemen), the same maneuver is repeated in an eye with a small pupil. With this technique, viscodilation with Healon 5 (Abbott Medical Optics Inc.) can be of some help, but no hooks or other devices are needed. With experience and with the appropriate forceps, the surgeon can make a rhexis broader than the pupil without direct visual control of the leading edge of the rhexis. The leading Nagahara tip of the chopper enables the nucleus to be chopped in a safe way without direct visual control.

I have been using this method of chopping for 8 years. In my experience, blind chopping has caused almost no cases of zonulolysis or capsular rupture, as long as the Nagahara tip of the Vryghem irrigating chopper is introduced underneath the rhexis. Of course, good anterior chamber stability is mandatory, and this can be obtained by a perfect match between instruments and incision diameters and by fine-tuning of phaco settings. ■

Jérôme C. Vryghem, MD, practices at Brussels Eye Doctors, in Brussels, Belgium. Dr. Vryghem states that he has no financial interest in the products or companies mentioned. He is a member of the CRST Europe Editorial Board. Dr. Vryghem may be reached at +32 2 741 6999; e-mail: info@vryghem.be.

