

Combined Phaco-vitrectomy

Advantages include the elimination of a second procedure and improved access to the retinal periphery.

BY CLAUS ECKARDT, MD

In this issue of Retina Today, Claus Eckardt, MD, discusses his surgical approach to phacovitrectomy and the advantages and disadvantages of this combined procedure.

We extend an invitation to readers to submit pearls for publication in Retina Today. Please send submissions for consideration to Dean Elliott, MD (dean_elliott@meei.harvard.edu); or Ingrid U. Scott, MD, MPH (iscott@hmc.psu.edu). We look forward to hearing from you.



— Dean Elliott, MD; and Ingrid U. Scott, MD, MPH

It is well known that pars plana vitrectomy commonly results in cataract development, especially in eyes in which an internal tamponade is performed.¹⁻³ In many patients, cataract and vitreoretinal pathology are addressed in 2 separate procedures. However, there are several advantages offered by the combination of phacoemulsification and vitrectomy into 1 procedure, known as phaco-vitrectomy. The primary advantages of this combined approach include the elimination of a second procedure, improved access to the retinal periphery during phacoemulsification, and, in my opinion, better vitrectomy results.

Of course, there are also disadvantages associated with phaco-vitrectomy, including a less predictable refractive outcome, which is relevant in eyes with macula-off retinal detachments. In addition, phacoemulsification may be more difficult when the red reflex is missing, as in eyes with vitreous hemorrhage, for example. There is also a larger amount of debris on the intraocular lens (IOL), especially when the patient is required to maintain specific positioning (such as after macular hole surgery), which may cause decentration of the IOL. This, in turn, may yield an increased rate of posterior capsular opacification (PCO) development.

In an ideal situation, the anterior capsule is in front of the optic; however, very often in vitrectomy patients, we see a situation in which the anterior capsule is behind the optic, causing early PCO. In most cases, this occurs due

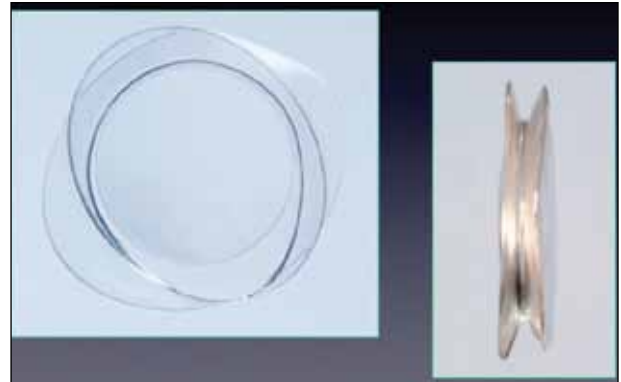


Figure 1. Front and side views of the Tassignon lens.

to pressure from gas or air tamponade. At the end of surgery, the eye is filled with gas; once the patient gets up 2 to 3 hours after the procedure, the gas bubble creates its own force, which can cause the anterior capsule to move behind the optic.

PHACO-VITRECTOMY WITH THE TASSIGNON LENS

An IOL designed by Marie-José Tassignon, MD, PhD, FEBO, an anterior segment surgeon at Antwerp University Hospital in Edegem, Belgium, has proven effective in reducing the aforementioned complications. The bag-in-the-lens (BIL) IOL, also known as the Tassignon lens (Morcher GmbH), is made of hydrophilic acrylic and has a

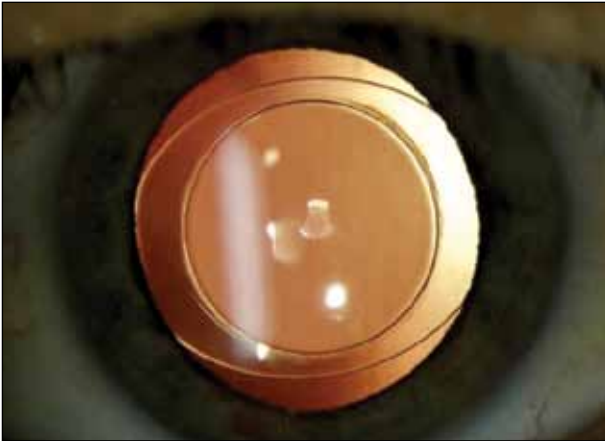


Figure 2. A well-centered Tassignon lens 2 years after combined phaco-vitrectomy with gas tamponade for macular hole.

5-mm optic that is surrounded by a groove running 360° around the rim of the lens and elliptical haptics (Figure 1). The Tassignon lens requires both an anterior and a posterior capsulorhexis, the edges of which are captured in the 360° groove. The anterior and posterior capsulorhexes must each have a diameter of between 4.5 and 5 mm.

In the first step in my phaco-vitrectomy approach, a 23-gauge valved trocar (Dutch Ophthalmic Research Center) is inserted through the pars plana. This trocar will later be used for infusion to stabilize the intraocular pressure after phacoemulsification and to guarantee safe insertion of the other trocars for the vitrectomy instruments. Next, the anterior chamber is filled with high-viscosity sodium hyaluronate (Healon GV, Abbott Medical Optics), and a ring caliper is inserted through a 2.8-mm clear corneal incision into the anterior chamber and placed on the crystalline lens. This caliper serves as a guide for a 5-mm capsulorhexis.

The next step is standard phacoemulsification and removal of cortical material. The anterior chamber is then refilled with Healon GV; however, care must be taken not to inject the viscoelastic into the capsular bag but, rather, on top of the remaining peripheral anterior capsule only, so that the peripheral anterior capsule is pressed downward against the posterior capsule. Next, using a bent needle, a small tear is made in the center of the posterior capsule. A low-viscosity viscoelastic (Healon) is injected through this opening into the Berger space to detach the anterior hyaloid. Finally, the flap of the posterior capsule is grasped with forceps to perform a posterior capsulorhexis identical in size to the anterior capsulorhexis. The Tassignon lens is injected using a Naviject injector (Medicel AG) and is maneuvered into position,

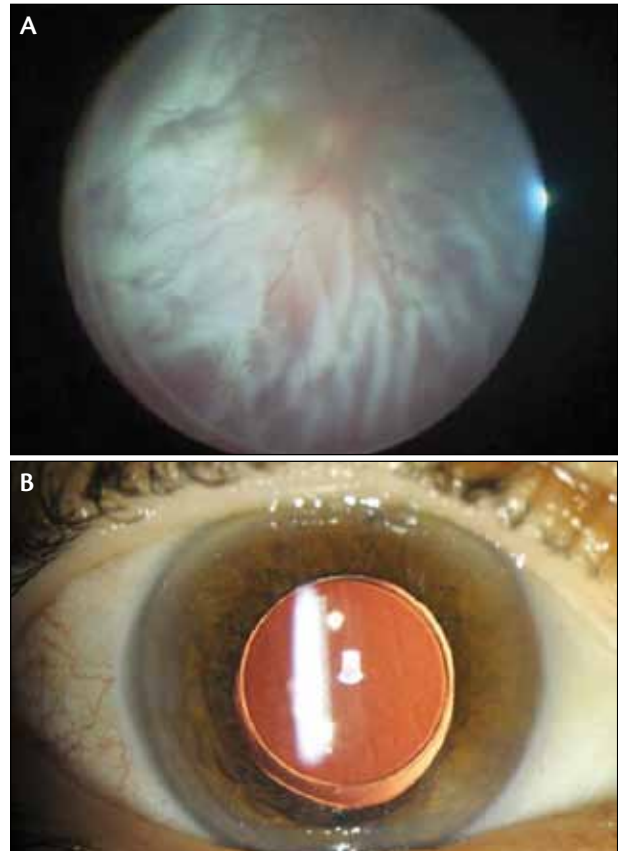


Figure 3. The Tassignon lens implanted via combined phaco-vitrectomy including silicone oil injection for proliferative vitreoretinopathy (PVR). The intraoperative view shows total retinal detachment with PVR (A). Slit-lamp examination 7 months after silicone oil removal reveals no posterior iris synechiae and perfect IOL centration (B).

inserting both capsulorhexes into the groove of the lens running 360° around the edge of the optic. During subsequent pars plana vitrectomy, the corneal wound is closed temporarily with 10-0 nylon suture.

RESULTS AND COMPLICATIONS

The Tassignon lens proved to be the IOL I had been looking for because it centered so nicely, regardless of the type of tamponade used. I have been performing phaco-vitrectomy using this lens now for 3.5 years and have completed more than 900 cases to date. Postoperatively, all of these cases look the same, and, in fact, some look better than my standard cataract cases without vitrectomy. Among these cases, I have treated patients with proliferative vitreoretinopathy, multiple vitreoretinal surgeries, and even uveitis or endophthalmitis.

One advantage of this technique is excellent centration of the Tassignon lens (Figure 2). The capsular bag

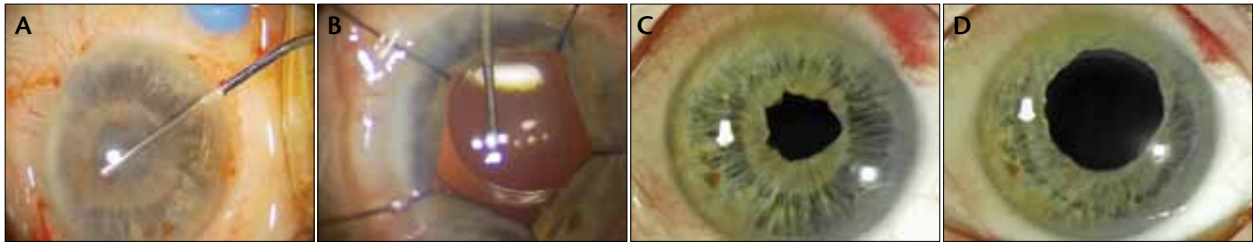


Figure 4. The Tassignon lens in phaco-vitrectomy for intermediate uveitis. Preoperatively, extensive posterior synechiae were present (A). IOL implanted after mechanical pupillary dilatation with 5 iris hooks (B). Four months postoperatively, the undilated (C) and dilated (D) pupil was almost round again, and no posterior synechiae were present.

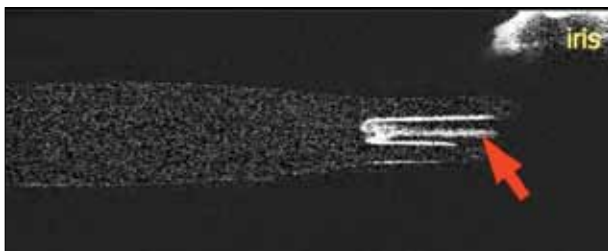


Figure 5. Optical coherence tomography 3 months after combined phaco-vitrectomy. The 2 lens capsules (arrow) are located in the groove of the IOL.

closes immediately after surgery, meaning the 2 capsules seal in the area of lens epithelial cells.^{4,5} Therefore, the result is associated with much less glare in the anterior chamber during the postoperative period. However, the greatest advantage of phaco-vitrectomy with the Tassignon lens is that the iris has no chance to develop posterior synechiae, even in patients with diabetes, uveitis, or proliferative vitreoretinopathy (Figures 3–5).

Both intraoperative and postoperative problems are a possibility with this approach. Intraoperative problems may occur during phacoemulsification when there is pressure from behind. Therefore, it may be more beneficial to use local or topical anesthesia rather than peribulbar injections. Problems may also occur in eyes with missing red reflexes due to vitreous hemorrhage and in vitrectomized eyes due to the lack of counterpressure. Implantation may also be difficult in patients with small pupils and may require the use of iris hooks more often than in standard cataract surgery with a conventional lens.

In patients with vitreous hemorrhage, the red reflex may be blocked, hindering visualization during phacoemulsification. Therefore, I perform this technique not with the light of a microscope, but with the help of endoillumination placed in the anterior chamber. This enables the surgeon to achieve an excellent view of the posterior capsule. One disadvantage of using a separate light source is that it requires the surgeon to hold the phaco probe in 1 hand and the light in the other hand. When you believe the

nucleus has been removed, put in the light and change the illumination technique to see how much cortical material is still in the eye, and then you can remove it.

CONCLUSION

Combined phaco-vitrectomy is an effective and safe technique. It is used routinely in all of our presbyopic patients. Whereas with intracapsular IOL implantation, complex pathologies can increase postoperative inflammation and result in posterior synechiae, the BIL lens guarantees excellent centration and never results in synechiae. Given these advantages, I would encourage readers to master the learning curve associated with phaco-vitrectomy and BIL implantation. ■

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