Air-assisted donor preparation for DMEK

Venzano et al.\(^1\) have described a technique of Descemet membrane air-bubble separation. We also use an air-assisted (reverse big bubble)\(^2\) technique to prepare Descemet membrane for Descemet membrane endothelial keratoplasty. In our method, a corneoscleral button is placed endothelial side up on a Barron donor punch and fixed by grasping the outer scleral edge with a 0.12 forceps. A 27-gauge bevel-up needle attached to a 2 mL syringe filled with air is inserted into the posterior stroma with the entry point located just outside Schwalbe line. The needle is advanced to the central cornea. Air is gently injected to make a big bubble, detaching Descemet membrane from the posterior stroma. Injecting into the endothelial side-up corneoscleral button allows us better visualization and makes the procedure more feasible, less instrument dependent, and less traumatic.

Venzano et al.\(^1\) reported a high success rate of Descemet membrane detachment with their method. This high rate of success might be related to the older age (mean = 78 years) of donors. In our experience, we found that air-assisted Descemet membrane dissection is more difficult in young patients (younger than 40 years) and attempts to make a complete detachment may lead to Descemet membrane rupture. In our first 10 cases, with a mean age of 32 years, an incomplete detachment (smaller than 8.0 mm diameter) occurred in 2 cases and Descemet membrane rupture occurred in 1 case. We now prefer older donors with higher endothelial cell counts for this technique.

Siamak Zarei-Ghanavati, MD
Mehran Zarei-Ghanavati, MD
Mashhad, Iran

Arturo Ramirez-Miranda, MD
Mexico DF, Mexico

REFERENCES

REPLY: Statistical analysis correlating the age of the donors and the success rate of Descemet membrane air-bubble separation was not feasible in our study because of the limited size of the sample and possibly because other variables, such as the storage time, may affect the status of the tissue and its susceptibility to an easy separation. We adopted the Anwar big-bubble technique, a method widely tested in clinical use, which allows an increasingly high percentage of success, thanks also to a range of custom-made instruments.

With the Descemet membrane air-bubble separation technique, it is an advantage to have the endothelium stained with trypan blue. This enables the surgeon to keep the needle immediately above the Descemet membrane and to obtain an easy separation in a high percentage of cases.

In our study, we had 2 failures in 1 of 2 corneas from 2 older donors; in all the other donors, the bubble was achieved, suggesting that the success rate depends more on the correct application of the technique than on the tissue characteristics. Obviously, for this technique there is a learning curve.

During DALK, in case of failure of the Anwar big-bubble technique, manual separation can be successfully carried out, but if the bubble is obtained, the surgery will be more easily and quickly completed, probably with less surgical insult to the endothelium.

In case of failure of Descemet membrane air-bubble separation, it is possible to proceed with a SCUBA (submerged cornea using backgrounds away) technique or with the method described by Zarei-Ghanavati et al.\(^1\) This can be considered an additional advantage of the air-bubble separation technique. We agree in underlining the effectiveness of Descemet membrane endothelial keratoplasty (DMEK), as reported by several authors,\(^2,3\) and its superiority over other types of corneal lamellar graft techniques in speed and completeness of functional recovery. We are delighted that the research on how to obtain the Descemet roll is lively. The common goal is to reduce the failure rate to almost zero, avoiding the waste of precious tissue and allowing application of DMEK as a first choice for the treatment of endothelial disorders.

—Davide Venzano, MD, Carlo E. Traverso, MD

REFERENCES

Refractive surprise after piggyback intraocular lens implantation

The cataract surgical problem edited by Masket\(^1\) concerns residual ametropia and negative
dysphotopsia after cataract surgery. Explanations by the responding authors of the subsequent unexpected refractive change after sulcus intraocular lens (IOL) implantation are unconvincing.

The initial ametropia was +1.00 diopter (D). Postoperatively, after insertion of a +1.50 D sulcus IOL, the patient refRACTed to −1.25 D. Explanations for this unexpected and exaggerated refractive change include the sulcus lens sitting more forward than expected or the original IOL being moved posteriorly by the sulcus IOL. Both mechanisms cannot contribute, as one suggests that a positive lens moving anteriorly in the eye will induce additional unintended myopia (correct) and the other suggests that moving the original (also positive) lens posteriorly in the eye will also add myopia.

A 1.0 mm anterior movement of a +1.5 D lens should not provide a 1.25 D change in effectivity. For example, when consulting Hill’s table of correction for sulcus versus bag placement of IOLs, no change in power is recommended for powers less than 9.00 D—the change in lens effectivity for a given forward movement is a proportion of the IOL power. With a +1.5 D lens, a 1.0 mm forward shift should cause less than 0.12 D of unintended myopia, not the 1.25 D observed.

The suggestion that posterior movement of the primary IOL could cause additional effectivity of that lens is incorrect. For example, the myopic surprise caused by an ophthalmic viscosurgical device retained between the posterior capsule and the IOL is caused by an anterior displacement of the IOL, not a posterior movement.

Fortunately, the photopsia in this patient’s eye has resolved and several suggestions for resolving the ametropia have merit. The cause of the ametropia remains unexplained, although an optical bench check of the sulcus IOL, if ever explanted, could provide the answer.

Paul J. McCartney, FRANZCO
North Hobart, Australia

REFERENCE

OTHER CITED MATERIAL

REPLY: McCartney’s astute comments regarding this Consultation Section are most welcome. We appreciate his careful analysis of the case and related commentary and agree with his assessment that the 1.25 D myopic error following piggyback IOL implantation is unlikely to be induced by anterior shifting of the low-powered (+1.5 diopters [D]) secondary IOL. Likewise, as he suggests, a posterior shift of the IOL complex is counterintuitive.

The central unsolved mystery in this case is the space between the 2 IOLs that persisted unchanged for 3 months before an additional procedure was considered. We believe the answer rests with the physical design of the low-powered Clariflex IOL (Abbott Medical Optics, Inc.). This particular IOL series (−10.0 D to +1.50 D) is manufactured as a meniscus lens with a concave posterior surface and an edge design (OptiEdge) that is thicker than the optic. The net result is that the edge and posterior optic surface create an offset, separating the 2 IOLs and generating the space noted in the ultrasound biomicroscopy (Figure 2) in the Consultation Section.

In our view, the space between the 2 IOLs results in formation of a Keplarian telescope, with resultant increased optical power and induced myopia. This concept was not suggested by any of the respondents.

Regarding management, custom myopic laser in situ keratomileusis was performed without incident and the patient has fully achieved the optical goals of surgery, albeit with 3 procedures.—Samuel Masket, MD, Basak Bostanci Ceran, MD

Keratoconus correction using intrastromal corneal ring segments and posterior chamber phakic intraocular lens implantation

The results and conclusions of the study by Alfonso et al.1 of combined intrastromal corneal ring segments (ICRS) (Keraring, Mediphacos Ltd.) and posterior chamber phakic intraocular lens (pIOL) (Visian Implantable Collamer lens [ICL], Staar Surgical) implantation in patients with keratoconus coincide with those presented by Navas et al., who conducted a similar evaluation of 7 eyes of 6 patients with keratoconus who had sequential ICRS. In that study, 6 eyes received ICRS (Intacs, Addition Technology, Inc.) and 1 eye, corneal rings (Visiontech Medical Optics Ltd.) and the ICL; 4 eyes received the toric ICL and 3, the spherical ICL, as needed (Figure 1).

In the Navas et al. study, the mean uncorrected distance visual acuity (UDVA) improved from 0.05 ± 0.03 preoperatively to 0.57 ± 0.13 after both procedures ($P$ = .0001 for all). The mean manifest refraction spherical equivalent decreased from −11.03 ± 4.80 diopters (D) preoperatively to −0.46 ± 0.52 D after both procedures ($P$ = .0003) with at least 9 months of follow-up (mean 38.18 ± 18.7 months). Similar results were reported by Alfonso et al.1; the outcomes are consistent with our safety index for both procedures, 1.77 at 36 months of follow-up, and no patient in either study lost 2 or more lines of corrected distance visual acuity. The postoperative mean UDVA was slightly better.