

The Challenges of Performing Cataract Surgery on Hypotonous Eyes

Careful surgical planning is required for eyes with a low IOP.

BY JONATHAN MYERS, MD

The cataract surgeon is faced with several obstacles when treating patients with hypotony. This condition can affect the axial length and keratometry readings, and changes in IOP postoperatively may further complicate the situation.

IOL CHOICE AND CALCULATIONS

Calculations for IOLs are more complicated in patients with hypotony. Variable keratometry readings may make measuring for toric IOLs difficult. If a significant change in astigmatism has occurred after a trabeculectomy, careful consideration must be given as to whether the shift relates to the wound's construction and suturing or to the hypotony. In patients with hypotony, changes in astigmatism may be variable or may shift with rises in IOP after cataract surgery. Surgically induced astigmatism is unlikely to change with cataract surgery, but it may improve in some cases with a trial of late trabeculectomy with releasable sutures before cataract surgery.

In hypotonous eyes, contact A-scan biometry is less accurate than noncontact methods, and an immersion A-scan performed on a patient in the supine position may contain artifacts that could affect measurements of the anterior chamber's depth and axial length, making optical axial length measurements preferable.

Short- or long-term hypotony may be associated with a true reduction in axial length.¹ Comparisons of the axial length and refractive error of the hypotonous eye to that of the fellow eye, as well as information regarding the refraction before the development of hypotony and cataract, may provide insight concerning a hyperopic shift related to the hypotony. Cataract surgery may lead to increased IOP in the mid- to long term, and this may cause, especially in younger, myopic eyes, an increase in axial length, further complicating the surgeon's choice of IOL.^{2,3}

CHANGE IN AXIAL LENGTH

Five years ago, a middle-aged man came to me for cataract surgery. He was myopic with an IOP of 5 mm Hg 2 years after a trabeculectomy. The eye in question had a shorter axial length than his other eye by 0.5 mm, and both eyes had approximately 6.00 D of myopia. The fellow eye had no significant cataract, and I aimed for a little more than 4.00 D of myopia postoperatively. Uncomplicated surgery resulted in a final postoperative refraction of 6.00 D of myopia. The patient was happy with the outcome, but I was shaken and surprised. Repeat biometry showed that the axial length had increased by nearly 0.3 mm, and the cornea was a bit steeper, accounting for most of the myopic surprise. The patient's IOP increased from 5 to 11 mm Hg.

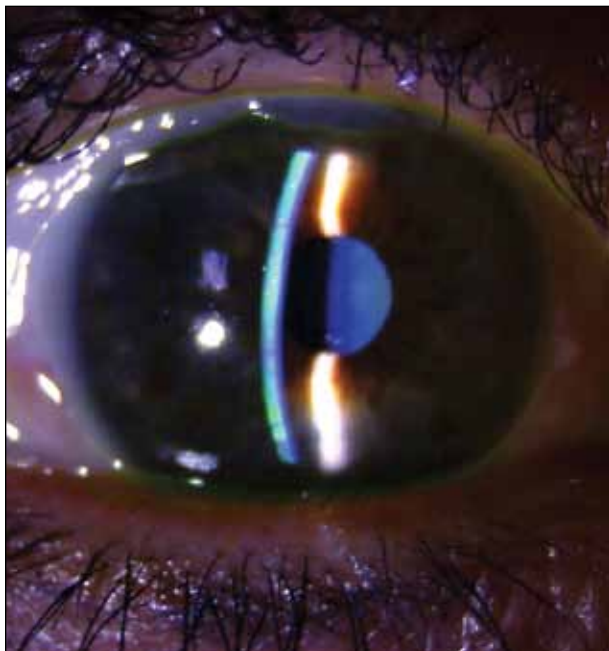


Figure. Exfoliation syndrome, cataract, and a large bleb with low pressure. There is an opportunity here for a great outcome as well as greater than usual risk.

A reduction in axial length after glaucoma surgery has been demonstrated in the literature,¹⁻⁵ as have later increases in axial length with subsequent phacoemulsification.^{2,3} Francis and coworkers showed a linear relationship between a reduction in IOP and a reduction in axial length after trabeculectomy or tube shunt surgery.¹ Huang et al reported that greater corneal hysteresis was associated with a greater change in axial length.⁴

The vast majority of patients will not have a large swing in IOP or a surprising refractive result. The risk of a surprise is greater in hypotonous eyes, which merits a preoperative discussion with patients.

SURGICAL CHALLENGES

Intraoperatively, soft eyes can be challenging; creating incisions may be awkward. In my experience, a steeper, firmer attack is more effective and will result in less distortion of the globe. Pressurizing the eye with viscoelastic is helpful; however, great caution is warranted in truly hypotonous eyes, as deepening the chamber too much with excessive viscoelastic will make surgery more difficult and may compromise the lens' stability. Given the possibility of a soft eye postoperatively coupled with the potentially imperfect construction of the clear corneal wound in a soft eye, it is reasonable for the surgeon to suture the wound to ensure it is tightly

closed in the early postoperative period.

In many cases, cataract surgery may provide just enough stimulation to slightly shrink the bleb and produce a slightly higher IOP. Some blebs will fail following cataract surgery with loss of control of IOP. This may be more likely if cortical material is left behind.

In some eyes, however, the pressurization of the eye during phacoemulsification may lead to an enlargement of a bleb that may be persistent. This process can create hypotony in filtered eyes that were not previously hypotonous, may worsen existing hypotony, or can rarely lead to chronic bleb dysesthesia from the larger bleb. If the bleb significantly enlarges during cataract surgery, a lower bottle height may be beneficial in reducing these sequelae, although this will be less effective in counteracting the difficulties of working on a soft eye (Figure). Surgical correction of the hypotony prior to cataract surgery removes many of these uncertainties. Changes in corneal and axial length are most profound with very low pressures, so achieving an IOP even in the low normal range may significantly improve outcomes. This entails two surgeries, however, and the cataract surgery may further change the final IOP. On the other hand, if surgical repair of the hypotony should lead to loss of IOP control, then the planned subsequent cataract surgery may be combined with intervention to lower the IOP again.

CONCLUSION

Forethought and careful planning can reduce stress and surprises during and after cataract surgery on hypotonous eyes. Detailed consideration of the possible outcomes, good and bad, for the individual patient may point to the best path forward. It is very helpful to discuss these uncertainties with the patient preoperatively, as this facilitates understanding of any less than ideal outcomes, and the patient may have preferences among the choices and their associated risks. ■

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