

Yamane Technique for IOL Fixation in the Absence of Capsular Support

Adopting this technique may result in greater efficiency and cost savings.

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Aphakia in the absence of capsular support presents significant challenges for proper IOL fixation. Several techniques have been proposed to manage this complex pathology, including implanting an anterior chamber IOL, an iris-fixed IOL, or transscleral suturing of a posterior chamber IOL. In the hands of a skilled surgeon, use of any of these techniques has a high probability of achieving the desired surgical objective. However, suture erosion and breakage has been noted to occur after transscleral procedures,¹ and due to the relatively large sclerotomy wounds, there may be a low risk of inducing hypotony with the Agarwal glued IOL technique.² Each of these techniques also requires the surgeon to perform numerous additional steps during surgery, which has the effect of extending case time significantly. On the other hand, anterior chamber IOLs have been associated with a risk of inducing glaucoma and increased corneal decomposition.³⁻⁶

More recently, Yamane et al introduced the idea of using flanged intrascleral IOL fixation, which avoids the need for suturing or glue.⁷ In my hands, this technique is more efficient, economical, and effective relative to other options for IOL implantation in an eye with aphakia without capsular support.

In brief, the Yamane technique involves externalizing the haptics of the IOL using a double needle technique, and then using cautery to form a mushroom-shaped or button-like tip at the end of each haptic. This objective is achieved as each haptic is threaded into the lumen of a pair of thin walled 30-gauge needle introduced via a pair of transscleral tunnels introduced 180° apart. The haptics are threaded using micro-forceps introduced via paracenteses cut adjacent to the plane of the scleral tunnels using a 15° blade. As the needles are externalized, the haptics are drawn through the transscleral tunnel, with the leading edge temporarily externalized. After cautery, gentle manipulation is used to depress the haptics back into the scleral tunnels and achieve centration of the lens. It has been my experience with the Yamane technique that instrument and IOL choice are important in achieving a successful outcome (see *Four Key Principles*).

Case

I recently used the Yamane technique for secondary placement of an IOL in an 18-year-old patient with ectopia lentis associated with Marfan syndrome. The patient had previously undergone pars plana vitrectomy and lensectomy in both eyes. I had placed a Yamane style scleral fixated IOL in

the fellow eye a few months prior with vision improving to 20/25. I decided to use a similar approach for the second eye.

Use of the flanged intrascleral fixation technique was successfully accomplished in this case with no complications. As seen in the accompanying video, some of the steps require delicate maneuvers, and so having to make intraoperative adjustments is to be expected (eyetu.be/byyob). For example, while I do not do this for every case, I have found it helpful to place a 6-0 silk suture on the trailing haptic to ensure the IOL stays secure as attention is directed to the leading haptic. A more expansive discussion of the technique is available in the video; as well, readers may refer to the original publication by Yamane et al.

Discussion

If the Yamane technique were not at my disposal for this case, either the transscleral suture technique or the Agarwal glue flap technique would have been reasonable considerations. I have modest experience in the past with these two techniques with good success. Based on previous experience, my case time would likely have been significantly longer if either of the aforementioned techniques were used. On the other hand, I wanted to avoid an anterior chamber IOL in this young patient out of concerns over the long-term risk for glaucoma and corneal decomposition. As well, posterior chamber IOL placement may help to maintain the binocularity of the eye.

Watch It Now



Yamane Technique

Kamran Riaz, MD

Kamran Riaz, MD, shares a case where he performed the Yamane Technique, the transconjunctival scleral fixation of an IOL without the need for glue or sutures. During the procedure, Dr. Riaz utilizes specific single-use instruments that may help surgeons trying out the technique for the first time.

eyetu.be/byyob

It should be noted that the Yamane technique, *per se*, does not have any impact on postoperative visual outcomes relative to other techniques. The choice of approach to achieving IOL fixation is more or less dictated by surgeon preference, although the presenting anatomy may be a consideration. When it is feasible, though, the Yamane technique might confer certain advantages. Because glue and sutures are not used, the cost per case will likely be lower; additionally, because extra steps

associated with gluing and suturing are not performed, time is saved in the OR. In fairness, there is not long-term follow-up of patients after performing the Yamane technique, but the early experience suggests it is highly effective and helps achieve IOL implantation and centration in the majority of cases. However, it is possible that over time we may learn of issues with this technique as well.

The Yamane technique may be a technically challenging procedure,

especially if the surgeon does not have prior experience performing intrascleral and transscleral techniques. Using this technique is not outside the ability of a skilled anterior segment surgeon, although adequate training should be done in a wet lab or in model eyes prior to live surgery. Surgeons may also wish to take any of a growing number of wet-lab technique courses teaching the Yamane procedure at the major ophthalmology conferences. A referral to an experienced surgeon is a consideration for those surgeons not comfortable with performing the steps required to complete the maneuvers.

The Yamane technique has now become my preferred approach for IOL fixation when there is not adequate capsular support for a traditional IOL. After learning the steps, I have found this technique to be efficient and effective in surgeries involving complex pathology. For those who wish to adopt this useful technique into practice, careful consideration should be given to proper instrument and IOL selection to increase the odds of a successful surgery.

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Four Key Principles

Learning and performing the Yamane technique may require some practice before adopting it in the OR. Some of the steps, such as threading the haptics into the needle lumen, may be foreign or novel for many surgeons. In particular, docking the trailing haptic can sometimes be challenging. It may also be difficult to gain experience with this technique, as aphakia without capsular support is relatively rare. When these cases do present, though, it is crucial to have the correct instrumentation on hand to achieve success with the Yamane technique.

IOL Choice. While considerations for IOL power calculation are important, the choice of IOL when using the Yamane technique is especially consequential. In particular, the material construction of the haptics may dictate whether cautery is successful. Generally, a PVDF haptic is amenable to cautery, and will consistently form the desired shape. In the United States, only one lens is available with PVDF haptics: the C2 Lucia 602 Lens (Zeiss). Using a standard three-piece IOL with acrylic haptics will make these cases extremely challenging and fraught with potential problems during intraocular manipulation, such as kinked haptic causing malposition or even haptic-optic break.

Ultrathin Walled Needle. Due to the outer diameter of the haptics, the inner lumen of the needle must be sufficiently large to adequately dock the haptics. A 25-gauge or 27-gauge needle may be a consideration, although these would require the use of a larger scleral tunnel wound. In my surgeries, I use a 30-gauge needle constructed with a thin wall (TSK Laboratory). This is the only needle I am aware of that has an inner lumen of sufficient diameter to enable externalizing the IOL haptics.

Intraocular Forceps. As noted, threading the haptics into the needle lumen is a delicate maneuver. This work is greatly facilitated by using the Vitreq Shah forceps (Beaver-Visitec International). These disposable 27-gauge microforceps are constructed with a small, needle-shaped tip, yet they provide sufficient grip of the haptics during delicate maneuvers.

Anterior Chamber Maintainer. Use of an anterior or posterior chamber infusion is essential for maintaining adequate working space inside the eye. I prefer not to use a posterior chamber infusion, as this would require trocar placement. In my hands, the Beaver Visitec 23-Gauge AC Maintainer does a good job of keeping the eye formed so that I can focus on performing the intraocular maneuvers necessary to complete the Yamane technique.

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