Bimanual Intraocular Lens Rescue With Transconjunctival Scleral Fixation

Scharioth and Pavlidis[1] popularized a sutureless technique for intrascleral fixation of an intraocular lens (IOL) in 2007 by placing haptics in scleral tunnels, thus avoiding the need for scleral suturing of haptics. Their technique is believed to provide a more stable posterior chamber placement without pseudophakodonesis of the IOL and avoids issues associated with polypropylene suture degradation and/or exposure. Maggi and Maggi[2] proposed a similar technique, but the use of a complex IOL design limited its applicability and popularity. Techniques for secondary IOL and IOL rescue using intrascleral haptic fixation have evolved. Agarwal et al[3] modified the technique of Scharioth and Pavlidis with the addition of fibrin glue, partial thickness scleral flaps, and the handshake technique.[4] In 2012, Prenner et al[5] published a modification of this technique that eliminated the scleral flaps and used larger sclerotomies for haptic externalization. More recently, Prasad[6] introduced a modification where the haptics were externalized and fixated to the sclera using a transconjunctival approach without conjunctival dissection.

These techniques have proven to be safe and reproducible[7–9] with different types of lenses and in different patient populations.[10] These techniques are an attractive alternative to anterior chamber lenses and both scleral and iris sutured lenses because they avoid the need for a large corneal and/or scleral incision. In addition, it avoids the use of prolene sutures that have been shown to be biodegradable and potentially only last for about a decade.[11,12]

We describe a bimanual technique for IOL rescue using a modified transconjunctival scleral fixation approach using skill sets and technology available to most vitreoretinal surgeons. This technique requires familiarity with bimanual intraocular maneuvers, transconjunctival sutureless trocar cannula system, chandelier lighting, and wide-angle viewing systems. The bimanual IOL rescue technique can be used with any of the previously described methods of IOL scleral fixation.

Surgical Technique

Our technique for IOL rescue is divided into three major parts and includes: trocar/cannula setup and positioning, IOL rescue, and haptic fixation. A total of four to five microincisional trocar/cannulas are used. Two of the cannulas are designated as "haptic retrieving cannulas," and although they can be used for other maneuvers, this is avoided to preserve the beveled architecture of the sclerotomies for snug haptic fixation.

Cannula Setup and Positioning

A Mendez corneal ring is used to mark the meridians of the haptic retrieving cannulas, placed 180° apart. These positions are marked with a 25-gauge needle by making a nick at the limbus. The haptic retrieving cannulas are placed 1.5 mm posterior to the limbus without displacing the conjunctiva. The sclerotomies are beveled in such a way that the direction of the haptics will ultimately rest in a "reverse S" configuration. Therefore, when performing the sclerotomies for the haptic retrieving cannulas, the superior trocar/cannula is directed to the surgeon's left and the inferior trocar/cannula is directed to the surgeon's right. A chandelier lighting system is placed 90° from the haptic retrieving cannulas, and the infusion is placed from 30° to 45° from one of the haptic retrieving cannulas (Figure 1). The nonretrieving haptic cannulas are placed 3.0 mm from the limbus.

From the *Department of Ophthalmology, University of Florida, Gainesville, Florida; †Department of Ophthalmology, New York Eye and Ear Infirmary, New York, New York; ‡Department of Ophthalmology, Westbank Hospital, Howrah, West Bengal, India; §Department of Ophthalmology, Sunetra Family Eye Care Centre, Kolkata, India; ¶Department of Ophthalmology, New York Medical College, Valhalla, New York; and **Department of Ophthalmology, Winthrop University Hospital, Mineola, New York.

Paper presented in part at the annual meeting of the American Society of Retina Specialists, Toronto, Canada, August 2013.

None of the authors have any financial/conflicting interests to disclose.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.retinajournal.com).

Reprint requests: Jonathan A. Feistmann, MD, 20 E 9th Street, New York, NY 10003; email: jfeistmannmdpc@gmail.com

Copyright © by Ophthalmic Communications Society, Inc. Unauthorized reproduction of this article is prohibited.

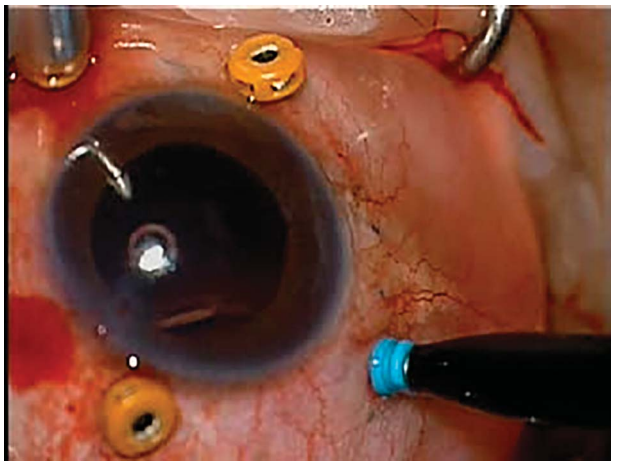

Fig. 1. Haptic receiving cannulas are placed at 12 and 6 o'clock with the infusion placed inferonasally and chandelier temporally.

Intraocular Lens Rescue

Before the IOL is rescued, it should be free of the capsular bag and resting on the retina in a reverse S configuration. If not, the capsular bag should be removed with the vitrector, and the IOL positioned appropriately. Using two end-grasping forceps through the designated haptic retrieving cannulas, the forceps within the dominant hand are used to grasp the tip of one of the haptics. The IOL is lifted off the retina and into the middle of the vitreous cavity (Figure 2). The forceps in the nondominant hand are then used to grasp the tip of the second haptic (Figure 3). An assistant removes the cannulas from the sclera by threading them over the forceps just before externalizing the haptics. Following the angle of the beveled sclerotomies, both forceps and haptics are simultaneously externalized (Figure 4).

Depending on the location of the haptic retrieving cannulas, the surgeon's position will vary for the step of IOL rescue from the head of the bed for a 3- and 9-o'clock haptic retrieving cannula position to a temporal approach for a 12- and 6-o'clock haptic retrieving cannula positions.

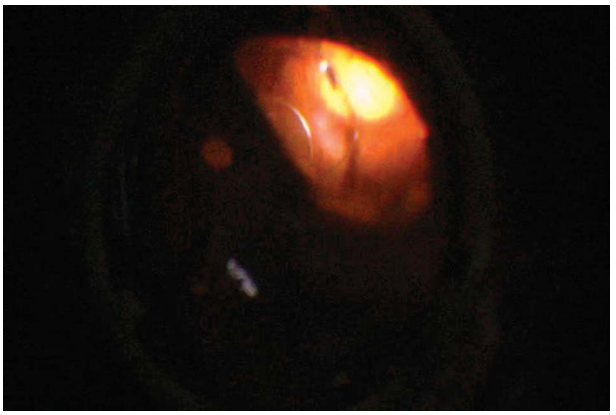

Fig. 3. The forceps in surgeon's nondominant hand grasp the tip of the other haptic in the middle of the vitreous cavity.

Haptic Fixation

Once the haptics are externalized, they are adjusted until the optic is well centered and tilt is minimized. Vannas scissors are used to open the conjunctiva over the sclerotomy to expose the external portion of the sclerotomy. A 25-gauge bent needle is used to make an "upstream" intrascleral Scharioth tunnel that originates from the os of the sclerotomy and travels in the opposite direction to how the original haptic retrieving trocar/cannula was placed (Figure 5). This tunnel is made parallel to the limbus. The end-grasping forceps are used to grasp the haptic just behind the tip and guide it into the Scharioth tunnel. The haptic will need to be slightly retracted back into the sclerotomy to tuck the tip of the haptic into the Scharioth tunnel. The haptic is then advanced into the tunnel (Figure 6). This is performed for both haptics. Polyglactin 910 suture

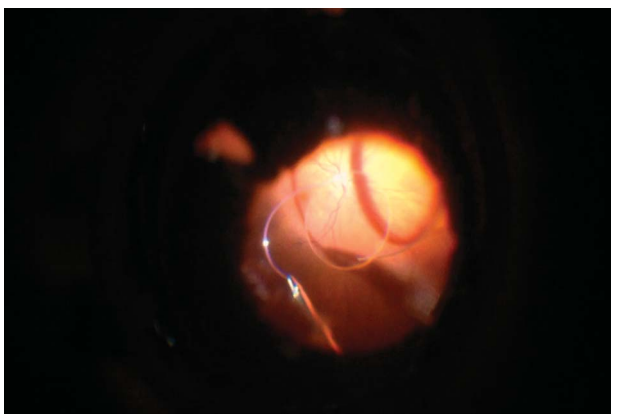

Fig. 2. The forceps in the surgeon's dominant hand grasp the tip of the haptic resting on the retina and lift it to the mid vitreous cavity.

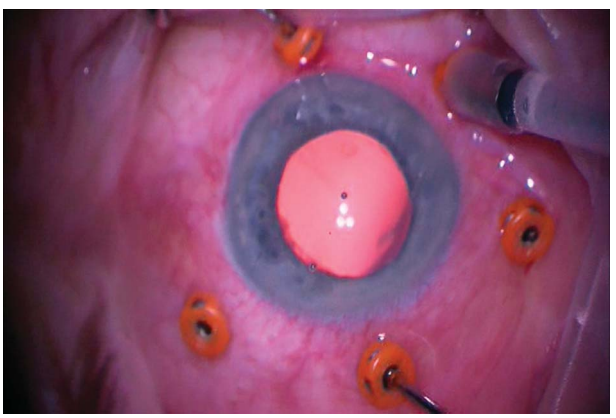

Fig. 4. Both forceps with associated haptics are simultaneously removed from sclerotomies.

Copyright © by Ophthalmic Communications Society, Inc. Unauthorized reproduction of this article is prohibited.

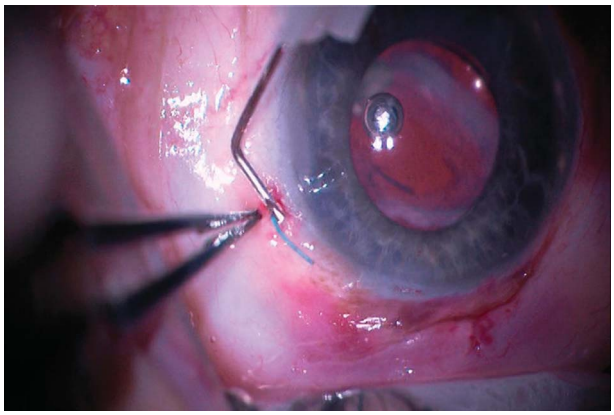

Fig. 5. A bent 25-gauge needle is used to make an "upstream" Scharioth tunnel.

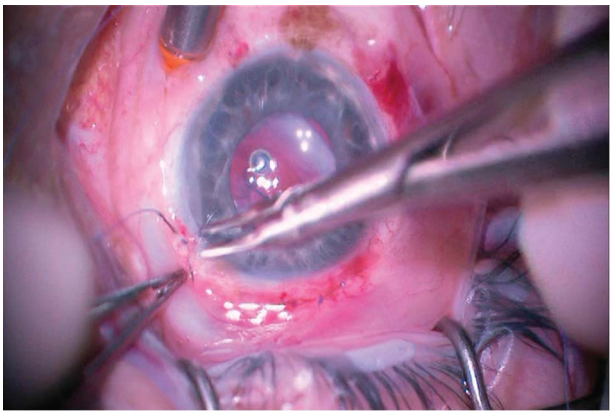

Fig. 7. Polyglactin 910 suture on a BV needle is used to close the sclerotomies.

on a BV needle (Ethicon, Somerville, NJ) is used to close the sclerotomy and overlying conjunctiva in 2 layers (Figure 7). The other sclerotomies are sutured closed if they are not self sealing.

Discussion

We describe a novel technique in which both haptics of an IOL can be simultaneously externalized to perform an IOL rescue (**Supplemental Digital Content 1 and 2**, http://links.lww.com/IAE/A219 and http://links.lww.com/IAE/A220). Instead of externalizing each haptic one at a time, as has been previously described, the retina surgeon can grasp each haptic in the vitreous cavity, under wide field viewing, and externalize both haptics simultaneously. This avoids anterior segment haptic manipulation and requires fewer overall steps than previously described.[5,6] This bimanual IOL rescue approach can be used in combination with other previously described scleral fixation techniques.[3,5,6]

The modification of the transconjunctival scleral fixation approach, adding the upstream Scharioth tunnel, provides greater haptic support to previously published techniques[6] while decreasing the likelihood of intraoperative haptic retraction and loss. This modification can also be used with secondary IOL transconjunctival scleral fixation.

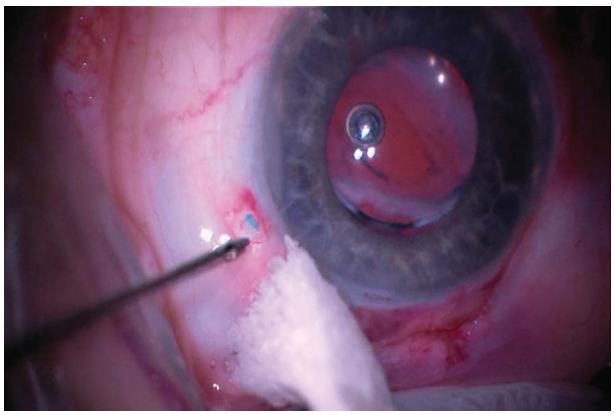

Fig. 6. The haptics exiting the sclerotomies are tucked into their associated Scharioth tunnels.

Our technique recommends removing the cannulas just before externalizing the haptic as opposed to externalizing the haptics through the cannulas and then removing them. Removing the cannulas first helps reduce both tension on the haptic/optic junction and the possibility of complete intraoperative haptic retraction.

Our technique uses fewer surgical steps with shorter surgery time and requires less haptic manipulation, thus affording a decreased likelihood of disfiguring haptics. Disadvantages of our technique include the reliance on a chandelier lighting system and the need, in some cases, to have an assistant remove the cannulas before externalizing the haptics.

Our technique is evolving and new instrumentation will likely aid in performing a few portions of the surgery including haptic placement into the Scharioth tunnel. Longer-term safety outcomes, especially regarding haptic erosion through the scleral wall, either externally or internally, need to be addressed before there is a major paradigm shift in how ophthalmologists perform IOL rescue and secondary IOL surgery. Our technique seems to be a safe and efficient option for rescuing dislocated IOLs and should be part of every retinal surgeon's armamentarium.

Key words: scleral, fixation, intraocular lens, transconjunctival, IOL rescue, bimanual, rescue, secondary, IOL.

JONATHAN A. FEISTMANN, MD†*
SOM PRASAD, MD‡§

Copyright © by Ophthalmic Communications Society, Inc. Unauthorized reproduction of this article is prohibited.

*RONALD C. GENTILE, MD†¶***
*DANIEL T. KASUGA, MD**
*SHAMINDER S. BHULLAR, MD**
*DEVAL D. JOSHI, MD**

References

1. Gabor SG, Pavlidis MM. Sutureless intrascleral posterior chamber intraocular lens fixation. J Cataract Refract Surg 2007;33:1851–1854.
2. Maggi R, Maggi C. Sutureless scleral fixation of intraocular lenses. J Cataract Refract Surg 1997;23:1289–1294.
3. Agarwal A, Kumar DA, Jacob S, et al. Fibrin glue-assisted sutureless posterior chamber intraocular lens implantation in eyes with deficient posterior capsules. J Cataract Refract Surg 2008;34:1433–1438. doi: 10.1016/j.jcrs.2008.04.040.
4. Agarwal A, Jacob S, Kumar DA, et al. Handshake technique for glued intrascleral haptic fixation of a posterior chamber intraocular lens. J Cataract Refract Surg 2013;39:317–322. doi: 10.1016/j.jcrs.2013.01.019.
5. Prenner JL, Feiner L, Wheatley HM, Connors D. A novel approach for posterior chamber intraocular lens placement or rescue via a sutureless scleral fixation technique. Retina 2012; 32:853–855. doi: 10.1097/IAE.0b013e3182479b61.
6. Prasad S. Transconjunctival sutureless haptic fixation of posterior chamber IOL: a minimally traumatic approach for IOL rescue or secondary implantation. Retina 2013;33:657–660. doi: 10.1097/IAE.0b013e31827b6499.
7. Scharioth GB, Prasad S, Georgalas I, et al. Intermediate results of sutureless intrascleral posterior chamber intraocular lens fixation. J Cataract Refract Surg 2010;36:254–259. doi: 10.1016/j.jcrs.2009.09.024.
8. Kumar DA, Agarwal A, Packiyalakshmi S, et al. Complications and visual outcomes after glued foldable intraocular lens implantation in eyes with inadequate capsules. J Cataract Refract Surg 2013;39:1211–1218. doi: 10.1016/j.jcrs.2013.03.004.
9. Kumar DA, Agarwal A. Glued intraocular lens: a major review on surgical technique and results. Curr Opin Ophthalmol 2013; 24:21–29. doi: 10.1097/ICU.0b013e32835a939f.
10. Kumar DA, Agarwal A, Prakash D, et al. Glued intrascleral fixation of posterior chamber intraocular lens in children. Am J Ophthalmol 2012;153:594–601, 601.e1–e2. doi: 10.1016/j.ajo.2011.09.027.
11. Price MO, Price FW Jr, Werner L, et al. Late dislocation of scleral-sutured posterior chamber intraocular lenses. J Cataract Refract Surg 2005;31:1320–1326.
12. McAllister AS, Hirst LW. Visual outcomes and complications of scleral-fixated posterior chamber intraocular lenses. J Cataract Refract Surg 2011;37:1263–1269.

Copyright © by Ophthalmic Communications Society, Inc. Unauthorized reproduction of this article is prohibited.