Needle-guided intrascleral fixation of posterior chamber intraocular lens for aphakia correction

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We present a technique for the surgical correction of aphakia that allows intrascleral fixation of a posterior chamber intraocular lens (IOL) without sutures. The technique is useful in situations in which one haptic has to be fixated and capsule support is adequate for fixation of the second haptic. The haptic is externalized with a 25-gauge needle; no surgical instrumentation other than that needed for conventional cataract surgery is used. The technique is particularly appropriate for 3-piece IOLs with flexible haptics.


Currently, the surgical correction of aphakia involves implantation of intraocular lenses (IOLs) in the anterior or posterior chamber. Anterior chamber (AC) IOLs can rest on the iridocorneal angle (angle-supported IOLs) or be fixated to the iris stroma (iris-fixated IOLs). In contrast, posterior chamber (PC) IOLs are usually sutured transsclerally (fixation to the sulcus or to the pars plana) or to the iris. In recent years, PC IOL implantation by means of intrascleral fixation without sutures has become more popular. We present a technique for intrascleral fixation of one haptic in the sulcus, which may be useful for situations in which adequate capsule and lens remains to support the second haptic.

SURGICAL TECHNIQUE

Anterior vitrectomy and synechialysis using a Vannas scissors is performed under peribulbar anesthesia. Following conjunctival peritomy and diathermy of the scleral bed, a 2.5 mm × 3.0 mm partial-thickness scleral flap is made 180 degrees from the localization of the capsule remnants; which was situated, 0.5 mm from the sclerocorneal limbus. After the incision is widened, a 3-piece IOL is inserted into the anterior chamber with a folding forceps. The IOL is then rotated so the tip of the haptic to be externalized faces the scleral flap. Using a 25-gauge needle, a straight sclerotomy is made 1.0 mm from the sclerocorneal limbus. The position of the sclerotomy under the scleral flap can be proximal or distal depending on the course of the haptic after it has been externalized, ensuring that all or most of the haptic can be embedded in the sclera. The space behind the iris is accessed by the 25-gauge needle, and one end of the haptic is introduced into the lumen of the needle using a McPherson forceps (Figure 1). A wide paracentesis situated 180 degrees from the sclerotomy is recommended to facilitate manipulation of the haptic with the forceps. While the needle is removed, the haptic is carefully externalized to avoid damage to the iridocorneal angle by lens rotation. At this stage, the second haptic is placed in the sulcus, resting on the residual capsule (Figure 2). If the entire haptic cannot be placed intrasclerally, a 3.0 mm tunnel is made adjacent to the scleral flap to embed the distal part of the haptic in the sclera (Figures 3 and 4). Finally, the scleral flap is sutured with 10-0 nylon, burying the knots in the conjunctiva.

Results

The technique was performed in one patient with no complications or side-effects during 6 months of follow-up. The corrected distance visual acuity improved from light perception to 0.3. This was considered satisfactory improvement since the patient presented with associated retinopathy, probably due to the trauma that
produced the cataract. The postoperative refraction was adequate (spherical equivalent of +0.75) and has remained stable throughout the follow-up. There was no biomicroscopic evidence of IOL tilt or decentration.

**DISCUSSION**

Secondary implantation of IOLs for the surgical correction of aphakia is not without complications. The principle disadvantages associated with anterior chamber IOLs include reduction of corneal endothelial cellularity,1,6,7 pupil ovalization (angle-supported and iris-fixated IOLs),1,8 pseudophacodonesis (iris-fixated IOLs),9 and the appearance of secondary glaucoma (angle-supported IOLs).1,2 Posterior chamber IOLs also present several specific disadvantages such as tilt and decentration (scleral-sutured IOLs),10 hyphema or vitreous hemorrhage (scleral-sutured IOLs),11 endophthalmitis due to suture exposure (scleral-sutured IOLs),12 pupil distortion (iris-sutured IOLs),1 and late IOL dislocation due to suture erosion (scleral- and iris-sutured IOLs).13

Relative to AC IOLs, intrascleral fixation of IOLs has the inconvenience of requiring more surgical time. However, it has the advantages of PC IOLs; ie, remote position of IOL from the corneal endothelium and proximity to the ocular rotational axis and nodal point.14 Intrascleral fixation also eliminates the complications associated with the use of sutures, which are necessary for IOLs fixated to the iris or sulcus. We think the technique provides greater IOL stability with less tendency toward tilt, decentration, and pseudophacodonesis.

To our knowledge, Maggi and Maggi3 were the first to report a technique for intrascleral fixation of PC IOLs without sutures. Recently, Gabor and Pavlidis4 described a technique that involves intrascleral fixation of both haptics in the sulcus by means of a scleral tunnel parallel to the limbus and intrascleral placement of both haptics in the tunnel after their intraocular capture with a 25-gauge forceps. Agarwal et al.5 applied a biological adhesive to attach the haptics to the sclera as well as to glue the scleral flaps and overlying conjunctiva. In this case, haptics were captured...
by a straight 22-gauge sclerotomy using a 25-gauge microcapsulorhexis forceps.

The technique we present has the competitive advantage of not requiring instrumentation other than that typically used for standard cataract surgery; the haptic is captured using a 25-gauge needle. A potential inconvenience is difficult capture of the second haptic, in the event this is required, caused by the distance between the end of the second haptic and the site of the second sclerotomy after the first haptic is externalized. We think 4 clock sectors would provide sufficient support and prevent dislocations of the IOL. In our case, we did not detect any bleb formation at the sclerotomy site during the postoperative period. Nevertheless, we recommend evaluating the sclerotomy seal after the haptic is externalized.

We consider a 3-piece IOL with flexible haptics and a total diameter of approximately 13.0 mm to be ideal for this technique. The insertion can be performed with a folding forceps or an injector. In our case, we chose the forceps because of the greater ease of positioning the IOL in the anterior chamber. In the case of scleral-sutured IOLs, fixation to the sulcus is reported to be more feasible with IOLs with a total diameter of 12.0 mm rather than 13.5 mm. This is less relevant in our case because the intrascleral location of the haptics prevents the complications that result from supporting the haptics on the pars plicata of the ciliary body. For the haptics, we recommend evaluating the sclerotomy seal after the haptic is externalized.

To conclude, we consider needle-guided intrascleral fixation to be appropriate for scleral positioning of a single haptic and this technique does not require the use of instrumentation other than that used for standard cataract surgery. It does require longer follow-up to determine the long-term anatomical and functional results.

REFERENCES


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