

Tips and Tricks of Intrasceral Fixation of Single-Piece and Toric Intraocular Lens

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Abstract:

Various techniques for scleral fixation of IOL in cases of poor capsular support have been described in past. Sutured scleral fixation of IOLs has been attempted for single piece and toric IOLs also. But this predisposes to various suture related complications. Sutureless fixation of three piece IOLs with or without glue has gained popularity worldwide. However, odd power lenses and high astigmatism cannot be countered with three piece lenses. Our technique of sutureless, glueless scleral fixation of IOL using single piece and toric IOLs has shown favourable results and a potential option in such scenarios.

Keywords: Sutureless scleral fixation; Scleral fixated IOL; Single piece; Toric IOL

Introduction

Stable intraocular lens (IOL) implantation in cases with poor capsular support has always remained a surgical challenge. Various techniques have been devised to offer optimal visual outcomes with minimal complications in such cases.

Gabor and Pavlidis in 2007 [1], described a sutureless technique for intrasceral fixation of posterior-chamber IOL using permanent incarceration of the haptics in a scleral tunnel parallel to the limbus. This method offers postoperative axial stability of the IOL without irritating the iris or cornea and avoids intraoperative or post-operative suture-related complications. Adoption of a similar surgical technique using fibrin glue for adherence of scleral flaps has been popularised by Agarwal et al. in 2008 [2].

Both the above techniques mainly use three piece IOL. Certain ophthalmic situations, like odd lens power and unacceptable astigmatism, wherein three piece lenses are not available, necessitates a creative surgical solution.

Potential for scleral fixation of single piece and single piece toric IOLs-using trans scleral sutures has been demonstrated in the past [3,4]. This technique predisposes to suture related complications like suture erosion, suture knot exposure and repeated dislocation due to broken sutures [5,6].

We have devised a novel technique of sutureless, glueless, scleral fixation of single piece and toric intraocular lenses to offer better refractive outcomes to patients with poor capsular support [7].

Surgical technique

Linear partial thickness scleral cuts are made 2 mm in size perpendicular to the limbus at 0° and 180° after minimal conjunctival dissection. Scleral pockets of 1.8 mm, open at only one end, are fashioned with keratome, parallel to the limbus starting from the edge of these marks and running in opposite directions (Figure 1). 20G

microvitrectomy (MVR) blade is used to make 2 vertical sclerotomies 1.5 mm behind the limbus at the 2 marked points in the linear partial thickness scleral cuts (Figure 2).

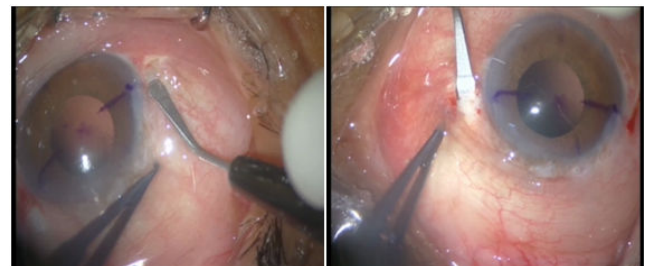


Figure 1: Scleral pockets (1.8 mm), diametrically opposite. [Courtesy: S. Karger AG, Basel].



Figure 2: Vertical sclerotomy 1.5 mm behind the limbus at the linear partial thickness scleral cut with 20G MVR blade.

2.2 mm tri-planar clear corneal incision is made. Anterior chamber formed with viscoelastic. Single piece lens is injected and the leading haptic is grasped and externalized with 23G end-gripping intravitreal forcep passing thru the sclerotomy (Figure 3). Procedure is repeated on

the other side and both the haptics externalized. Haptics are then inserted into the respective scleral pockets with McPherson forceps (Figure 4). Centration confirmed (Figure 5). Conjunctiva closed over the scleral pockets and superior scleral tunnel. If need be, the eye can be stabilized with a linear 25G pars plana infusion or an anterior chamber maintainer placed inferotemporally throughout the procedure.

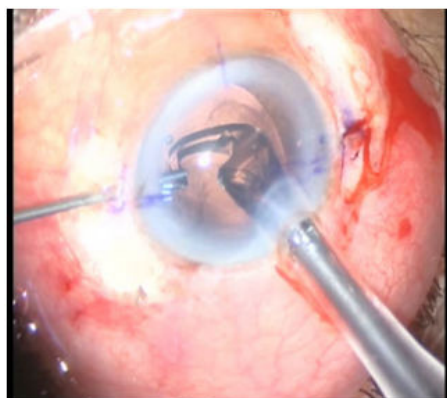


Figure 3: Simultaneous injection of IOL and externalization of leading haptic with 23G endgridding intravitreal forceps.

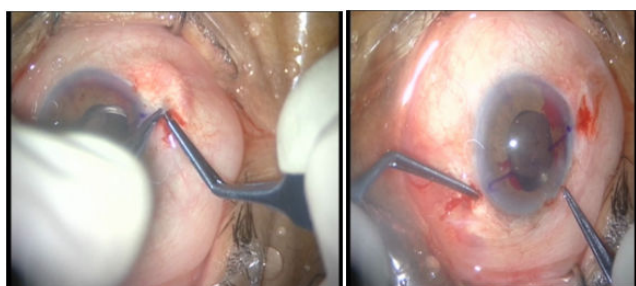


Figure 4: Tucking of haptics in respective scleral pockets [Courtesy: S. Karger AG, Basel].

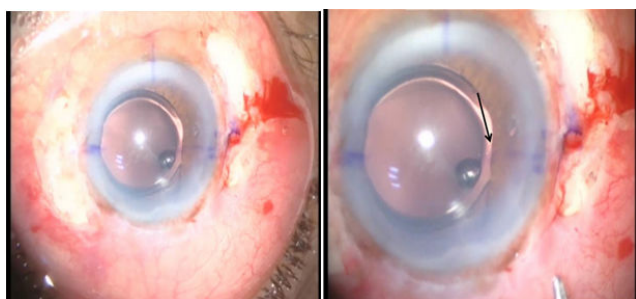


Figure 5: Well centered and aligned toric IOL.

Similar process can be duplicated for toric lenses after marking the incision site and placing linear cuts in desired toric axis (instead of 0 and 180°).

We have used this technique in 12 eyes so far. Our standard IOLs are Tecnis® 1-piece or Tecnis toric (Abbot Medical Optics Inc).

As the optic is shifted more anterior during sulcus placement, its “effective power” increases. Hence, for sulcus fixation in eyes with a normal axial length, the IOL power should be 1.00 D less than the power for in-the-bag fixation [8].

Discussion

Three piece IOLs are widely preferred for sulcus placement or scleral fixation with or without glue in cases of poor capsular support. Sulcus fixation of single piece IOLs is not popular due to postoperative complications like pigment dispersion, iris trans illumination defects, dysphotopsia [9]. This is owing to the fact that bulky single piece haptics are large and thick enough to contact the posterior iris when placed in the sulcus. Also, the haptics are planar rather than angulated and therefore do not vault the optic posteriorly from the iris [9].

Single piece Tecnis® 1 or Tecnis® toric foldable lenses have an offset design. Hence, neither the optic nor haptics come in contact with the iris nor the above mentioned complications are minimized.

Single piece lens haptics are sturdy, this allows easy exteriorization. Although larger sclerotomies are required (as compared to three piece IOL), these are usually blocked completely by the thick stubby haptics; mitigating the need for suturing. However, sclerotomies can be sutured when needed.

Sclerotomies should be placed exactly 180° apart and 1.5 mm behind the limbus on both sides to avoid IOL tilt. Adequate and equal amount of haptic should be inserted in the respective scleral pockets- to ensure exact horizontal alignment. Push-back-spring system injector (instead of screw type of injector) can be used- this allows the second hand free- to grasp the leading haptic simultaneously. Proper planning and alignment of toric IOL is essential; digital markers like verion® 10 and callisto eye provide real time lens alignment and aid in better accuracy. Thus, albeit technically difficult, single piece IOLs provides a definite option when needed.

We have seen favorable results with stable and well centered single piece IOL. However, like any other technique, there is a learning curve involved. This technique is evolving and long term safety concerns especially regarding lens centration, haptic erosion, dislocation need to be addressed.

At present, sutureless glueless implantation of single piece IOL finds its place in cases of poor capsular support wherein standard three piece lens is not available (odd IOL power or high astigmatism).

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