A New Technique of Sutureless SF IOL

Surgical Technique

Introduction
Intraocular lens (IOL) implantation to correct aphakia offers a better visual rehabilitation in comparison to aphakic spectacles or contact lenses. In the absence of adequate capsular support, anterior chamber IOLs, iris fixated IOLs and scleral fixated intraocular lens (SFIOL) may be considered. Anterior chamber IOLs are associated with complications such as glaucoma, hyphaema, uveitis, cystoid macula oedema, and corneal decompensation. SFIOL is an accepted alternative, but has its own associated limitations. SFIOL has been used in both adults and children with success, either as a single procedure or combined with penetrating keratoplasty and other vitreoretinal procedures. There are many variations of the technique and a range of complications of varying frequencies, which include suture and knot erosions, lens tilt, dislocation or decentration, infection, glaucoma, cystoid macular oedema, corneal decompensation, retinal detachment, and suprachoroidal haemorrhage. Complications are common, and suture degradation is an important long-term complication, particularly in young patients.[1]

To avoid the suture related intraoperative and postoperative problems, Gabor and authors introduced a new technique wherein they developed a sutureless technique for sulcus fixation of a posterior chamber IOL using permanent incarceration of the haptics in a scleral tunnel parallel to the limbus. This method combines the control of a closed-eye system with the postoperative axial stability of the posterior chamber IOL while avoiding suture related problems.[2]

In his technique, Gabor et al used cannulas to create a limbus-parallel tunnel at approximately 50% scleral thickness, starting from the ciliary sulcus sclerotomies and ending with externalization of the cannula after 2 or 3 mm. A standard three-piece foldable IOL with a haptic design fitting to the diameter of the ciliary sulcus was implanted with an injector, and the trailing haptic was fixated in the corneal incision. The leading haptic was then grasped at its tip with an end-gripping 25-gauge forceps, pulled through the sclerotomy, and left externalized. With the same forceps, the haptic was then introduced into the intrascleral tunnel. The same maneuvers were performed with the trailing haptic. The ends of the haptics were left in the tunnels to prevent foreign body sensation and erosion of the conjunctiva and to reduce the risk of inflammation. The sclerotomies were checked for leakage. If necessary, they were sutured.[3]

We describe a much simpler technique which is a modification of the above mentioned Gabor’s technique. It also avoids the use of a specialized forceps for the haptic insertion. Any 25 gauge micro vitreoretinal forceps with a firm grip (e.g. Alcon Grishaber max grip or serrated forceps) can be used.

A linear cut (2mm approx.) is made adjacent and perpendicular to the limbus in the upper right (superotemporal quadrant in right eye, superonasal quadrant in left eye) (Fig 1). This cut is deep enough to cut through the conjunctiva and approximately 50% of scleral thickness. Using a 1 mm to 1.5mm keratome blade, a limbus parallel 3mm scleral pocket is fashioned starting from the groove incision downwards along the limbus (Fig 2 to 4). This step is then repeated in the lower left quadrant (inferonasal in right eye and inferotemporal in left eye) diametrically opposite to the first scleral pocket (Fig 5 to 7). A 24gauge needle or 25G trocar used for MIVS (MicroVitreoRetinal Surgery) is used to make two sclerotomies at 1.5 mm from limbus within the groove on either side(Fig 8 to 9).An anterior chamber maintainer is used to maintain the IOP throughout the surgery.

Main incision
A clear corneal tunnel incision is made in superior quadrant for injecting the foldable 3 piece IOL (Fig 10). A good anterior vitrectomy is done. The IOL is then injected into the anterior chamber.

Haptic externalisation
As the IOL is being injected, a 25G micro vitreo retinal forceps is introduced into the globe through the lower left sclerotomy and the tip of leading prolene haptic is held inside the eye and externalized(Fig 11 to 12). The trailing
haptic is then held with the MVR forceps introduced through the upper right sclerotomy using a handshake technique and externalized (Fig 13). Care should be taken to hold the haptics at the very tip to avoid kinking or fracture of the haptic. In case of IOL flip during the process of insertion, the haptics will face in the wrong direction. Holding both the haptics with McPherson forceps and rotating them like a bicycle pedal can correct this.

**Tucking the haptics**

The tip of the haptic is held with a McPherson forceps and tucked into the already fashioned limbus parallel scleral pockets (Fig 14 to 15). If the IOL is not centered well in the pupillary axis, the haptics can be pulled out or pushed in to the scleral pocket on either side to center the IOL (Fig 16).
The corneal tunnel and the paracentesis sites can be hydrated if leaking. If the sclerotony sites leak, which is rare, then an 8-0 Vicryl suture may be used to close it using a trans conjunctival shoe lace knot. This same technique can be used to implant a rigid 3 piece IOL as well. The only difference will be a larger scleral tunnel in the superior quadrant to enable the insertion of a larger rigid IOL. The rest of the surgical steps remain the same. If as a beginner, surgeons have difficulty constructing scleral pockets transconjunctivally, localized peritomy in the temporal and nasal quadrants can be made and the scleral pockets made under direct visualisation of the sclera.

A Retrospective data analysis
We present our experience with this technique.
Study design and number: Retrospective and 106 patients/eyes
Study period: January 2011 to December 2013

The case records of these patients were reviewed and the data such as 1. Age, Gender & laterality 2. Reasons for failed implantation of IOL in the primary surgery 3. Change in visual acuity pre and post scleral fixation of IOL 4. Complications in the immediate and late post operative period till the individuals longest follow-up were collected and analysed

Inclusion Criteria:
All cases with SFIOL done between specified time period

Exclusion Criteria:
Combined procedures Like SFIOL with penetrating keratoplasty & SFIOL with trabeculectomy

Statistical analysis
- Mann-Whitney U test/Wilcoxon sign rank sum test was used to assess the difference between the continuous variable
- P-value is less than 0.05 considered as statistically significant
- Mean (SD) and Frequency (percentage) was used for continuous and categorical variables respectively

Follow up: Mean follow up 8 months
Median follow up 5 months : range 3-26 months

Results
Visual acuity:

There was a significant improvement in visual acuity from Uncorrected pre operatively 1.63 Log MAR to post operative best corrected of 0.21 Log MAR.

Intra-operative complications
1. Haptic bending (can be straightened with Mcpherson’s forceps before tucking the haptic).
2. Haptic breaking needs removal and re-doing the procedure if adequate length of haptic is not available for tucking and stabilizing the IOL
3. Scleral pockets not exactly 180 degree apart may result in decentration of the IOL
4. Leaking sclerotomies may require an absorbable scleral suture
5. Hyphema

Post operative complication
Early (within one month):
Mild corneal odema and vitreous hemorrhage which resolved without any intervention are the most frequent early complications.

Late (after one month):
Raised IOP and cystoid macular odema were the most frequent complications.

Almost all the complications were managed mostly conservatively. No case had clinically significant scleral or conjunctival changes in the pocket area were haptics were tucked. None of the case had clinically significant IOL decentration or dislocation in the study period.

Conclusion
As this technique avoids the risk of long term suture degradation and IOL dislocation associated with sutured Scleral fixated IOLs, this may be a safe and simple procedure in cases where conventional in the bag IOL implantation was not possible and it can be done in pediatric age group also.

References