

Outcome of Iris Fixation of Posterior Chamber Intraocular Lenses Using Siepser Sliding Knot Technique

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ABSTRACT

Purpose: To report the outcomes and complications of iris-fixated posterior chamber intraocular lenses (PCIOL) using Siepser sliding knot technique in suturing one or both haptics.

Methods: Retrospective, observational case study involving surgical placement of a foldable iris-sutured PCIOL using the Siepser sliding knot technique. This study was carried out between September 2008 and March 2010 and reviewed by seven anterior segment surgeons. Outcome measures included change in visual acuity (VA) and complications.

Results: 30 eyes of 29 patients were included. 26 PCIOLs (86.7%) had the Siepser sliding knot technique fixed on both haptics whereas 4 (13.3%) had the PCIOL knot was fixed over a single haptics. Mean age of patients at the time of surgery was 50.5 years \pm 24.5 (Range, 7 to 79 years). Preoperatively, the mean Snellen decimal uncorrected VA (UCVA) was 0.158 \pm 0.163 and the mean preoperative best-corrected VA (BCVA) was 0.249 \pm 0.195. Postoperatively, the mean Snellen decimal BCVA was 0.383 \pm 0.232. 22 patients (73.3%) showed improved BCVA following surgery. The mean follow up period was 6.9 months \pm 5.5 (Range, 1 to 16 months). Complications included elevated intraocular pressure (IOP) (10%, n=3), transient diplopia (6.7%, n=2), decompensated cornea (3.3%, n=1), wound leak (3.3%, n=1) and dislocated PCIOL (3.3%, n=1).

Conclusion: Iris-fixated PCIOL using Siepser sliding knot technique in suturing one or both haptics is a useful and safe technique for PCIOL implantation in the event of a partial or complete absence of capsular support.

Keywords: Iris fixation, posterior chamber, intraocular lenses, Siepser sliding knot technique.

INTRODUCTION

Posterior chamber intraocular lens (PCIOL) fixation in the absence of adequate capsular support is required in cases of primary or secondary implantation following rupture of the posterior capsule or disinsertion of the zonules, or for re-fixation of dislocated/subluxated PCIOLs. If adequate capsular support exists, a PCIOL can be placed in the ciliary sulcus or over the remaining capsule^[1]. We report the visual outcomes and complications following an iris-sutured foldable PCIOL implantation using the Siepser sliding knot technique in fixing one or both haptics.

MATERIALS AND METHODS

The institutional review board at King Khaled Eye Specialist Hospital approved this study. A computer-based search of inpatient records was generated by cross-referencing coded discharge information to obtain a list of eligible patients. The Medical records of all patients who underwent the

iris-fixated PCIOL at our tertiary eye center between September 2008 and March 2010 were reviewed. Our inclusion criteria included patients that had iris-fixated PCIOL using Siepser sliding knot technique in suturing one or both haptics. Those who had iris-fixated PCIOL using other techniques were excluded. Specific data collected included age, eye involved, preoperative and postoperative uncorrected corrected visual acuity (UCVA) and best corrected visual acuities (BCVA), preoperative and postoperative endothelial cell counts, associated systemic and ocular illnesses, intra-operative and postoperative complications, and associated surgical procedures. The Snellen visual acuities (VA) were converted to decimal fraction for statistical analyses. For Snellen VA less than 20/400 (0.05), counting fingers (CF; 0.025), hand motions (HM; 0.0125), light perception (LP; 0.006), and no light perception (NLP; 0.0) were used.

Surgical Technique

Seven anterior segment surgeons performed all procedures through a temporal 3.5 mm clear corneal wound. A 3-piece AMO Sensar® PCIOL model AR40e was inserted through the temporal incision either manually folded in a moustache fashion or using an intraocular lens injector. The haptics were placed under the iris, and the optic was captured by the pupil. After pupillary miosis was achieved with intracameral acetylcholine (Miochol®), a double-armed 10-0 polypropylene (Prolene®) suture on a long curved CIF-4 needle was passed under the haptics. A Siepser sliding slipknots were thrown to secure the haptics in a mid-peripheral iris location. The optic was then repositioned behind the iris and the temporal wound sutured with 10-0 nylon⁴⁵⁶. Postoperatively, all eyes were treated with gatifloxacin for two weeks and a tapering dose of topical prednisolone acetate 1% over 4 weeks.

RESULTS

30 eyes of 28 patients that met our inclusion criteria were included in our study. 26 PCIOLs (86.7%) had a Siepser sliding knot technique in both haptics and 4 PCIOLs (13.3%) had a knot fixed over a single haptics only. All PCIOLs that had two knots lacked adequate capsular support, zonular support, or both for a sulcus-fixated PCIOL and were offered an iris-sutured PCIOL. The remaining eyes had capsular/zonular remnants sufficient for a single haptic only and thus had the other haptic fixated. The mean age of patients at the time of surgery was 50.5 years ± 24.5 (Range, 7 to 79 years). Preoperatively, the mean Snellen decimal UCVA was 0.158 ± 0.163 and the mean preoperative BCVA was 0.249 ± 0.195. Postoperatively, the mean Snellen decimal BCVA was 0.383 ± 0.232. Twenty-two patients (73.3%) had improved BCVA following surgery (Figure 1). The mean follow up period was 6.9 months ± 5.5 (Range, 1 to 16 months). Twenty-four patients had no previous ocular disorders. The remaining had diabetic retinopathy (10%, n = 3), amblyopia (3.3%, n=1), decompensated cornea (3.3%, n=1) and retinal detachment (3.3%, n=1). Table 1 shows the associated surgical procedure at the time of the iris-sutured foldable PCIOL implantation using Siepser sliding knot technique. Most of patients had no complications following surgery. The encountered complications are shown in table 2.

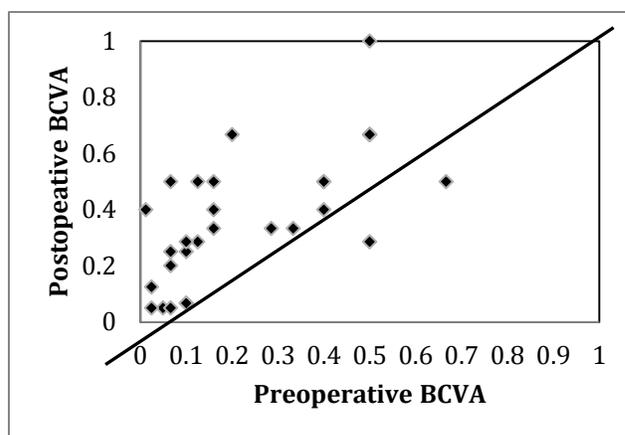


Figure 1. Preoperative vs. Postoperative BCVA

Table 1. Associated surgical procedure at the time of iris-sutured foldable IOL implantation using Siepser sliding knot technique

Surgery	No. (Percentage)
None	10 (33.3)
Pars Plana Vitrectomy	8 (26.7)
Anterior chamber intraocular lens removal	4 (13.3)
Anterior vitrectomy	4 (13.3)
Lens aspiration	3 (10)
Descemet stripping automated endothelial keratoplasty	1 (3.3)
Total	30(100)

Table 2. Complications following iris-sutured foldable IOL implantation using Siepser sliding knot technique.

Surgery	No. (Percentage)
None	23 (76.6)
Elevated IOP	3 (10)
Diplopia	2 (6.7)
Wound leak	1 (3.3)
PCIOL dislocation	1 (3.3)
Total	30 (100)

DISCUSSION

There are various existing methods of iris suture PCIOL fixation¹⁻⁷ in the absence of an adequate capsule support. These methods are technically more demanding than implantation of an anterior chamber lens (AC-IOL) or a trans-scleral fixated sutured lens⁷. In 1976, McCannel introduced the open-sky iris-fixation technique during penetrating keratoplasty². This technique was then modified by McCannel and later by Stark

*et al*³ through limbal incisions. Both techniques mandated pulling the iris up to the incision to tie the knots and required capturing the PCIOL optic in a small pupil. Chang⁴ was the first to introduce the modified Siepser slipknot to avoid traction on iris tissue, but the incision had to be large enough for an intraocular scissors. Slipknots reduce the traction on iris tissue during the procedures and IOL movement. Advantages of the technique included optical correction of the eye closer to the nodal point, and a possible decreased risk of corneal endothelial damage (compared to the AC IOLs), and possible stabilization of the PCIOL by the ciliary sulcus⁵. Condon *et al.*⁶ suggested that the lower risk of late suture breakage may be the result of the peripheral iris elasticity that provides a more forgiving suspension system than the sclera. Disadvantages however, includes some degree of immediate iris pigment epithelial loss, formation of peripheral anterior synechiae (PAS) overlying the angulated haptics of iris-fixed PCIOLs, late breakage of the polypropylene suture, and late erosion of an iris suture into an iris vessel, resulting in a transient hyphema⁷.

Change *et al.* described 8 cases that presented with symptomatic PCIOL subluxation. In all cases a McCannel Prolene suture was used with the Siepser slipknot technique, to successfully re-fixate the IOLs to the iris. In one case both haptics were sutured to the iris, while in the remaining seven cases only a single haptic was sutured. There were no intraoperative complications, and a round pupil was preserved in all cases⁷. One patient had a mild posterior tilting of the non-sutured haptic, but was asymptomatic. Chang found that the Siepser slipknot is superior to making an overlying paracentesis to externalize the suture ends and lay down the knot. Kaiura *et al* reported 4 cases of iris-fixed PCIOLs with complications related to the procedure. Three patients developed postoperative slippage of the IOL, and 1 patient presented with iris erosion of the haptic leading to recurrent hemorrhage. Three cases were repaired by re-suturing of the same IOL using iris fixation, while one case required an IOL exchange with trans-scleral fixated PCIOL. All cases showed stable IOLs at the final follow-up visit⁸.

In our study, all patient's BCVA either improved or were within one line of their preoperative BCVA except for one patient who dropped 3 lines of BCVA following the procedure, and this was secondary to a pre-existing diabetic

retinopathy aggravated following the procedure. An elevated intra-ocular pressure (IOP) was among the most common complications encountered in our study. From these patients, two had a combined lensectomy and a pars plana vitrectomy (PPV) and one patient had PPV only. The elevation in IOP was successfully treated with topical anti-glaucoma medications. Two patients developed a transient diplopia one of which was from a pre-operative exotropia. No case of iris atrophy at the suturing site was encountered. Minimal ovalization of the pupil was seen in four cases where sutures were taken nearer than the mid-periphery of the iris and were not cosmetically noticeable. No titling of the iris fixated PCIOL was noted.

In conclusion, suture fixation of 1 or both haptics using Siepser sliding knot is a useful and safe technique for PCIOL implantation in partial or complete absence of capsular support. Although procedure is technically more challenging, it does have the procedural benefits of a small incision (3.5 mm) in a closed anterior chamber. Diabetics or patients with pre-existing uveitic disease will not have a favorable out come although a large sample size is needed for a better conclusion.

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