Original Article

Safety and Visual Outcome of Scleral Sutured Posterior Chamber Intraocular Lenses (SS-PCIOL)

Mushtaq Ahmad, Sofia Iqbal, Nazullah, Naz Jehangir

Pak J Ophthalmol 2011, Vol. 27 No. 3

See end of article for authors affiliations

Correspondence to:
Mushtaq Ahmad
Department of Ophthalmology
HMC, Peshawar

Submission of paper
June 2011

Acceptance for publication
September' 2011

Purpose: The aim of this study was to determine the safety and visual outcome of scleral sutured fixation of posterior chamber intraocular lenses.

Material and Methods: This prospective and interventional study was conducted from April 2010 to April 2011 in the department of Ophthalmology Hayatabad Medical Complex Peshawar. Thirteen eyes of 13 subjects were enrolled for scleral sutured posterior chamber intraocular lens. There were three follow up visits at 1st post op day, at two months and at six months.

Results: A total of 13 eyes underwent scleral sutured posterior chamber intraocular lens. There were 10 male and 3 female patients. All patients had completed their six months follow-up. After six months nine patients (69.23%) out of 13 achieved 6/12 vision or better.

Three patients did not come for their follow-up visits and were excluded from the study. Two patients had bleeding intra operatively from the scleral suture site. Two patients had suture erosion, one patient had lens tilt due to vitreous tag postoperatively and one patient had cystoid macular edema.

Conclusion: The technique of scleral sutured posterior chamber intraocular lens insertion via the ab externo method with a thick scleral flap offers a low complication profile and should be considered as a viable option for secondary intraocular lens.

Intraocular lenses were introduced in cataract surgery by Sir Harold Ridley in 1949[1] and they became standard of care in the late 1980s. However, various models, fixation sites and techniques are recommended for difficult situations. Fixation of intraocular lenses in cases of insufficient or no capsular support is challenging and requires good surgical techniques to resolve different situations[2]. In such a situation, the surgeon has four options, to leave the eye aphakic, to implant an anterior chamber intraocular lens (AC IOL), to fixate a posterior chamber intraocular lens (PC IOL) in the iris or to fixate a PC IOL in the sclera. The potential issues of anisometropia, optical aberrations, and contact lens intolerance make aphakia a less than optimal solution in all but a few patients[3].

Following the implantation of the first anterior chamber lens in 1952 by Baron, multiple lens type were developed. However, even with a perfectly implanted AC IOL, it is postulated that sub clinical uveitis secondary to lens-tissue contact creates inflammatory products that could be directly toxic to the endothelium and angle and could also result in cystoid macular oedema[4].

The rates of adverse outcomes associated with AC IOL implantation are cystoid macular oedema (CME) (1% to 10%), corneal decompensation (1% to 7.8%) glaucoma (0 to 15%) and retinal detachment (0 to 4%). The frequency of endophthalmitis was reported to be 0.2%[5].

Some surgeons prefer iris-sutured intraocular lenses. These techniques need sufficient iris stroma for fixation. Furthermore, there could be a need for special intraocular lenses, which may not be available everywhere. In addition, urgency, extra cost, logistics, and adapted biometry are all possible complicating factors. These can cause cat-like pupil

and iris chafing, with uveitis and/or pigment dispersion and secondary complications such as chronic inflammation and secondary glaucoma. Recognition of the high rate of adverse events associated with closed-loop AC IOLs in the 1980s prompted the development of novel techniques for fixating an IOL in the aphakic eye.

In 1986, Malbran and colleagues were the first to describe scleral sulcus fixation of PC IOLs[6]. In 2003, an American Academy of Ophthalmology sponsored report on IOL implantation in the absence of capsular support Wagoner and colleagues concluded that the scleral sutured posterior chamber IOLs were safe and effective in adults[7].

Two major concerns with scleral fixation IOLs are posterior placement of the haptics in sulcus and longevity of the sutures. Haptics correctly placed in the sulcus will most likely achieve stable fixation after fibrosis to the surrounding structures[8].

MATERIAL AND METHODS

This prospective and Interventional study was conducted from April 2010 to April 2011 in the department of Ophthalmology, Hayatabad Medical Complex Peshawar. Thirteen eyes of 13 subjects were enrolled from April 2010 to October 2010 for scleral sutured PCIOL. All of them had completed their six months follow-up. Three follow-up visits were given at 1st post operative day, after two months and after six months. All patients were determined to have aphakia of insufficient or no capsular support. Patients were asked to be a part of the study if they met the inclusion criteria, which primarily included the presence of aphakia with no capsular support, informed consent to participate in the study, and the follow-up visits.

Exclusion criteria were as follows: Extremes of ages, only eye, pre-existing macular disease and amblyopia. Patients were also excluded if they had a vitreo-retinal pathology. Preoperative evaluation of the patients was done thorough history and examination. The aetiology, best corrected visual acuity (BCVA) and intra and postoperative compli-cations were recorded on proforma. BCVA and complications were noted at each follow-up visit.

Surgery was carried out by a single surgeon under local anaesthesia in adults and under General anaesthesia in children. Local anaesthesia consisted of peribulbar injection of 1:1 mixture of 0.5% bupivacaine and 2% lignocaine with adrenaline (1:1000).

Limited conjunctival peritomy was carried out and 2 triangular scleral flaps 2/3rd of the scleral thickness and 180° apart were made at 3 and 9 o'clock with the base at the limbus and size 3mm from base to apex.

A corneal incision with 3.2mm knife at 12 o'clock was given. Anterior vitrectomy were carried out in all cases. 10/0 prolene suture was used in all cases for lens fixation. 10/0 nylon suture was used for scleral flap and corneal repair. Conjunctiva sutured with 7/0 vicryl. A 27 gauge needle was passed through a sclera at 0.7mm scleral bed from the limbus on one side and a 10/0 prolene suture on a straight needle through opposite scleral bed. The prolene suture needle was engaged into the 27 gauge needle in the peripupillary plan. The 27 gauge needle was withdrawn along with the prolene needle. The corneal incision enlarged with scissor to accommodate the IOL optic to 6.50mm. The suture was drawn out through the corneal incision. The suture was cut and each end tied to the haptics eyelets of the IOL. Sutures were pulled through the scleral bed and tied. Scleral flaps were sutured with 10/0 nylon and conjunctiva with 7/0 vicryl.

The corneal wound stitched with 10/0 nylon interrupted sutures.

RESULTS

A total of 16 eyes of 16 patients underwent scleral sutured PC IOL. Thirteen patients had completed their six months follow-up. Three patients who did not complete their follow-up visits were excluded from the study. There were 10 male and three female patients. All of them had unilateral surgery. Age ranged from 10 years to 65 years. Out of 13 cases 9 (69.23 %) cases had left eye while 4 cases (30.76%) had right eye. Indications for scleral sutured PC IOL were complicated eye surgery with posterior capsule rupture in 8 cases (61.53%), traumatic lens subluxation in 3 cases (23.07%) and lens dislocation in one case (7.69%).

Nine patients (69.23%) achieved 6/12 or better visual acuity on 3rd post operative follow up visits. On 1st postoperative day the BCVA was decreased due to corneal oedema. Two patients (15.38%) had bleeding intraoperatively from fixation suture site. Bleeding stopped spontaneously and cleared up as much as possible with anterior vitrectomy. In one patient 1st postop visual acuity was decreased but improved at 2nd follow-up visit. Two patients (15.38%) had suture erosion, one patient (7.69) had lens tilt due to vitreous tag postoperatively and one patient (7.69%) had cystoid macular oedema.

Demographic profile, aetiology, pre and post operative best corrected visual acuity are shown in (Table I).

DISCUSSION

Currently no consensus exists on the question of optimal method for intraocular (IOL) implantation without capsular support. Scleral sutured IOLs require a precise surgical technique and prolonged surgical time. In the absence of adequate capsular support or in the presence of zonular dialysis various techniques of IOL implantation are available. AC IOLs, iris-sutured PC IOLs, and scleral sutured PC IOLs are common methods of lens implantation for patients with little or no capsular support. Studies have reported various benefits and complications for each procedure. However, the decision of which IOL to be placed for each patient may introduce selection bias that could have affected study outcomes. For example, angle abnormalities and peripheral synechea may have precluded

AC IOL placement in some patients, and patients with limited iris tissue may not get an iris-sutured lens. Schein and colleagues compared all 3 intraocular lenses and found similar visual acuity outcome with all 3 types and a slight increase of CME with SS PC IOLs[9]. In our study out of 13 patients one patient got cystoid macular oedema and one patient had intraocular lens tilt, all the other patients achieved good visual acuity. All patients were followed up for six months and had stable visual acuity. The percentage of patients with stable or improved postoperative visual acuity is (69.23%) which is comparable to both iris-sutured lenses (72%) and ACIOL (71.4%–76%)[10].

In our study, we had one case of lens till, but there was no case of IOL dislocation. Previously published data report a lens tilt rate of 11% and dislocation rate between 0 and 10%[11]. The incidence of lens dislocation is 9.9% after an iris-sutured lens and 3% after AC IOL implantation[12].

Studies of the scleral sutured PC IOL, in particular, have shown that it is a safe procedure that can improve visual acuity, but it can present various complications. The published complications include glaucoma, CME, retinal detachment, endophthal-mitis, lens tilt or dislocation, and suture exposure or breakage. All of these complications have been reported at variable frequencies following placement of iris-sutured IOLs, and all except suture exposure or breakage have been documented with AC IOLs.

In uncontrolled and controlled studies, the risk of choroidal hemorrhage ranged from 0 to 22%[13]. In our study, only two eyes developed hemorrhage, which started in the scleral suture site.

A new concern has been raised about the long-term safety of using 10-0 polypropylene as the suture material to fixate the IOL haptic to the scleral wall. Recent reports have indicated that prolene suture can undergo hydrolysis and degrade, leading to spontaneous subluxation of the scleral-sutured IOL in 10–27% of cases[14].

It is known, however, that a haptic sewn to the sclera, outside of the ciliary sulcus, will not form a fibrous membrane and that as many as 50% of scleral-sutured haptics are unintentionally sewn outside the ciliary sulcus.

This case series provides evidence that SS PCIOL insertion can be performed with minimal postoperative complications. This technique appears to be a satisfactory method of visual rehabilitation.

CONCLUSION

The technique of scleral sutured PC IOL insertion via the ab externo method with a thick scleral flap offers a low complication profile and should be considered as a viable option for secondary IOL implantation. Ultimately, individual patient factors and surgeon preference and expertise should be a guide to decide as to which secondary IOL is most appropriate for each patient.

Author's affiliation

Dr. Mushtaq Ahmad
Registrar Ophthalmology
Department HMC, Peshawar

Dr. Sofia Iqbal
Associat Prof. Ophthalmology
Khyber Girls Medical College
HMC, Peshawar

Dr. Nazullah
Assistant Prof. Ophthalmology
Bannu Medical College, Bannu

Dr. Naz Jehangir
Medical Officer Ophthalmology
HMC, Peshawar

Table 1:

Laterality of the eye	Age	Sex	Aetiology	Preoperative BCVA	Postoperative BCVA after one day	Postoperative BCVA after two months	Postoperative BCVA after six months	Complications
Lt eye	35 yrs	Male	Trauma (Traumatic lens Subluxation)	6/60	6/24	6/12	6/9	None
Lt eye	60yrs	Male	Complicated surgery (posterior capsular rupture with vitreous loss)	6/36	6/36	6/24	6/9	None
Rt eye	13yrs	Male	Trauma (Traumatic lens subluxation)	6/24	6/18	6/18	6/6	Intraoperative Vitreous bleed
Lt eye	35 yrs	Male	Marfan Syndrome Lens dislocation to AC	6/12	6/9	6/9	6/9	None
Rt eye	56yrs	Female	Complicated surgery (posterior capsular rupture with vitreous loss)	6/24	6/18	6/12	6/12	None
Lt eye	65yrs	Male	Psuedoexfoliation complicated cataract surgery (posterior capsular rupture vitreous loss)	6/18	6/36	6/18	6/18	Suture erosion
Lt eye	60yrs	Female	Complicated surgery (posterior capsular rupture with vitreous loss)	6/12	6/24	6/12	6/12	Suture erosion
Rt Eye	60yrs	Female	Complicated surgery (posterior capsular rupture with vitreous loss)	6/24	6/36	6/18	6/18	Intraoperative Vitreous bleed
Rt Eye	34 yrs	Male	Traumatic (Traumatic posterior capsular rupture vitreous loss)	6/24	6/36	6/24	6/24	Lens tilt due to vitreous tag
Lt Eye	57yrs	Male	Complicated surgery(posterior capsular rupture with vitreous loss)	6/18	6/18	6/24	6/36	CME
Lt Eye	11yrs	Male	Congenital lens aspiration (No Posterior capsular Support Aphakia)	6/18	6/12	6/12	6/12	None
Lt Eye	14yrs	Male	Microspherophakia/ Ectopia lentis	6/24	6/18	6/9	6/9	None
Lt Eye	45yrs	Male	Multiple Intraocular surgery (Aphakic)	6/24	6/36	6/24	6/12	None

REFERENCE

1. **Ridley H:** Intra-ocular acrylic lenses. Trans Ophthalmol Soc UK. 1951, 71**:** 617–21.
2. **Por YM, Lavin MJ.** Techniques of intraocular lens suspension in the absence of capsular/zonular support. Surv Ophthalmol. 2005; 50: 429-62.
3. **Oh H, Chu Y, Woong known O.** Surgical technique for suture fixation of a single piece hydrophilic acrylic intraocular lens in the absence of capsular support. J Cataract Refract Surg. 2007; 33: 962-5.
4. **Apple DJ, Brems RN, Park RB.** Anterior chamber lenses. Part I: complications and pathology and a review of designs. J Cataract Refract Surg. 1987; 13: 157-74
5. **Wagoner MD, Cox TA, Ariyasu RG.** Intraocular lens implantation in the absence of capsular support. A report by the American Academy of Ophthalmology. Ophthalmology. 2003; 110: 840-59.
6. **Malbran ES, Malbran E Jr, Negri I.** Lens guide suture for transport and fixation in secondary IOL implantation after intracapsular extraction. Int Ophthalmol. 1986; 9: 151-60.
7. **Wagoner MD, Cox TA, Ariyasu RG, et al.** Intraocular lens implantation in the absence of capsular support: a report by the American Academy of Ophthalmology. Ophthalmology. 2003; 110: 840-59.
8. **Manabe SI, Oh H, Amino K.** Ultrasound biomicroscopic analysis of posterior chamber intraocular lenses with transscleral sulcus suture. Ophthalmology. 2000; 107: 2172-8.
9. **Schein OD, Kenyon KR, Odrick MQ.** A randomized trial of intraocular lens fixation techniques with penetrating ketaroplasty. Ophthalmology. 1993; 100: 1437–43.
10. **Akpek EK, Altan-Yaycioglu R, Karadayi K.** Long-term outcomes of combined penetrating keratoplasty with iris-sutured intraocular lens implantation. Ophthalmology. 2003; 110: 1017-22.
11. **Akpek EK, Altan-Yaycioglu R, Karadayi K, et al.** Long-term outcomes of combined penetrating keratoplasty with iris-sutured intraocular lens implantation. Ophthalmology. 2003; 110: 1017-22.
12. **Donaldson KE, Gorscak JJ, Budenz DL, et al.** Anterior chamber and sutured posterior chamber intraocular lenses in eyes with poor capsular support. J Cataract Refract Surg. 2005; 31: 903-9.
13. **Walter KA, Wood TD, Ford JG, et al.** Retrospective analysis of a novel method of transscleral suture fixation for posterior-chamber intraocular lens implantation in the absence of capsular support. Cornea. 1998; 17: 262-6.
14. **Price MO, Price FW, Werner L, et al.** Late dislocation of scleral-sutured posterior chamber intraocular lenses. J Cataract Refract Surg. 2005; 31: 1320-6.