Original Article

Visual Outcome and Complications of Anterior Chamber Intraocular Lens Versus Scleral Fixated Intraocular Lens

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Purpose: To compare the visual outcome and complications associated with anterior chamber IOL versus scleral fixated IOL following cataract surgery with poor capsular support.

Material and Methods: This interventional comparative study was conducted from April 2010 to December 2011 in the department of Ophthalmology Hayatabad Medical Complex Peshawar. Thirty two eyes were included in the study consisting of twenty eight patients. They were classified into 2 groups; Group I: Where 16 eyes underwent anterior chamber IOLs (ACIOLs) implantation either primary or secondary and Group II: Where 16 eyes underwent scleral fixated IOLs (SFIOLs) implantation either primary or secondary. Patients were followed for one month, 3 months and 6 months.

Results: There was no statistically significant difference noted between the two groups after six months. BCVA 6/6 – 6/9 in 25% preoperatively improved to 56.25% in group – I after six months postoperatively while in group-II it improved from 31.25% to 56%. Complications rate was analysed, corneal astigmatism > 1 diopter was noted 31.25% in group – I and 25% in group – II. Hyphaema / vitreous hemorrhage was 18.75%, IOL decentration was 12.50% in group – II, but no case recorded in group – I.

Conclusion: BCVA improved in both groups with no significant differences in outcome in complicated cataract extraction with poor capsular support. However higher rate of complications were noted in ACIOLs group as compared to SF IOL. Further large scale evaluation is need.

The first Intraocular lenses were introduced in cataract surgery by Sir Harold Ridley in 1949[1]. It became standard of care in the late 1980s. Fixation of intraocular lenses in cases of insufficient or no capsular support is challenging and requires good surgical techniques to resolve different situations. 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]. Presently, there are five primary methods for dealing with IOL requirements in the absence of capsular support, mainly depending on the preoperative status of the eye: flexible open-loop ACIOLs and iris claw ACIOLs; iris-fixated retro-pupillary ACIOLs; iris-sutured PCIOLs and trans-scleral – sutured PCIOLs. If both the iris and the capsule are absent or disrupted, sutured transscleral PCIOLs are the only option[2]. It has been postulated that AC IOL cause subclinical uveitis secondary to lens-tissue, which creates inflammatory products that could be directly toxic to the endothelium and angle and could also result in cystoid macular edema[4]. Considerable controversy remains over the relative efficacy and safety of the different implantation

approaches when capsular supportis absent. Anterior chamber intra-ocular lens implantation is coming back into favor among some surgeons, thanks to improved, open loop ACIOL designs and re-emergence of the iris fixated claw IOL. Sizing is less critical with the flexible haptics of the open-loop ACIOLs; as opposed to the more rigid or closed-loop ACIOL designs.[5] Several studies demonstrated improved results with these modern devices. Nevertheless, concern remains that ACIOLs are more damaging to the corneal endothelium than PCIOLs. The modern ACIOL designs had decreased the complications which were associated with the closed-loop ACIOLs but they have not been eliminated[6]. In 1986, Malbran and colleagues were the first to describe scleral sulcus fixation of PC IOLs.[7] In 2003, an American Academy of Ophthalmology sponsored report on IOL implantation in the absence of capsular support after a thorough literature assessment, by Wagoner and colleagues concluded that the scleral sutured posterior chamber IOLs were safe and effective in adults[8]. Today, considerable controversy remains over the relative efficacy and safety of the different implantation approaches when capsular support is absent.

MATERIAL AND METHODS

This interventional comparative study was conducted from April 2010 to December 2011 in the department of Ophthalmology Hayatabad Medical Complex Peshawar. Thirty two eyes included of 28 patients and they were classified into 2 groups; Group I: Where 16 eyes underwent anterior chamber IOLs (ACIOLs) implantation either primary or secondary and Group II: Where 16 eyes underwent scleral fixated IOLs (SFIOLs) implantation either primary or secondary. Indications for surgery included aphakia, subluxated lenses and cases with posterior capsular rents. Exclusion criteria included iritis, uveitis, glaucoma, amblyopia, macular scar and patients with poor vision other than cataract. A structured proforma was used for each patient including demography, clinical history, investigations and complete ophthalmic examination. Reason for failed PCIOL implantation, mean preoperative and postoperative Snellen BCVA recorded. Surgery was carried out under local anaesthesia in adults and under General anaesthesia in children.

Surgical Technique

In group-I, large 6 to 9 mm incision was used, after the completion of surgery limited anterior vitrectomy and one superior PI done in each case and pupil was constricted with carbacol 0.01%. Viscoelastic hydroxyl-propylmethyl cellulose (HPMC) 2% injected to the anterior chamber. ACIOL with overall diameter 12.50 mm, optic diameter6.50 mm and with 115 A –constant implantation was performed either primary in complicated cataract surgeries or secondary in aphakic cases. Corneal wound was stitched using interrupted 10/0 Nylon sutures. In group-II, 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. One side port was made for anterior chamber (AC) maintainer, viscoelastichydroxyl propyl methyl cellulose (HPMC) 2% was pushed into the anterior chamber. Corneal incision was made from 6-9 mm and surgery was completed after limited anterior vitrectomy. Viscoelastic pushed into the AC 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 suture was drawn out through the dilated pupil and 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 was stitched with 10/0 nylon interrupted sutures. Postoperatively, topical antibiotics and steroid drops were used routinely for one month. Patients were followed for one month, 3 months and 6 months. During each follow up visit BCVA and complications recorded in both groups.

RESULTS

Total 32 eyes of 28 patients were included in the study all of them had completed six months follow up. They were divided in to two groups group-I ACIOLs group and group–II SFIOLs group. The mean age of patients in ACIOL group was 57.30 ± 18.54 years and male: female ratio was 12:9 In the SFIOL group, mean age was 57.35 ± 18.80 years; M: F ratio was 10:9.

The pre and post-operative visual acuity was measured and there was no statistically significant difference noted between the two groups after six months. BCVA 6/6-6/9 in 25% preoperatively improved to 56.25% in group-I after six months postoperatively while in group-II it improved from 31.25% to 56% as shown in (Table 1).

Table 1: Pre and post-operative after six months best correted visual acuity (BCV A) n = 32

BCV A	Groups	Pre-Operative n (%)	Post-Operative After one month n (%)	Post-Operative After three month n (%)	Post-Operative After six month n (%)
6/6-6/9	Group-I (n = 16)	4 (25)	5 (31.25)	8 (50)	9 (56)
	Group-II (n = 16)	5 (31.25)	6 (37.50)	7 (43.75)	9 (56.25)
	p-value	1.00	1.00	1.00	1.00
6/12-6/18	Group-I (n = 16)	9 (56.25)	8 (50)	5 (31.25)	5 (31.25)
	Group-II (n = 16)	9 (56.25)	9 (56.25)	6 (37.50)	5 (31.25)
	p-value	1.00	1.00	1.00	1.00
6/60 and worse	Group-I (n = 16)	3 (18.75)	3 (18.75)	3 (18.75)	2 (12.50)
	Group-II (n = 16)	2 (12.50)	1 (6.25)	3 (18.75)	2 (12.50)
	p-value	1.00	0.5996	1.00	1.00

BCV A = Best Corrected Visual Acuity

Table 2: Postoperative complication Mention cases in following table to calculate p-value n = 32

Complications	Group-I (n=16) No. of Patients n (%)	Group-II (n=16) No. of Patients n (%)	P-value
Astigmatism>1diopter	5 (31.25)	4 (25)	1.000
Iritis/Uveitis	2 (12.50)	1 (6.25)	1.000
Cystoid Macular Oedema	1 (6.25)	0	1.000
Hyphaema/Vitreous Haemorrahage	0	3 (18.75)	0.2258
Suture Erosion	1 (6.25)	2 (12.50)	1.000
IOL decentration	0	2 (12.50)	0.4839

Table 3: Comparison of intraocular pressure n = 32

IOL	Group-I (n=16) Mean SD	Group-II (n=16) Mean SD	p-value
Pre-Operative	13.7 + 2.2	14 + 2.5	0.7212
Post-Operative	14.5 + 1.8	13.50 + 2.50	0.2040

Complications rate was analysed as shown in table 2, corneal astigmatism, cystoid macular oedema and hyphaema / vitreous haemorrhage were more in group-I as compared to group-II.

Intraocular pressure was recorded pre and post-operatively in both groups no significant change noted in pre and post-operative readings (Table 3).

DISCUSSION

The surgical approach in this series was influenced by the specialty (vitreo-retina) and the preferences of the operating surgeon (AS), but standardization was established regarding the scleral fixation itself, while the remainder of the procedure was determined by the case pathology and operative circumstances. The stability and centralization of the scleraly fixated IOLs in this study were excellent during the follow up period with no rotation or subluxation. The visual acuity significantly improved postoperatively. Our results were comparable to Ellakwa et al who showed no significant difference existed regarding the final visual outcome between anterior chamber (log MAR=0.88) and scleral fixation IOL (log MAR=0.84) groups, also non significant difference existed regarding the final visual outcome between primary and secondary AC IOL implantation, however higher postoperative visual acuities were detected in secondary SFIOL. In group I, the most common complications were uveitis (35%), ocular hypertension (25%), CME (20%), retinal detachment in one case (5%) and endophthalmitis in one case (5%). In group II, the most common complications were ocular hypertension (25%), retinal detachment (15%), CME (15%), suture erosion (15%), vitreous hemorrhage (10%), uveitis (5%) and endophthalmitis in one case (5%).[9] Our results were also comparable to the results of Donaldson et al[11], who showed that mean postoperative BCVA 20/60 (0.5 Log MAR) in ACIOL group and 20/50 (0.4 Log MAR) in SFIOL group with no statistically significant difference between both groups, Donaldson et al[10] study also recorded elevated IOP in 39% of ACIOL group versus 42% of SFIOL group with no statistically significant difference between the two groups which differs from our study in that percentage of ocular hypertension in ACIOL group was more than SFIOL group. CME found at 12% of ACIOL group versus 10% of SFIOL group with no statistically significant difference between the two groups that matches our results. A research done by Sujata et al,[11] showed that the mean post-operative log MAR BCVA was 0.75 in SFIOL group and 0.52 in AC IOL group with better BCVA in ACIOL group. This difference was statistically significant (p = 0.0003). Our study showed no statistically significant difference in the final BCVA in both groups because at our study AC IOL implantation was done by different surgeons not by a single surgeon besides Sujata et al[5] compared SF IOL versus primary AC IOL only. Kwong et al,[12] recorded better results from primary AC vs primary sclera – fixated IOLs in eyes with poor capsular support, log MAR visual acuity averaged 0.322 in eyes that received an anterior chamber IOL, significantly better than the sclera – fixated IOL group, which had a mean visual acuity of 0.486 (P = 0.01). In the anterior chamber IOL group, 71% of eyes achieved a Snellen visual acuity of 20/40 or better compared with 47.2% of eyes in the scleral fixated IOL group, in our study no statistically significant difference was found between primary AC vs. primary scleral – fixated IOLs.

CONCLUSION

BCVA improved in both groups with no significant differences in outcome in complicated cataract extraction with poor capsular support. However higher rate of complications were noted in ACIOLs group as compared to SF IOL. Further large scale evaluation is needed.

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