

VISUAL OUTCOME AFTER CATARACT SURGERY IN COMPLICATED CATARACT

Satish Desai¹, Vinita Rao²

HOW TO CITE THIS ARTICLE:

Satish Desai, Vinita Rao. "Visual Outcome after Cataract Surgery in Complicated Cataract". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 34, August 11; Page: 9142-9156, DOI: 10.14260/jemds/2014/3180

ABSTRACT: AIMS: To study various factors responsible for visual outcome after cataract surgery in complicated cataract secondary to uveitis. **SETTINGS AND STUDY DESIGN:** A Retrospective, Clinical study was carried out at tertiary eye care center in central Maharashtra from Jan. 2002 to Jan. 2007 which included 60 eyes of 52 patients. **METHODS AND MATERIAL:** It was a retrospective study of patients with uveitis undergone cataract surgery between Jan. 2002 to Jan. 2007, at Shri Ganapati Netralaya, Jalna. It included patients of all age groups, both genders, diagnosed of complicated cataract due to uveitis subjected to cataract surgery with IOL implantation and detailed preoperative and postoperative -UCVA, BCVA, SLE, and Fundus evaluation with at least 3 months follow up. Follow up was on 1st post-operative day, 1 week post-operative, 1 month post-operative and 3 months post-operative. We excluded patients with complicated cataract other than uveitic origin, post-operative follow up less than 3 months and patients with ocular diseases other than uveitis. **TESTS APPLIED:** Paired & Unpaired t-test. **RESULTS:** 1) Visual acuity: BCVA (>6/12 in 43(71.67 %) eyes. 2) **TYPE OF SURGERY:** ECCE+IOL,⁽³⁾ SICS+IOL,⁽⁵⁾ SICS+AV(1) PE+IOL.⁽⁵¹⁾ 3) Type of IOL used: PMMA,⁽⁴⁶⁾ HSM,⁽²⁾ Acrylic.⁽¹¹⁾ 4) Postoperative complications:- CME-1(1.66%), Recurrence of Uveitis-9(15%), PCO:-19(31.66%), Posterior synechie: 3 (5%), Hyphema:-2 (3.33%), Hypotony:-4 (6.66%), Secondary Glaucoma:-2 (3.33%) RD:-1 (1.66%). **CONCLUSIONS:** 1) Visual outcome after cataract surgery in complicated cataract is statistically significant (P<0.0001) in our study. 2) The best technique of surgery remains Phacoemulsification with in-the-bag IOL implantation of PCIOL. 3) Use of pupil dilating technique's (Iris hook, Sphincterotomy) is helpful in making adequate size capsulorrhexis and thereby reducing post-operative complications like anterior capsular opacification & capsular phimosis. 4) The most important predictor of successful cataract surgery in our study was meticulous control of preoperative inflammation followed by regular follow up after cataract surgery.

KEYWORDS: Complicated cataract.

INTRODUCTION: Uveitis is a common problem encountered in diverse forms. It is a chronic and usually protracted condition, requiring long-term treatment with corticosteroid or other immunosuppressive drugs. Cataract is a common complication of uveitis patients either as a direct consequence of the disease process or as a sequel of long-term corticosteroid use.

Fortunately, however, modern cataract surgery can restore good vision in most patients. While patients with uveitis require special preparation and planning, appropriate patient selection, meticulous suppression of preoperative inflammation, careful surgical technique and prompt management of complications can restore good vision.

Cataract surgery in uveitic eyes has been shown to offer good visual rehabilitation, especially with the use of intraocular lenses (IOLs). Modern IOLs are considered safe in most uveitic eyes and do not cause increased postoperative inflammation.

ORIGINAL ARTICLE

The general guidelines for cataract surgery in uveitic eyes include a preoperative control of inflammation for at least a period of 3 months.

Preoperative Evaluation: Every possible attempt should be made to identify a cause for the uveitis prior to cataract surgery. As mentioned above, certain diseases tend to respond well to surgery, whereas other disorders pose more challenges both during and after the procedure. Establishing the diagnosis helps predict the patient's response to surgery. It is also important to identify those inflammatory disorders that are associated with systemic diseases.

It does relatively little good, for example, to remove a patient's cataract if he or she is suffering from a potentially fatal and unrecognized systemic illness. For these reasons, uveitis specialists will go to great lengths to identify the cause of inflammation in every patient. Once the intraocular inflammation has been controlled for 3-6 months with corticosteroids or non-corticosteroid immunosuppressive agents, most patients with uveitis may undergo cataract surgery if not otherwise contraindicated. Control of inflammation for at least 3 months, except in Fuchs' or lens induced uveitis.

Surgical Considerations: In general, the same surgical approach can be used for patients with uveitis as would be used for patients without uveitis. Most patients with uveitis can undergo clear corneal incision cataract surgery using topical/ local anesthesia. There are some differences between patients with and without uveitis, however and these should be noted while planning for surgery.

Once the decision has been made to place an IOL and the lens type has been chosen, positioning the lens becomes the next decision. Most patients with uveitis and cataract can have their IOLs placed safely in the capsular bag, just as would be done for non-uveitis patients with cataract. Iris-mounted, anterior chamber and scleral-fixated IOLs should be avoided in patients with uveitis.

AIMS AND OBJECTIVES:

Title: Visual outcome after cataract surgery in complicated cataract.

Aim: To study various factors responsible for visual outcome after cataract surgery in complicated cataract secondary to uveitis.

Study Design: Retrospective, Clinical study.

Period of Study: Jan. 2002 to Jan. 2007.

No. of Eyes included: 60.

REVIEW OF LITERATURE: Cataracts are a common complication of many forms of uveitis, with incidence rates, approaching 50% in uveitis associated with Juvenile rheumatoid arthritis¹⁻³ pars planitis⁴ and Fuchs' syndrome.⁵⁻⁸ Pathologically, lens abnormalities secondary to inflammation are seen initially in the anterior sub-capsular epithelium, equatorial zone, or in the posterior subcapsular region.⁹ Histopathologically, a multilayered fibrillar plaque is seen between the anterior capsule and lens epithelium.

This plaque has been found to compose of metaplastic lens epithelial cells.^{9,10} Deposition of immune complexes on the lens capsule during an inflammatory episode may also result in lens damage by activating complement and intensifying the inflammatory activity adjacent to the lens.¹¹

ORIGINAL ARTICLE

Until the advent of corticosteroids in the early n 1960s, ocular inflammation was difficult and often impossible to control, and articles discussing the results of cataract extraction in inflamed eyes reported a high incidence of severe complications.^{12,13} In many cases, the complications resulted in marked reduction of vision, or even loss of the eye.^{3,12}

A. CATARACT EXTRACTION IN FUCHS' HETEROCHROMIC IRIDOCYCLITIS: Prior to 1967, a number of authors reported that cataract extraction in Fuchs' syndrome was uncomplicated or associated with transient hyphema. Other authors even found that these patients tolerated the surgery better than did patients with primary cataract.^{5,7,14} In 1967, Ward and Hart¹⁵ reported a series of 9 patients with Fuchs' syndrome in whom significant complications developed following cataract extraction.

Shortly following this series Norn M, S,¹⁶ published retrospective series of 19 patients who underwent cataract extraction over 35years period from 1930 to 1965. Six patients underwent ICCE and remainder underwent ECCE. Vision at the time of last follow was 20/40 in 12 patients (63%) and worse in seven patients (37%). Smith and O'Connor,¹⁷ Liesegang,⁸ Jain et al,⁶ Mills and Rosen,¹⁸ Gee and Tabbara,^{19,20} Sukanya Mitra, J Biswas²¹ reported with similar results.

B. CATARACT EXTRACTION IN UVEITIS ASSOCIATED WITH JUVENILE RHEUMATOID ARTHRITIS: In a 1974 review of 76 children with JRA-associated uveitis, Smiley¹³ reported the results of cataract extraction that had been performed on 18 eyes. The complications that developed following, surgery was not specifically enumerated, but only three eyes (17%) retained 20/40 or better vision during follow-up. Two of these eyes were described as inflamed, one of which had secondary glaucoma. Twelve eyes (66%) were totally blind five years after surgery.

In 1976, the surgical results following phacoemulsification alone in eleven eyes were presented by Kanski and Shun-Shin,²² Praeger et al,²³ Foster et al²⁴ reviewed their results. A 1979 report by Diamond and Kaplan²⁵ and Algvere et al²⁶ reported similar results. Nobe et al²⁷ reported similar results in two eyes followed for seven and 15 months, respectively, following surgery. Petrilli et al,^{28,29,30} Flynn et al,³¹ Gregory M. Fox,³² David BenEzra et al³³ studies concluded that Cataract surgery in children's eyes with uveitis may be beneficial.

C. CATARACT EXTRACTION IN PARS PLANITIS: In a 1976 review of the complications encountered in 100 patients with pars planitis, Smith et al⁴ reported on 20 eyes that underwent cataract extraction. Intracapsular or extracapsular technique was used, and patients were followed for up to four years following surgery. Two eyes (10%) developed glaucoma postoperatively, but no other major complications were noted. In the group as a whole, 13 patients (65%) achieved vision better than 20/40. Foster et al.²⁴ Diamond and Kaplan,³⁴ Tutein, Nolthenius and Dcutman,³⁰ Girard et al,³⁵ Mieler et al³⁶ studies showed similar results.

E. CATARACT EXTRACTION IN IDIOPATHIC AND OTHER FORMS OF UVEITIS: This group includes patients with uveitis associated with Sarcoidosis, toxoplasmosis, Vogt-Koyanagi-Harada syndrome and sympathetic ophthalmia. Duke-Elder¹² and Smith and Nozik³⁷ both reported that

ORIGINAL ARTICLE

these patients do well following conventional surgery; as long as inflammation has been absent for at least two to three months preoperatively.

This evidence is anecdotal, however. Moorthy et al³⁸ performed cataract surgery in 19 eyes of VKH. 68% of eyes had BCVA of >6/12. The most common reason for BCVA <6/12 was pigmentary disturbances in the macula. Reynard and Minckler³⁹ Foster et al²⁴ Akova and Foster⁴⁰ Ganesh S, K, J Biswas et al,⁴¹ Foster et al²⁴ studies showed similar results.

- F. ROLE OF LENSECTOMY COMBINED WITH VITRECTOMY:** Reports of combined lens extraction with vitrectomy in inflamed eyes first appeared in the literature in 1978.³⁴ Following episodes of ocular inflammation the vitreous has been shown to contain clones of cells that will respond to the antigenic stimulus that incited the original inflammation.⁴² Pilot studies in rabbit eyes produced unacceptable sequelae.^{1,43} In 1980, Fitzgerald^{44,45,46,47} reported results following vitreous surgery in four patients with toxoplasmosis retinochoroiditis. The final acuity was improved in all patients, with two patients who had vision of 20/40 and 20/60, respectively. One patient had counting fingers vision secondary to macular toxoplasma scars.

In 1981, Algvere et, Nobe et al,²⁷ Tutein Nolthenius and Dcutman,³⁰ Dangel et al,²⁹ Girard et al,³⁵ Petrilli et al²⁸ published similar reports.

- G. Surgical technique:** Foster C S⁴⁸ includes a peripheral iridectomy, synechiolysis, pupillary membrane rupture and insurance of adequate pupil expansion. Adequate surgical access to the lens is essential,⁴⁹ Capsulorhexis allows the surgeon to be certain that the IOL is in the bag.⁵⁰ In 1993 Davison reported on the capsular contraction syndrome.⁵¹ Nishi.⁵² Suggested vacuuming the undersurface of the anterior capsule to significantly reduce the amount and effect of residual lens epithelial cells.

Foster and Barret⁵³ recommend a combination of phacoemulsification (because of the advantages of it's closed- system nature), followed by a pars plana vitrectomy for total removal of the lens in patients with JRA. Foster C S⁵⁴ concluded in his report about cataract extraction in patients with intermediate uveitis that IOLs in these patients are safe provided the selection of the patient is appropriate.

For eyes with uveitis, an all-polymethyl methacrylate (PMMA) lens may avoid the complement-mediated inflammation that may be induced by polypropylene haptics,^{55,56,57,58,59,60} although PMMA alone also may stimulate the complement cascade.⁵⁷ Short-term clinical evaluation revealed significantly less anterior chamber reaction and fewer IOL deposits in eyes with HSM IOL versus PMMA lenses.⁶¹ Jones N P,⁶² Narciss Okhravi⁶³ showed similar results.

- H. Specific Techniques Applicable to Cataract Surgery in Uveitic Eyes⁶⁴:** Vigorous dilation with atropine 1% and Neo-Synephrine-2.5% pre-operatively. Peripheral iridectomy followed by "hydraulic dissection" of iris with viscoelastic substances. Sector iridotomy/iridectomy followed by mechanical synechiolysis.

MATERIALS AND METHODS: It was a retrospective study of patients with uveitis undergone cataract surgery between Jan. 2002 to Jan. 2007, at Shri Ganapati Netralaya, Jalna. It included patients of complicated cataract subjected to preoperative and postoperative -UCVA, BCVA, SLE, and Fundus evaluation with at least 3 months follow up.

ORIGINAL ARTICLE

Follow up: 1'st post-operative day, 1 week post-operative, 1 month post-operative, and 3 months post-operative.

RESULTS:

Parameters were assessed as:

1. Patients with uveitis having undergone cataract surgery.
2. Visual acuity: UCVA, BCVA.
3. Type of surgery: ECCE+IOL, SICS+IOL, PE+IOL.
4. Type of IOL used. (PMMA, HSM, Acrylic)
5. Postoperative status of inflammation.
6. Postoperative complications (including PCO).
7. Intraoperative difficulties.
8. Postoperative follow up of at least 3 months.

The tests applied: Paired & Unpaired t-test.

RESULTS:

	Males	Females
No. of Eyes	30	30
No. of Patients	29	23
Overall Mean Age of Patients (Males+Females) +/- SD	36.4667 Yrs +/- 14.39 Yrs	

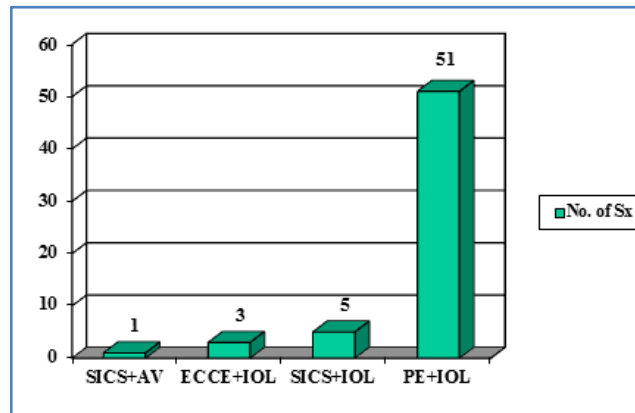
Table 1: Males/ Females

Type of Surgery	No. of Eyes
SICS+AV	1(1.67%)
ECCE+IOL	3 (5%)
SICS+IOL	5 (8.33%)
PE+IOL	51 (85%)
Total	60

Table 2: Type of Surgery

By conventional criteria, it is not statistically significant (P value equals 0.7849) in Post-OP BCVA between PE & SICS.

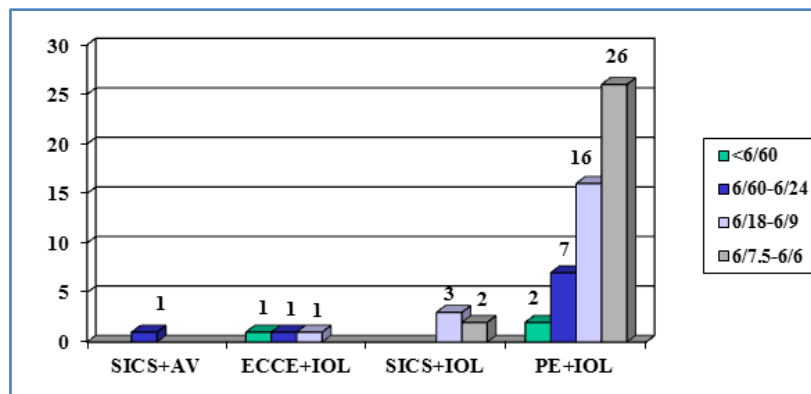
ORIGINAL ARTICLE



V/A	PE+IOL n=51	SICS+IOL n=5	ECCE+IOL n=3	SICS+AV n=1
<6/60	2(4%)	-	1(33%)	-
6/60-6/24	7(14%)	-	1(33%)	1(100%)
6/18-6/9	16(32%)	3(60%)	1(33%)	-
6/7.5-6/6	26(52%)	2(40%)	-	-

Table 3: BCVA at 6 wk PO -Type of Surgery

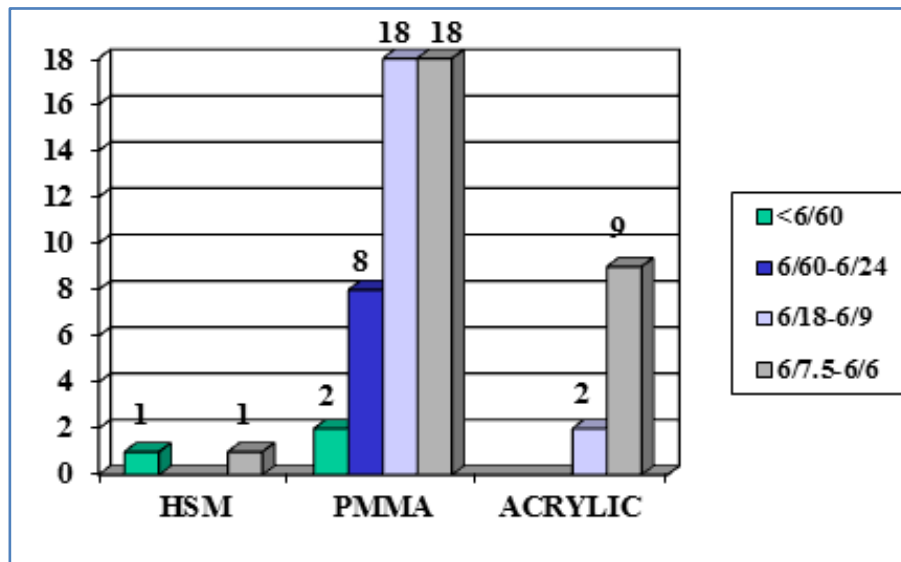
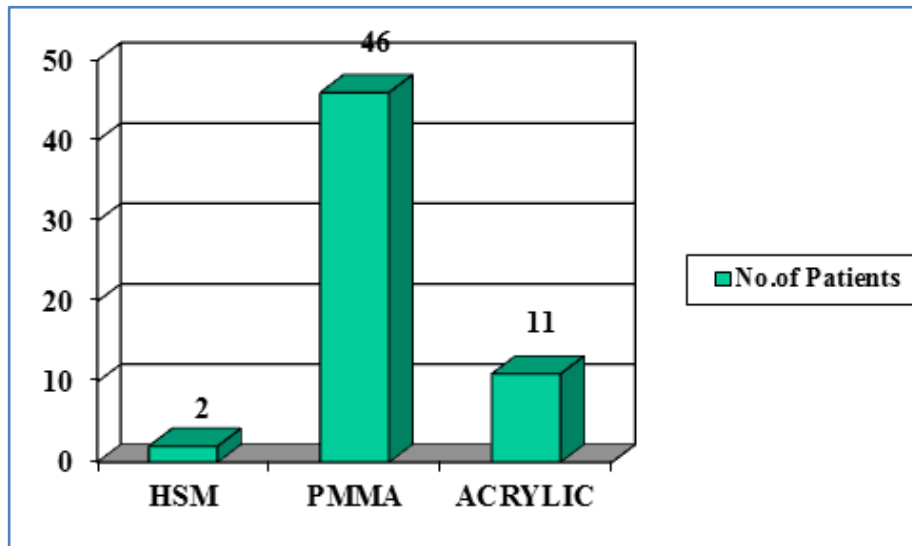
BCVA at 6 wk PO -Type of Surgery



Type of IOL Used	No. of Eyes
HSM	2(3.38%)
PMMA	46(77.96%)
ACRYLIC	11(18.64%)
Total	59

Table 4: Type of IOL Used

ORIGINAL ARTICLE



V/A	Acrylic n=11	PMMA n=46	HSM n=2
<6/60	-	2(4%)	1(50%)
6/60-6/24	-	8(16%)	-
6/18-6/9	2(18%)	18(40%)	-
6/7.5-6/6	9(82%)	18(40%)	1(50%)
BCVA at 6 wk PO-Type of IOL			

ORIGINAL ARTICLE

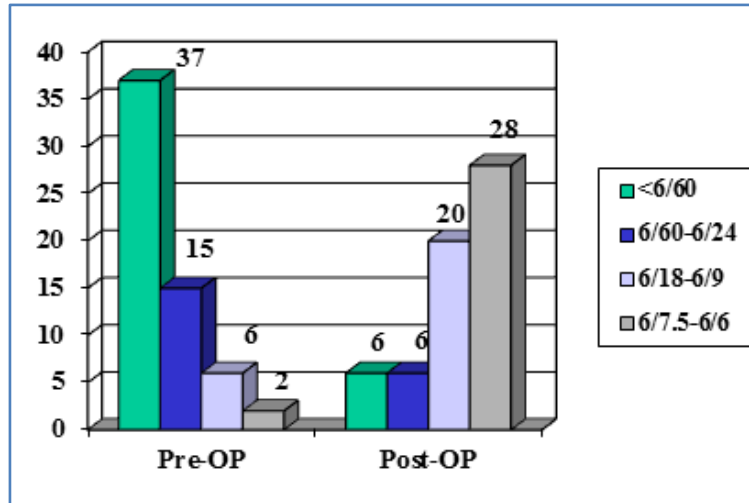
Post-op BCVA (Type of IOL):

Acrylic IOL v/s PMMA (Unpaired t test results):

P value and statistical significance:

The two-tailed P value equals 0.0351

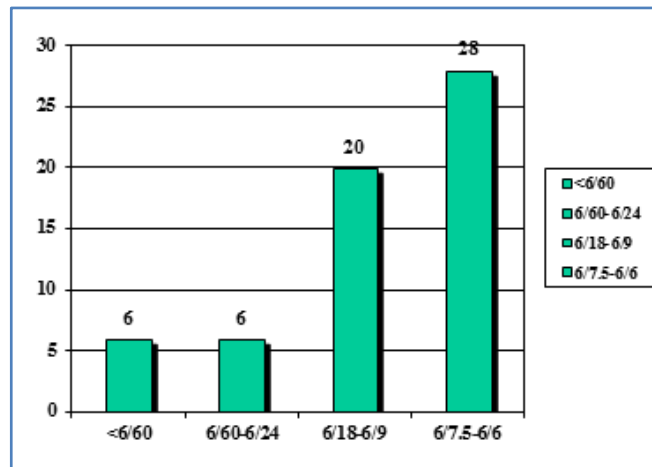
By conventional criteria; this difference is considered to be statistically significant.



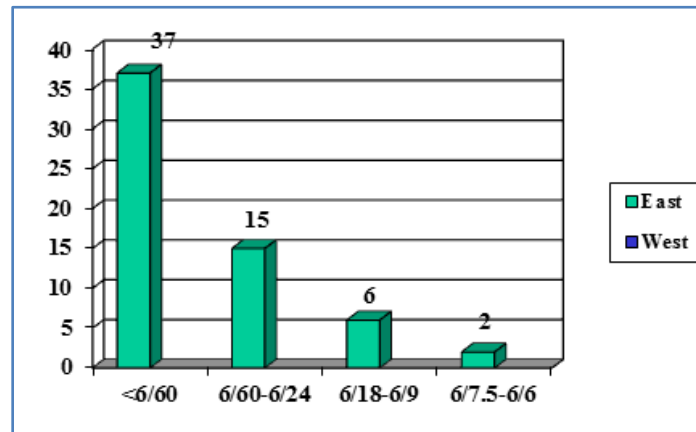
V.A.	Pre-OP N=60	Post-OP N=60
<6/60	37 (61.66%)	6(10%)
6/60-6/24	15(25%)	6(10%)
6/18-6/9	6(10%)	20(33.33%)
6/7.5-6/6	2(3.34%)	28(46.67%)

Table 5: BCVA-Pre-OP & Post-OP

BCVA at Pre-OP & BCVA at 6 wk PO:



ORIGINAL ARTICLE



Pre-op & Post-op BCVA:

Paired t test results:

P value and statistical significance:

The two-tailed P value is less than 0.0001

By conventional criteria; this difference is considered to be extremely statistically significant.

Complications	PE+IOL n=51	SICS+IOL n=5	ECCE+IOL n=3	APHAKIA (SICS+AV)n=1
Sec Glaucoma	2(4%)	-	-	-
Hyphema	2(4%)	-	-	-
PS	1(2%)	2(40%)	-	-
PCO	15(30%)	3(60%)	1(33%)	-
Recurrence of Uveitis	6(12%)	2(40%)	-	1(100%)
CME	1(2%)	-	-	-
Hypotony	2(4%)	-	1(33%)	1(100%)

Table 6: Post OP complications- Type of Surgery

DISCUSSION: Over the last 2-3 decades, it has been proven that cataract surgery has been of immense benefit in visual rehabilitation of patients with uveitis and cataract. Cataract surgery with PCIOL implantation has been established as a safe modality of treating cataract in pts with uveitis.

In our study accurate patient selection was done fulfilling the inclusion and exclusion criteria. Meticulous pre-operative and post-operative control of inflammation was achieved and a standardized surgical procedure was carried out. There was significant improvement ($P < 0.0001$) in visual acuity after cataract surgery.

Our study included 60 eyes of 52 patients, out of which 29 were males & 23 were females. We had one male patient and 7 female patients with bilateral involvement. Out of 60 eyes, 17 eyes (28.3%) suffered from FHI, 14 eyes (23.3%) from Idiopathic anterior uveitis, 14 eyes (23.3%) from VKH, 8 eyes (13.3%) from Intermediate uveitis, 4 eyes (6.7%) from Panuveitis and 1 eye (1.7%) each from TB, Sarcoidosis & Toxoplasmosis.

ORIGINAL ARTICLE

In our study, out of 17 eyes with FHI, 15 eyes (88.24%) had BCVA of 6/7.5-6/6, 1 eye (5.88%) had BCVA of 6/18-6/9 & 1 eye (5.88%) had BCVA of 6/60-6/64 (macular scar was the cause of reduced V.A.). In our study 15 eyes (88.24%) had BCVA of >6/12. There was no intraoperative complication in patients with FHI in our study.

Our results are more satisfactory compared to other studies. Liesegang⁸ in 1982, reported outcome of 17 eyes with FHI who underwent cataract surgery and found BCVA of >6/12 in 8eyes (41%), 6/18-6/60 in 3 eyes (17.6%) and < 6/60 in 6 eyes (35.3%). Smith and O Connor¹⁷ in a series of 29 eyes found BCVA of > 6/12 in 25 eyes (86.2%) & 1 eye with <6/60. The results of Sukanya Mitra, J Biswas^{21,65-68} showed BCVA of >6/6 in 9 eyes (50%) & 6/18-6/9 in 5 eyes (27.7%) & 6/60-6/24 in 3 eyes (16.66%) & 1 eye (5.5%) <6/60.

The design & material of IOL also can influence the outcome of surgery. The results suggest that Acrylic IOL's provide a better visual outcome and lower rate of complications compared from other IOL's.

Narciss Okhravi⁶³ & Susan L Lightman, in January 1998; studied 90 eyes of 76 patients with uveitis who underwent cataract surgery. The majority of patients, however, were noted to have visual loss secondary to conditions present before surgery & concluded that Cataract surgery in eyes with uveitis leads to an improvement of vision in the majority of cases.

A study by Estafanous M, L et al⁷², reported results of 39 eyes of varied uveitic etiology which underwent PE+ IOL implantation & found BCVA of >6/12 in 34 eyes (87%). PCO occurred in 24 eyes (62%), recurrence in 41% eyes, CME in 33% eyes, Posterior synechiae in 8% eyes & concluded PE as safe surgery in uveitis patients.

Sr No.	Study	No. of Eyes	Type of IOL	Conclusion
1	Foster et al ²⁴	39	27 All PMMA	Single piece broad haptic PMMA IOL exerts a positive influence in maintaining capsular bag size & shape & good functional IOL position.
			12 Haptic of Polypropylene	
2	Jones et al ⁵⁶	20	20 HSM	Giant cell adhesion to IOL was not prevented & posterior synechie may still occur with HSM.
3	Jan Ygge et al ⁵⁹	53	30 PMMA	HSM lenses give rise to fewer signs of cellular reaction than PMMA.
			23 HSM	
4	Chia Lee et al ⁶⁸	121	73 HSM	HSM IOL result in less corneal edema, AC reaction, posterior synechie, pigment deposition & corneal edema.
			48 PMMA	
5	Rauz et al ⁶⁹	60	30 Acrylic	Giant cells are more common on Acrylic IOL. Scratch marks are more common on Acrylic & Hydrogel.
			17 Silicon	
			13 Hydrogel	
6	Claudette Abella et al ⁷⁰	43	25 Hydrophobic	Hydrophilic has better Uveal but poorer Capsular biocompatibility compared to Hydrophobic.
			18 Hydrophilic	
7	Claudette Abella et al ⁷¹	67	27 Hydrophobic	Hydrophilic Acrylic Material had good uveal but worse capsular biocompatibility. Hydrophobic Acrylic Material had lower uveal but better capsular biocompatibility
			16 Hydrophilic	
			24 Silicon	

ORIGINAL ARTICLE

In 2002 Hazari & V Sangwan⁷³, Dr Hawlina's study⁷⁴, Kawaquchi et al⁷⁵ reported similar results. Results in our study were in accordance with above studies with 43 eyes (71.67%) achieving BCVA of > 6/12. In 17 eyes (28.33%) VA was <6/12.

Sr. No.	Name of Study	Method of Surgery	No. of Eyes	BCVA >6/12
1	Our Study	PE + IOL	51	36 (70.6%)
2	Foster et al ²⁴	ECCE + IOL	39	27 (84.4%)
3	Kang et al ⁷⁶	PE + IOL	28	18 (64%)
4	Estafanous M L et al ⁷²	PE + IOL	39	34 (87%)
5	Kawaquchi et al ⁷⁵	PE + IOL	131	97 (74%)

Results of various studies show BCVA of >6/12 in >70% of patients, though operated by different techniques. But the decreased incidence of post-operative complications were seen in patients with PE + IOL. Above studies concluded that PE + IOL implantation is safe & effective method in majority of patients with uveitis.

Complications	Our Study (60 eyes)	Foster et al ²⁴ (39 eyes)	Kang et al ⁷⁶ (28 eyes)	Estafanous L et al ⁷² (39 eyes)	Kawaquchi et al ⁷⁵ (131 eyes)
CME	1 (1.66%)	18 (46.2%)	-	13 (33%)	-
Recurrence of Uveitis	9 (15%)	20 (51.3%)	-	16 (41%)	17 (13%)
PCO	19 (31.66%)	16 (41%)	3 (10.7%)	24 (62%)	11 (8.4%)
PS	3 (5%)	6 (15.4%)	2 (7.1%)	3 (8.1%)	-
ERM	-	9 (23%)	-	-	-
Hyphema	2 (3.33%)	3 (7.7%)	-	-	-
Hypotony	4 (6.66%)	3 (7.7%)	-	-	-
Sec Glaucoma	2 (3.33%)	-	1 (3.6%)	-	-
RD	1 (1.66%)	-	1 (3.6%)	-	-

CONCLUSIONS:

1. Visual outcome after cataract surgery in complicated cataract is statistically significant ($P < 0.0001$) in our study.
2. The best technique of surgery remains Phacoemulsification with in-the-bag IOL implantation of PCIOL.
3. Use of pupil dilating technique's (Iris hook, Sphincterotomy) is helpful in making adequate size capsulorrhexis and thereby reducing post-operative complications like anterior capsular opacification & capsular phimosis.
4. The most important predictor of successful cataract surgery in our study was meticulous control of preoperative inflammation followed by regular follow up after cataract surgery.
5. Appropriate patient selection, careful surgical technique and prompt management of complications can restore good vision in uveitic cataracts.
6. We also acknowledge that, Square edge Foldable IOLs can give better BCVA in uveitic cataracts.

REFERENCES:

1. Kaplan HJ, Diamond JG, Brown SA: Vitrectomy in Experimental Uveitis part-1. Operative technique in rabbits. *Arch Ophthalmol.*1979; 97: 331-335.
2. Key SN III, Kimura SJ: Iridocyclitis associated with Juvenile Rheumatoid Arthritis. *Am J Ophthalmology* 1975;80: 425-429.
3. Wolf MD, Lichter PR, Ragsdale CG: Prognostic Factors in Uveitis of Juvenile Rheumatoid Arthritis; *Ophthalmology* 1987;94: 1242-1248.
4. Smith RE, Godfrey WA, Kimura SJ: Complications of Chronic cyclitis. *Am J Ophthalmology* 1976; 82: 277-282.
5. Franceschetti A: Heterochromic cyclitis (Fuchs' syndrome).*Am J Ophthalmology.* 1955;39: 50-58.
6. Jain IS, Gupta A, Gangwar DN, and Dhir SP: Fuchs' heterochromic cyclitis: *Am J Ophthalmol* 1983;15: 640-64,.
7. Kimura SJ, Hogan MJ, Thygeson P: Fuchs' syndrome of heterochromic cyclitis. *Arch Ophthalmology* 1955; 54:179-186.
8. Liesegang TJ: Clinical features and prognosis in Fuchs' uveitis syndrome, *Arch Ophthalmology* 1982;100: 1622-1626.
9. Spencer WH: Lens, in Spencer WH (Ed): *Ophthalmic Pathology: An Atlas and Textbook.* Philadelphia, WB Saunders, 1985, Ed 3, pp 423-479.
10. Fisher RF: The lens in uveitis, "*Trans Ophthalmology Soc UK* 1981;101:317-320.
11. Wiliiamson J, Paterson RWW, Mc Gavin DM, et al: *Br J Ophthalmology* 53: 361-372, 1969.
12. Duke-Elder S: Cataract complication, *System of Ophthalmology-Vol. 11, Diseases of the Lens and Vitreous; Glaucoma & Hypotony.* St. Louis, Mosby, 1969, pp 210-219.
13. Smiley WK: The eye in juvenile rheumatoid arthritis. *Trans Ophthalmology Soc UK* 94: 817-829, 1974
14. Goldberg MF, Erozan YS, Duke JR, Frost JK; Cytopathological and histopathologic aspects of Fuchs heterochromic iridocyclitis. *Arch Ophthalmology* 74; 604-609, 1965.
15. Ward DM, Hart CT; Complicated cataract extraction in Fuchs' heterochromic uveitis. *Br J Ophthalmol*51: 530-538, 1967.
16. Norn MS; Cataract extraction in Fuchs heterochromia: follow-up of 19 cases. *Acta Ophthalmology* 46: 685-699, 1968.
17. Smith RE, O'Connor GR: cataract extraction in Fuchs syndrome. *Arch Ophthalmology* 91: 39-41, 1974.
18. Mills KB, Rosen ES: Intraocular lens implantation following cataract extraction in Fuchs' heterochromic uveitis. *Ophthalmic. Surg* 13: 467-469, 1982.
19. Gee SS. Tabbara KF: Extracapsular cataract extraction in Fuchs' heterochromic iridocyclitis, *Am J Ophthalmology* 108: 310-314, 1989.
20. Apple OJ, Mamalis N, Steinmetz RL, et al: Phacoanaphylactic endophthalmitis associated with extracapsular cataract extraction and posterior chamber intraocular lens. *Arch Ophthalmology* 102: 1528-1532, 1984.
21. Mitra S, J Biswas, et al: Comparison of Various Types of Cataract Surgery in Fuchs Heterochromic Iridocyclitis, *TNOA, March: 1994.*

ORIGINAL ARTICLE

22. Kanski JJ, Shun-Shin GA: Systemic Uveitis Syndromes in Childhood: An analysis of 340 cases. *Ophthalmology* 91: 1247-1252, 1984.
23. Praeger DL, Schneider HA, Sakowski AD Jr, Jacobs JC: Kelman procedure in the treatment of complicated cataract of the uveitis of Still's disease. *Trans Ophthalmology Soc UK* 96: 168-172, 1976.
24. Foster CS, Fong LP, Singh G: Cataract surgery and intraocular lens implantation in patients with uveitis. *Ophthalmology* 96: 281-287, 1989.
25. Diamond JG, Kaplan HJ: Uveitis: Effect of vitrectomy combined with lensectomy, *Ophthalmology* 86: 1320-1327, 1979.
26. Algvere P, Alanko H, Dickhoff K, et al: Pars plana vitrectomy in the management of intraocular inflammation. *Acta Ophthalmology* 59: 727-736, 1981.
27. Nobe JR, Kokoris D, Diddie KR et al: Lensectomy -vitrectomy in chronic uveitis. *Retina* 3: 71-76, 1983.
28. Petrilli AMN, Belfort RJr, Abreu MT, et al: Ultrasonic fragmentation of cataract in uveitis. *Retina* 6: 61-65, 1986.
29. Dangel ME, Stark WJ, Michels RG: Surgical management of cataract associated with chronic uveitis. *Ophthalmic Surg* 14:145-149, 1983.
30. Tutein Nolthenius PA, Dcutman AF: Surgical treatment of the complications of chronic uveitis. *Ophthalmologica* 186:11-16, 1983.
31. Flynn HW Jr, Davis JL, Culbertson W W: Pars plana lensectomy and vitrectomy for complicated cataracts in juvenile rheumatoid arthritis, *Ophthalmology* 95: 1114-1119, 1988.
32. Gregory M. Fox, M.D; Causes of Reduced Visual Acuity on Long-term Follow-up. After Cataract Extraction in Patients With Uveitis and Juvenile Rheumatoid Arthritis, *Am J Ophthalmology* 114: 708-714, 1992.
33. BenEzra D, Cohen E, et al: Cataract Surgery in Children with Chronic Uveitis *Ophthalmology* 2000; 107: 1255-1260.
34. Diamond JG, Kaplan HJ: Lensectomy and vitrectomy for complicated cataract secondary to uveitis, *Arch Ophthalmology* 96:1798-1804, 1978.
35. Girard LJ, Rodriguez J, Mailman ML, Romano TJ; Cataract and uveitic management by pars plana lensectomy and vitrectomy by ultrasonic fragmentation. *Retina* 5:107-114, 1985.
36. Mieler WF, Will BR, Lewis H, Aaberg TM: Vitrectomy in the management of peripheral uveitis. *Ophthalmology* 95: 859-864, 1988.
37. Smith RE, Nozik RA: Uveitis: A Clinical Approach to Diagnosis and Management. Baltimore, Williams and Wilkins, 1989, Ed 2, pp 115-126.
38. Moorthy RS, Rajeev B, Smith RE, Rao NA: Incidence and management of cataracts In Vogt-Koyanagi-Harada syndrome. *Am J Ophthalmology* 1994, 118: 197-204.
39. Reynard M, Minckler DS; Cataract extraction in the sympathizing eye *Arch Ophthalmol.*101; 1701-1703, 1983.
40. Akova YA, Foster CS: Cataract surgery in patients with sarcoidosis- associated uveitis. *Ophthalmology* 1994, 101: 473-479.
41. Ganesh SK, Biswas J et al,⁽⁴¹⁾ reported results of cataract surgery in 59 eyes of VKH; 2004.
42. Silverstein AM: Immunogenic uveitis: where in it is demon- started that the cure may sometimes be worse than the disease. *Trans Ophthalmology Soc UK* 94: 496-517. 1974.

ORIGINAL ARTICLE

43. Kaplan HJ, Diamond JG, Brown SA: Vitrectomy in experimental uveitis. II. Method in eyes with protein-induced uveitis. *Arch Ophthalmology* 97:336-339, 1979.
44. Fitzgerald CR: Pars plana vitrectomy for vitreous opacity secondary to presumed toxoplasmosis, *Arch Ophthalmology* 98:321-323, 1980
45. Nussenblatt RB, Kaufman SC, Palestine AG, et al: Macular thickening and visual acuity: measurement in patients with cystoid macular edema. *Ophthalmology* 94: 1134-1139, 1987.
46. Palestine AG, Alter GJ, Chan CC, Nussenblatt RB: Laser interferometry and visual prognosis in uveitis. *Ophthalmology* 92; 1567-1569, 1985.
47. Foster CS: Vitrectomy in the management of uveitis (guest; editorial), *Ophthalmology* 95:1011-1012, 1988.
48. Foster CS; Cataract surgery and Intraocular lens implantation in patients with intermediate uveitis. *Dev Ophthalmology* 1992, 23:212-218.
49. Drolsum L, Davanger, Haaskjold E: Risk factors for an inflammatory response after extracapsular extraction and posterior chamber IOL. *Acta Ophthalmology Copenh* 1994, 72:21-26.
50. Matsuo T, Fujiwara M, Matsuo N; Inflammation after cataract extraction and Intraocular lens Implantation in patients with rheumatoid arthritis. *Br J Ophthalmology* 1995, 79:549-553.
51. Foster RE. Lowder CY. Meisler OM, Zakov ZN, Meyers SM, Ambler J S: Combined extracapsular extraction, posterior chamber intraocular lens implantation, and pars plana vitrectomy. *Ophthalmic Surg* 1993, 24:446-454.
52. Hogan MJ, Kimura SJ, Thygeson P: Signs and symptoms of uveitis. *Am J Ophthalmo/1959*, 47:155-170.
53. Fox GM, Flynn HW, Davis JL, Culberstone W: Causes of reduced visual acuity on long-term follow-up after cataract extraction in patients with uveitis and juvenile rheumatoid arthritis. *Am J Ophthalmology* 1992, 114:708-714.
54. Hooper PL, Rao NA, Smith REP; Cataract extraction in uveitis patients. *Surv Ophthalmology* 1990, 35; 120-144.
55. Foster RE, Lowder CY, Zakov ZN; ECCE & PCIOL implantation in uveitic patients. *Ophthalmology* 1992, 99; 1234-1241.
56. Jones NP: Cataract surgery using heparin surface-modified intraocular lenses in Fuchs' heterochromic uveitis. *Ophthalmic Surgery* 1995, 26: 49-52.
57. Foster CS, Kaufman AH; Cataract extraction in pts with pars planitis; *Ophthalmology* 1993, 100; 1210-1217.
58. Kanski JJ: Juvenile arthritis and uveitis. *Surv Ophthalmology* 1990, 34: 253-267.
59. Ygge J, Wenzel M, et al: Cellular Reactions on Heparin Surface-modified versus Regular PMMA Lenses during the First Postoperative Month, *Ophthalmology* 1990; 97:1216-1224.
60. Ganesh S, Biswas J, Mittal S et al: PE +IOL. in retrospective study on 100 eyes of Pars planitis, *Ophthalmol* 1993; 100 (6): 818-24.
61. Chang & Yeh; *Retina & Uveitis Update*; John B. Saer - 2000 (Page-159).
62. Kang Y H et: *Korean J Ophthalmology*: 1997, Dec; 11 (2); 94-7. PE + IOL implantation following scleral tunnel incision in 28 eyes of varied uveitic etiology.
63. Narciss Okhravi, Susan L, et al: Assessment of visual outcome after cataract surgery in patients with uveitis. *Ophthalmology*. 1999 Apr; 106 (4): 710-22.

ORIGINAL ARTICLE

64. Estafanous M L et al; AJO 2001 Feb; 33 (2); 305-9. Results of 39 eyes of varied uveitic etiology which underwent PE+ IOL implantation.
65. Hazari A, Sangwan VS , et al ; Cataract surgery in uveitis: IJO Year: 2002, Volume: 50, Issue: 2, Page: 103-107.
66. Hawlina et al; Good long-term results possible in cataract patients with uveitis; Publications/EUROTIMES/07 March.
67. Kawaquchi et al; JCRS 2007 Feb; 33 (2); 305-9. Results in 131 eyes of uveitis who underwent PE IOL implantation.
68. Chia Lee Lin et al; Vitreo- Retina & Uveitis Update; John B. Saer - 2000 (Page-160).
69. Rauz S, Stavrou P, Murray PI: Evaluation of foldable intraocular lenses in patients with uveitis. Ophthalmology, Volume 107, Issue 5, Pages 909 - 919.
70. Abela-Formanek C, Amon M, Schauersberger J, Kruger A, Nepp J, J Cataract Refract Surg. 2002 Jul; 28 (7): 1141-52.
71. Abela-Formanek C, Amon M, Schauersberger J, Schild G, Kolodjaschna J, Barisani-Asenbauer T, Kruger A.: J Cataract Refract Surg. 2002 Jul; 28 (7): 1160-72.
72. Estafanous M L et al; AJO 2001 Feb; 33(2);305-9. Results of 39 eyes of varied uveitic etiology which underwent PE+ IOL implantation.
73. Hazari A, Sangwan VS; Cataract surgery in uveitis : IJO Year: 2002 ,Volume : 50 , Issue : 2, Page : 103-107.
74. Hawlina M, Kraut A, et al; Good long-term results possible in cataract patients with uveitis; Publications/EUROTIMES/07 March.
75. Kawaquchi H, Nakamura K, Akune Tet al ;JCRS 2007 Feb;33(2);305-9. Results in 131 eyes of uveitis who underwent PE + IOL implantation .
76. Kang Y H et: Korean J Ophthalmology: 1997, Dec; 11 (2); 94-7. PE + IOL implantation following scleral tunnel incision in 28 eyes of varied uveitic etiology.

AUTHORS:

1. Satish Desai
2. Vinita Rao

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Ophthalmology, Shri Ganapati Netralaya, Jalna, Maharashtra.
2. Consultant, Department of Ophthalmology, Shri Ganapati Netralaya, Jalna, Maharashtra.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Satish Desai,
C/o Mr. Ajit Patil,
Rajmane Nivas, Near Shikhare Hospital,
15th Lane, Jaysingpur, Kolhapur-District,
Maharashtra.
Email: drsatishonly@rediffmail.com

Date of Submission: 19/07/2014.
Date of Peer Review: 21/07/2014.
Date of Acceptance: 31/07/2014.
Date of Publishing: 11/08/2014.