



“A Prospective Clinical Study Of Pseudoexfoliation, It’s Associated Complications And Visual Outcome Following Cataract Surgery”

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ABSTRACT

PURPOSE: Pseudoexfoliation is an age-related fibrilopathy characterized by the deposition of fibrillar material in the eye with an increased risk of complications during cataract surgery.¹

AIM: To study visual outcome and complications in patients with pseudoexfoliation undergoing manual small-incision cataract surgery (MSICS).

METHODS : Prospective follow up study carried out on 40 patients with pseudoexfoliation undergoing MSICS in a tertiary hospital from July 2022 to December 2023, Intraoperative and postoperative complications and visual outcome were documented with follow-up on postoperative day 1, 4th, 6th and 12th week.

RESULTS: Preoperative small pupil was noted in 17 eyes (42.5%). Intraocular complications noted were posterior capsular rupture in 3 (7.5%), On postoperative day 1, the most common complication was corneal edema in 32 patients but clinically significant in only 20. Postoperative complications at 6th and 12th week were irregular pupil in 3 cases and at 12th week decentered IOL in 1 case. Intraocular pressure showed no significant difference with each visit [preoperative mean: 19.51(±2.48) and post operative mean : 20.04 (+2.14), 19.38 (±1.85), 18.97, 19.38(+1.73) mm Hg at day 1, 4th, 6th and 12th week respectively). There was a significant improvement in vision from the first day mean pinhole to mean best corrected visual acuity (BCVA) at 4th, 6th, 12th week respectively. Mean CCT was 504.35 (22.86), 502.13(24.49), 503.28(22.28) at 4th, 6th and 12th week respectively.

CONCLUSION: Pseudoexfoliation has an increased risk of complications during cataract surgery. MSICS gives good outcomes in terms of visual recovery and postoperative outcomes.

KEY WORDS : MSICS; BCVA; PXF; IOL; CCT

I. INTRODUCTION

Pseudoexfoliation (PXF) syndrome is characterized by the deposition of distinctive fibrillar material in the anterior segment of the eye.

It is an age-related process that is associated with open and narrow angle glaucoma and the formation of cataracts. Not only is PXF associated with the formation of dense nuclear cataracts, it is also well known that those presenting with PXF are at a higher risk of developing complications during, and even after cataract surgery²

Complications associated with cataract surgery in PXF can occur from poor pupillary dilation. Zonular dialysis and dropped nucleus, zonular weakness leading to intraoperative or postoperative lens dislocation and vitreous loss, postoperative intraocular pressure (IOP) spikes potentiating glaucomatous damage, capsular phimosis, prolonged inflammation, and postoperative corneal decompensation

The surgeon should be prepared to encounter the various potential intraoperative and postoperative complications in eyes with pseudoexfoliation syndrome during cataract surgery.

In this way, the surgeon can plan his/her surgical technique to help avoid surprises during cataract surgery and be prepared to manage the potential postoperative complications that can occur in pseudoexfoliation eyes.

Pseudoexfoliation is associated with 30% visual impairment across all stages and 28% absolute blindness rate which is a huge hidden burden of glaucoma.

Adequate disease staging and assessment of comorbidities is required for accurate prognostication at baseline and reducing avoidable pseudoexfoliation blindness³.



AIMS AND OBJECTIVES

- 1) To study clinical profile of patients with pseudoexfoliation
- 2) To study pseudoexfoliation and its associated complications
- 3) To know intraoperative and postoperative complications and difficulties encountered during the management
- 4) To assess visual outcomes following cataract surgery

METHODOLOGY

1) SOURCES OF DATA:

It is a prospective, follow up clinical study carried out on patients with Cataract with pseudoexfoliation attending Ophthalmology department, BMC&RC, Ballari during a period of July 2022 to December 2023 applying following inclusion and exclusion criteria.

2) METHODS OF COLLECTION OF DATA

A) Study Design: A Prospective follow up clinical study

B) Study period: July 2022 to December 2023

C) Place of study: Department of Ophthalmology, Ballari medical college and research centre, Ballari

D) Sample size: The study was conducted for period of 18 months from July 2022 to December 2023, 40 patients with cataract with pseudoexfoliation will be included in the study. Patients will be subjected to detailed ophthalmic evaluation and data will be recorded in a specially designed proforma, which will be transferred to master sheet and the data will be subjected to statistical analysis by the biostatistician of our institution

A. INCLUSION CRITERIA

All patients with cataract (presenile or senile) associated with pseudoexfoliation of one or both eyes who present to the Ophthalmology department, enrolled for small incision cataract surgery with intraocular lens implantation performed by same surgeon during the study period will be included in the study.

B. EXCLUSION CRITERIA

- Congenital/ developmental cataract/ juvenile cataract
- Preexisting ocular disease other than cataract
- Traumatic or complicated cataract
- Patients who declined participation in the study

STUDY METHODOLOGY:

During the above said period patients satisfying the inclusion criteria were selected at BMC&RC Hospital, Ballari

Informed and written consent was taken from all patients for the study

PREOPERATIVE ASSESSMENT

Preoperative:

- Eliciting appropriate history
- Visual acuity (unaided and aided) testing
- Detailed anterior segment evaluation with Slit lamp Biomicroscopy
- Posterior segment evaluation done by direct and indirect ophthalmoscope.
- Cataract work up
- IOP measurement using non contact tonometer
- Lacrimal sac syringing
- Keratometry and A scan biometry will be done for intraocular power calculation
- Blood pressure
- Routine blood analysis
- Specular microscopy (CCT and endothelial cell density)

SURGICAL PROCEDURE:

- Informed written consent was taken from all patients
- Single surgeon operated all the 40 patients

OPERATIVE NOTES :

Patients chosen for cataract surgery underwent dilatation with topical 0.8% tropicamide and 5% phenylephrine and will be prepped with 5% povidone iodine solutions

All manual SICS were done under local anaesthesia (peribulbar)

- After a limited conjunctival peritomy. Superior self-sealing sclerocorneal tunnel incision of 6.0- 7.0 mm will be created with a crescent blade. Starting 1-1.5 mm behind the limbus.
- This incision was widened to approximately 9.0 mm as it advanced into the clear cornea.
- A 2.8 mm keratome blade was used to make side port entry.
- A large capsulorrhexis or rarely can-opening capsulotomy (6.0-7.0 mm) was performed with a cystotome followed by hydrodissection.
- 2.8 mm keratome blade was used to open the internal lip of the tunnel incision
- The nucleus was prolapsed into the anterior chamber using a Sinsky hook and delivery was done using sandwich technique



- Cortical cleanup was performed with the Simcoe irrigating-aspirating cannula using Ringer's lactate or 0.9% normal saline solution.
- Viscoelastic was injected into the anterior chamber.
- After implantation of single piece PMMA intraocular lens into the capsular bag, viscoelastic was washed out with saline, the side port was hydrated, and the anterior chamber was checked for wound integrity
- Subconjunctival injection of gentamycin and dexamethasone given
- Eye padded and bandaged
- Systemic antibiotics were given orally for 3 days and Analgesics were administered orally SOS

POSTOPERATIVE ASSESSMENT

1. After removing the bandage, all the patients were examined for early postoperative complications of cataract surgery.
2. Visual acuity, Refraction, slit lamp examination, specular microscopy was performed (to know the corneal thickness and endothelial cell density.)
3. Antibiotic with steroid eye drops were given 6-8 times a day for 1 week and tapered every week thereafter up to 6 weeks.
4. Follow up was done 1st week, 4th week ,6th week and 12th week after surgery.
5. During each visit -visual acuity, Refraction, slit lamp examination, specular microscopy was performed to know the corneal thickness and endothelial cell density.
6. After 6 weeks spectacles were prescribed.

STATISTICAL ANALYSIS

Results are expressed in terms of ratios and percentage. The analysis assessed the differences Over time in the examined parameters. The analysis was done using IBM SPSS Statistics for windows ,version 29.0

To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean and S.D were used for continuous variables .

To find the significant difference in the multivariate analyses for repeated measures the ANNOVA was used with benferroni correction

In all the above statistical tools the probability value of $P < 0.05$ – considered as statistically significant and $P > 0.05$ - considered as statistically not significant

ETHICAL CONSIDERATION:

Ethical clearance has been obtained from the institution Ethical committe, Ballari medical college and research centre , Ballari

SAMPLE SIZE ESTIMATION:

$$\text{Sample Size} = Z_{\alpha}^2 \cdot P(1-P)/d^2$$

Z_{α} Standard normal variate 1.96

P= Expected proportion from population

$$D \text{ Sample Size} = Z_{\alpha}^2 \cdot P(1-P)/d^2$$

Absolute error

Prevalence of pseudoexfoliation was reported to be 3.8% in an Indian study. Considering 6% of margin of error minimum sample needed to conduct this study is 39 cases. 40 cases will be selected.

During our study period ,considering the number of patients with cataract attending department of ophthalmology,BMC&RC ,Ballari , patients who met with inclusion and exclusion criteria were considered for MSICS with IOL implantation by a single surgeon

II. RESULTS AND OBSERVATIONS

A total of 40 patients were included in this study. All the patients underwent manual small incision cataract surgery under local anaesthesia by a single surgeon

Table 1: Age distribution

Age distribution		
	Frequency	Percent
41 - 50 yrs	4	10.0
51 - 60 yrs	12	30.0
61 - 70 yrs	18	45.0
71 - 80 yrs	5	12.5
Above 80 yrs	1	2.5
Total	40	100.0



Fig: 1 . BAR GRAPH SHOWING AGE DISTRIBUTION AMONG PATIENTS

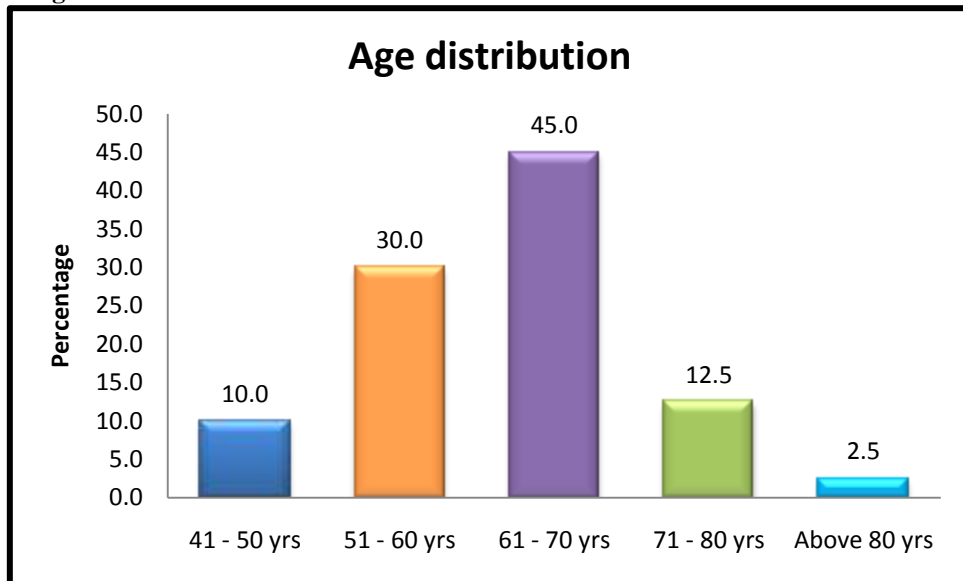


Figure 1

The demographic data of the patients included in the study was analysed . Above table shows Age distribution were 41-50 years is

10.0%,51-60 years is 30.0%, 61-70 years is 45.0%, 71-80 years is 12.5%, >80 years is 2.5%.

Table 2: Gender distribution

Gender distribution		
	Frequency	Percent
Male	24	60.0
Female	16	40.0
Total	40	100.0

Fig: 2. PIE CHART SHOWING GENDER DISTRIBUTION AMONG PATIENTS

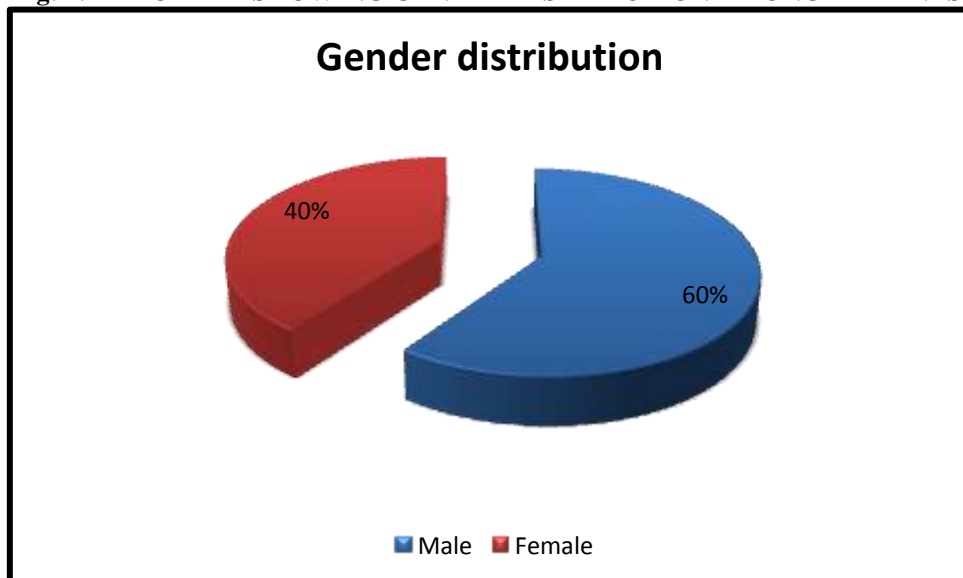


Figure 2



The above table shows Gender distribution: Female -40.0%, Male -60.0%.

Table 3: CATARACT GRADING USING LOCS III

Nucleus Grading		
	Frequency	Percent
Hyperature cataract with PXF	3	7.5
SMC with PXF	12	30
NS 4 with PXF	3	7.5
NS 3 with PXF	7	17.5
NS 2 with PXF	13	32.5
NS 1 with PXF	2	5
Brown cataract with PXF	2	5
Total cases	40	100

Fig:3 BAR GRAPH SHOWING CATARACT GRADING AMONG PATIENTS

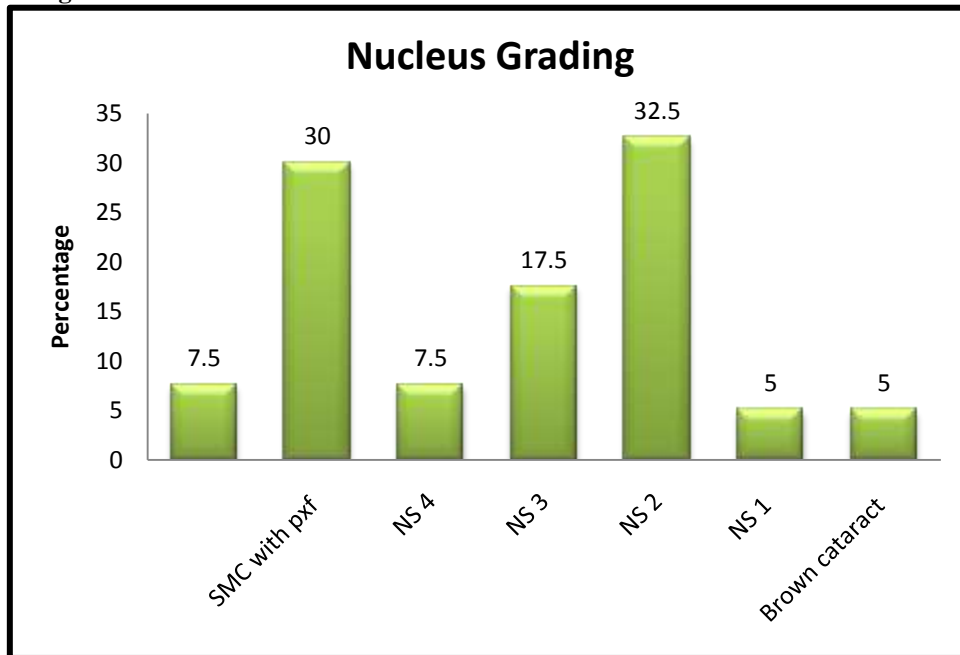


Figure 3

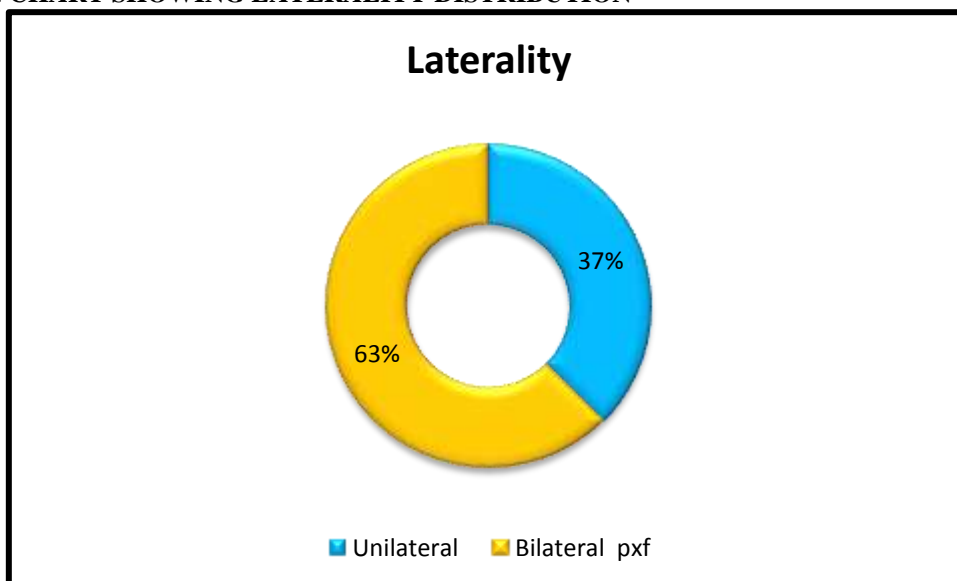
The above table shows Nucleus Grading distribution were NS 2 with PXF has highest percentage(32.5%), NS 1 with PXF , Brown cataract with PXF has lowest percentage(5.0%).

Table 4: Laterality distribution

Laterality		
	Frequency	Percent
Unilateral PXF	15	37.5
Bilateral PXF	25	62.5
Total	40	100



Fig:4 PIE CHART SHOWING LATERALITY DISTRIBUTION

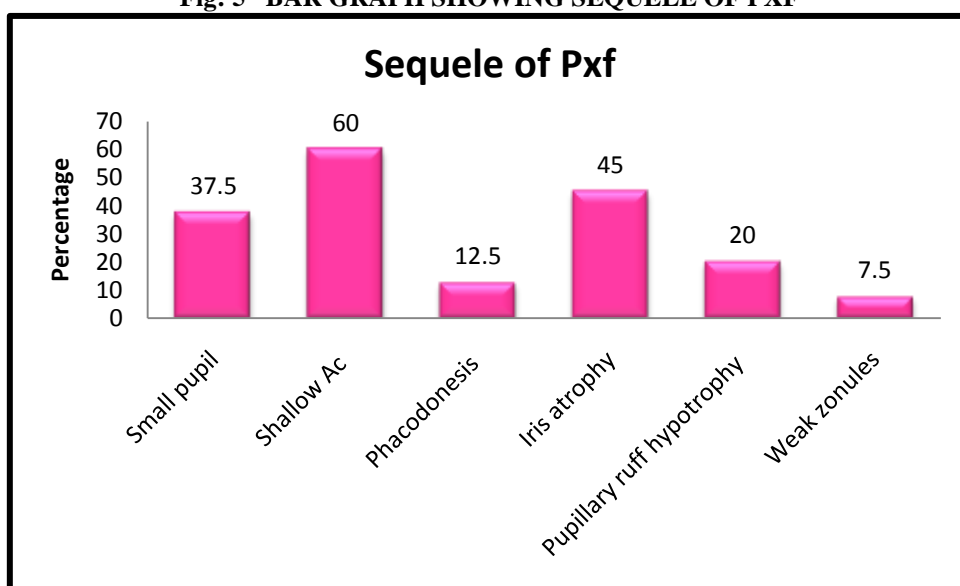


The above table shows Laterality distribution were Unilateral PxFis 37.5%, Bilateral PxFis 62.5%.

Table 5 : Sequele of PXF distribution

Sequele of Pxf		
	Frequency	Percent
Small pupil	15	37.5
Shallow Ac	24	60
Phacodonesis	5	12.5
Iris atrophy	18	45
Pupillary ruff hypotrophy	8	20
Weak zonules	3	7.5

Fig: 5 BAR GRAPH SHOWING SEQUELE OF PXF



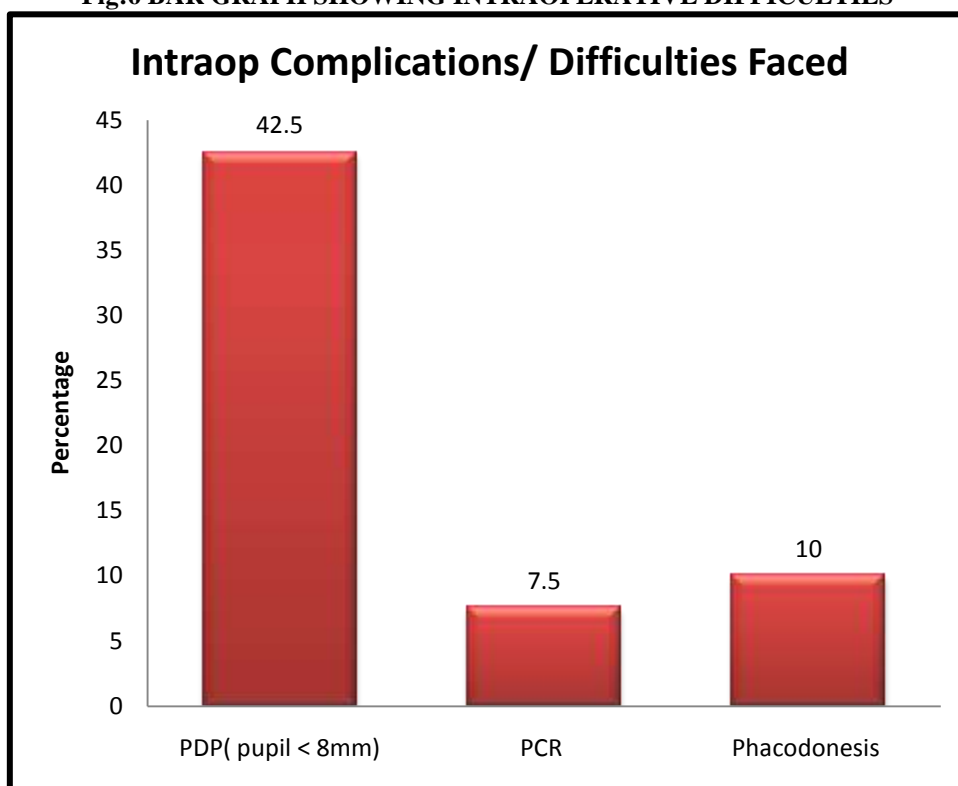


The above table shows Sequelae of PXF distribution were Shallow AChas highest percentage(60.0%), Weak zonules has lowest percentage(7.5%).

Table 6 : Intraoperative Complications/ Difficulties Faced distribution

Intraoperative Complications/ Difficulties Faced		
	Frequency	Percent
PDP(pupil < 8 mm)	17	42.5
PCR	3	7.5
Phacodonesis	4	10

Fig:6 BAR GRAPH SHOWING INTRAOPERATIVE DIFFICULTIES



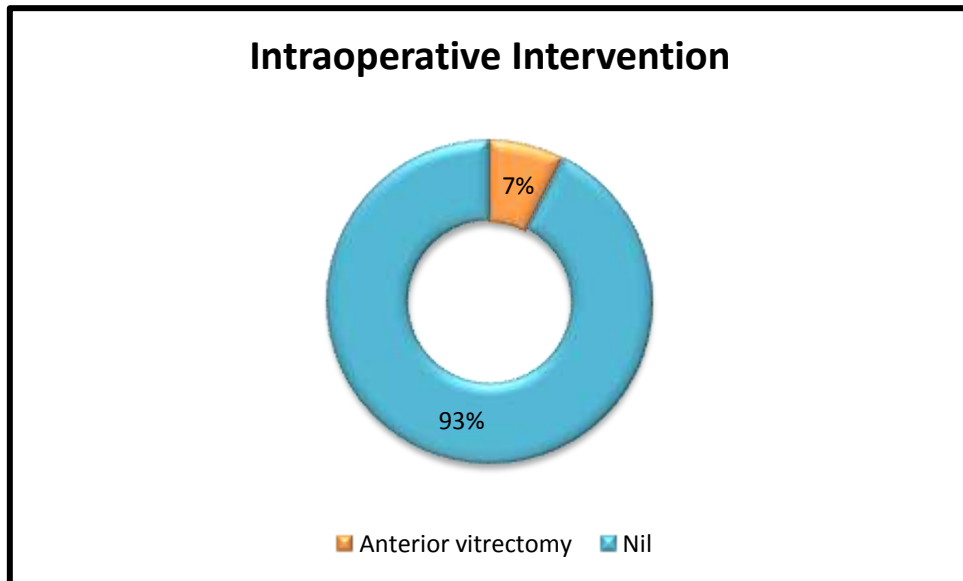
The above table shows Intraoperative Complications/ Difficulties Faced distribution were PDP(pupil <8 mm)is 42.5%, PCR is 7.5%, Phacodonesis 10.0%.

Table 7 : Intraoperative Intervention distribution

Intraoperative Intervention		
	Frequency	Percent
Anterior vitrectomy	3	7.5
Nil	37	92.5
Total	40	100.0



FIG 7: PIE CHART SHOWING INTRAOPERATIVE INTERVENTION

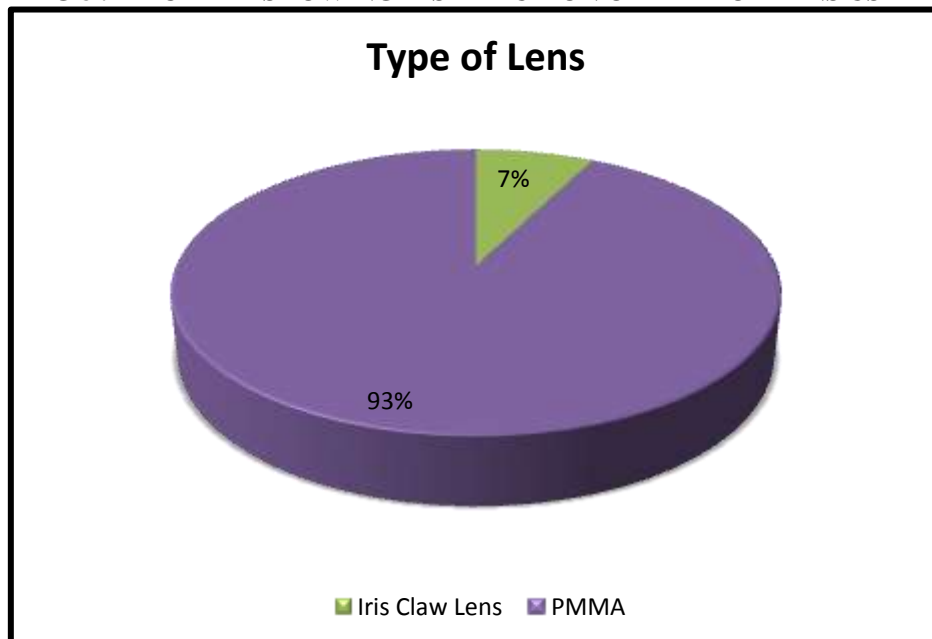


The above table shows Intraoperative Intervention distribution were Anterior vitrectomy is 7.5%, Nil is 92.5%.

Table 8 : Type of Lens distribution

Type of Lens	Frequency	Percent
Iris Claw Lens	3	7.5
PMMA	37	92.5
Total	40	100.0

FIG 8 :PIE CHART SHOWING DISTRIBUTION OF TYPE OF LENS USED



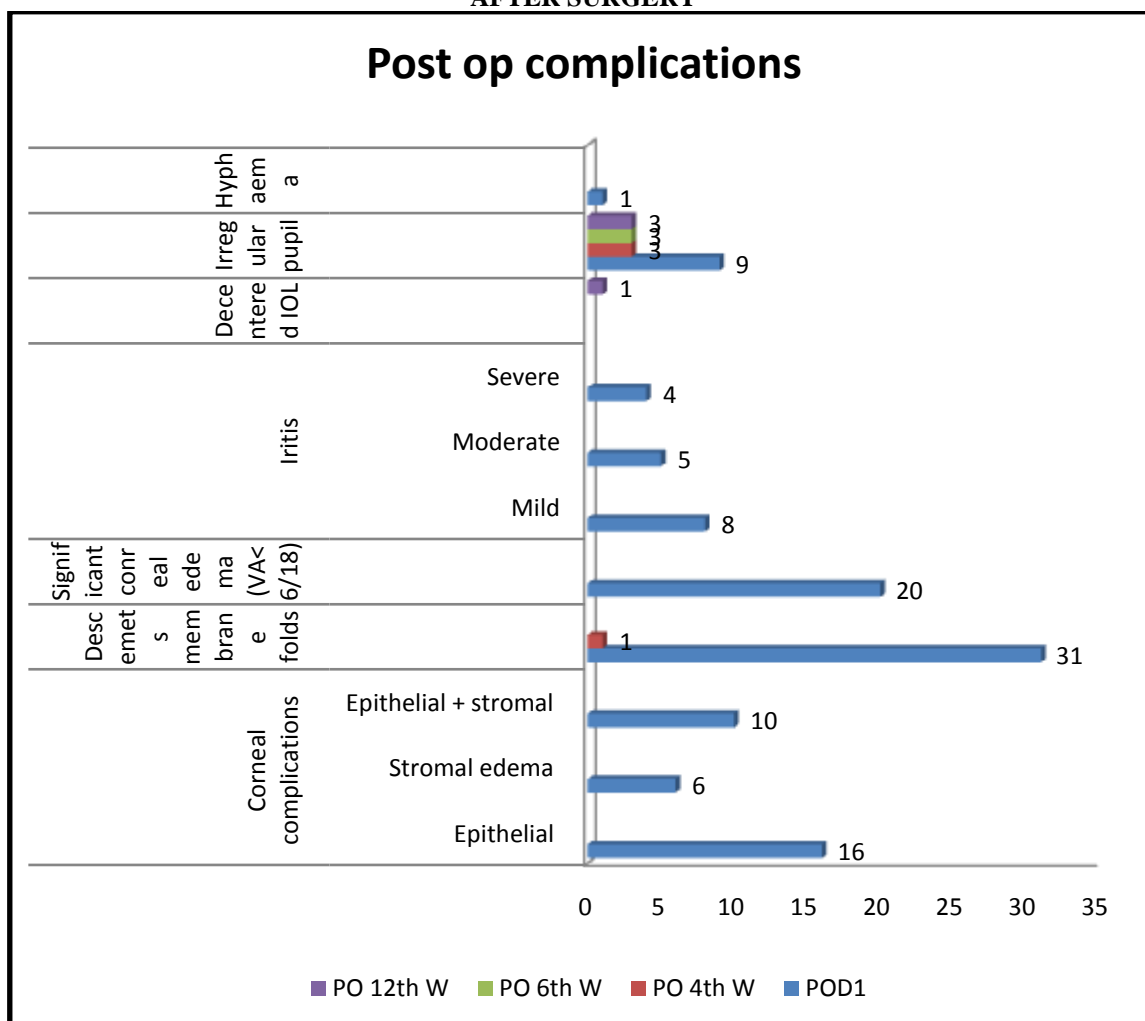
The above table shows Type of Lens distribution were Iris Claw Lens:7.5%, PMMA:92.5%.



Table 9 : Post Operative Complications distribution

Post Op Complications		POD1	PO 4th W	PO 6th W	PO 12th W
Corneal complications	Epithelial	16	0	0	0
	Stromal edema	6	0	0	0
	Epithelial + stromal	10	0	0	0
Descemet's membrane folds		31	1	0	0
Significant corneal edema (VA<6/18)		20	0	0	0
Iritis	Mild	8	0	0	0
	Moderate	5	0	0	0
	Severe	4	0	0	0
Decentered IOL		0	0	0	1
Irregular pupil		9	3	3	3
Hyphaema		1	0	0	0

Fig:9 BAR GRAPH SHOWING DISTRIBUTION OF COMPLICATIONS AT VARIOUS TIMES AFTER SURGERY



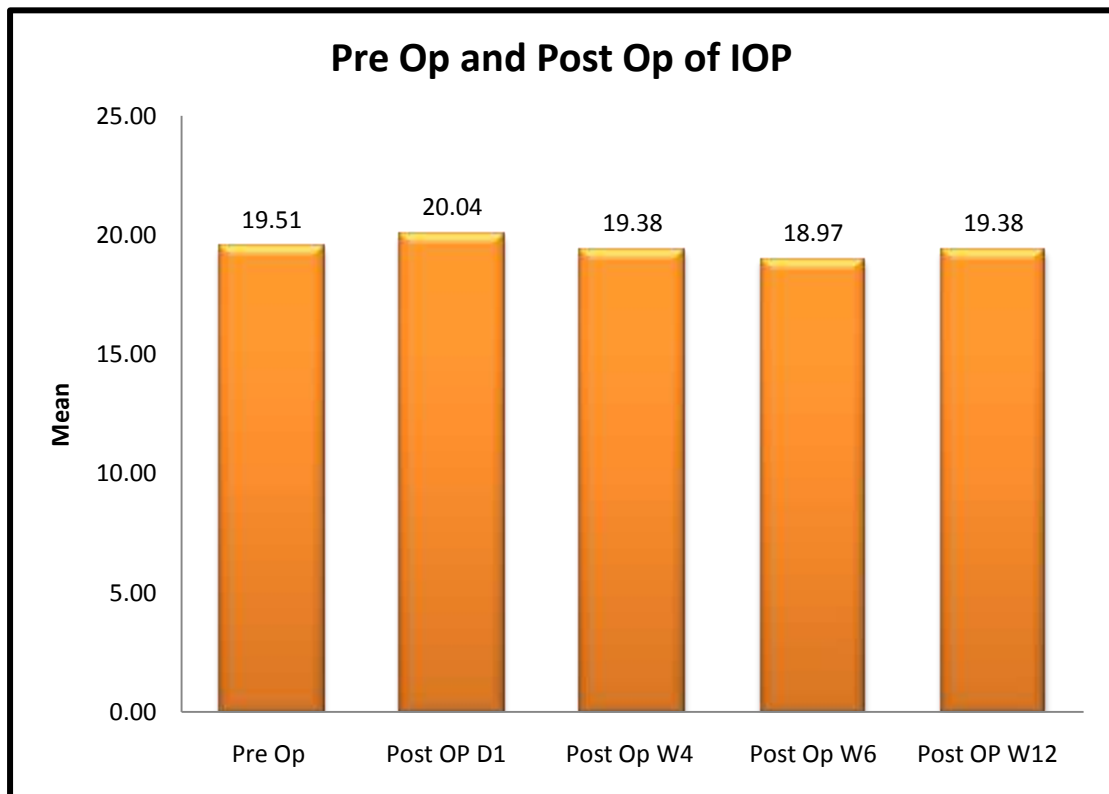


The above table shows Post Op Complications distribution of Post OP D1, Post Op W4, Post Op W6 and Post OP W12.

Table 10 : Comparison of Pre Op and Post Op of IOP by Repeated measures of ANOVA

IOP	Mean	SD	N	F-value	p-value
	19.51	2.48	40	1.548	0.191 #
Post OP D1	20.04	2.14	40		
Post Op W4	19.38	1.85	40		
Post Op W6	18.97	2.02	40		
Post OP W12	19.38	1.73	40		
# No Statistical Significance at $p > 0.05$ level					

Fig: 10 BAR GRAPH SHOWING MEAN DIFFERENCE IN IOP AT VARIOUS TIMES



The above table shows comparison of Pre Op and Post Op of IOP by Repeated measures of ANOVA were F-value=1.005, p-value=0.393>0.05 which shows no statistical significance difference at $p > 0.05$ level.



Table 11: COMPARISION OF RANGE OF PRE-OPERATIVE AND POST OPERATIVE BEST CORRECTED VISUAL ACUITY (BCVA)(n=40)

BCVA	PRE-OPERATIVE	POST – OPERATIVE			
		DAY 1	4 th WEEK	6 th week	12 th WEEK
6/6- 6/12	0	07	25	37	37
6/18- 6/36	0	27	14	3	03
6/60 OR LESS	40	06	1	0	0

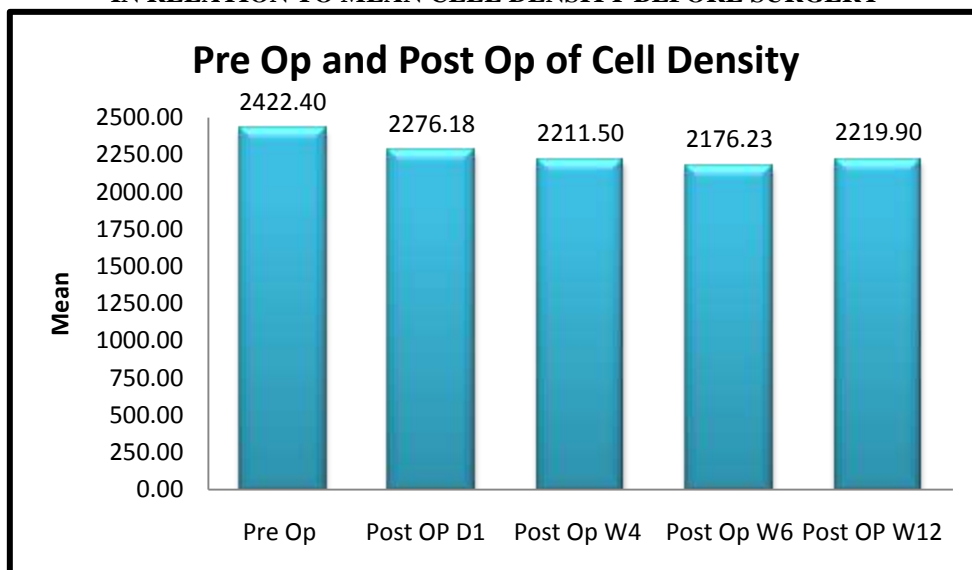
Table 12 : Comparison of Pre Op and Post Op of Cell Densityby Repeated measures of ANOVA

Cell Density	Mean	SD	N	F-value	p-value
Pre Op	2422.40	182.44	40	109.902	0.0005 **
Post OP D1	2276.18	150.58	40		
Post Op W4	2211.50	146.39	40		
Post Op W6	2176.23	142.17	40		
Post OP W12	2219.90	151.99	40		
** Highly Statistical Significance at p < 0.01 level					

Pairwise Comparisons						
(I) CD		MD (I-J)	Std. Error	p-value	95% C.I	
					LB	UB
Pre OP	Post OP D1	146.225*	12.328	0.0005 **	109.542	182.908
	Post Op W4	210.900*	13.386	0.0005 **	171.068	250.732
	Post Op W6	246.175*	20.782	0.0005 **	155.921	249.079
	Post OP W12	202.500*	15.654	0.0005 **	184.335	308.015
Post OP D1	Post Op W4	64.675*	6.596	0.0005 **	45.049	84.301
	Post Op W6	99.950*	13.531	0.0005 **	35.132	77.418
	Post OP W12	56.275*	7.106	0.0005 **	59.687	140.213
Post Op W4	Post Op W6	35.275	13.430	0.123 #	-29.442	12.642
	Post OP W12	-8.400	7.072	1.000 #	-4.687	75.237
Post Op W6	Post OP W12	-43.675*	13.976	0.034 *	2.087	85.263
** Highly Significant at p < 0.01, * Sign at p < 0.05 and # No Statistical Significance at p > 0.05 level						



FIG:11 BAR GRAPH SHOWING MEAN DIFFERENCE IN CELL DENSITY AT VARIOUS TIMES IN RELATION TO MEAN CELL DENSITY BEFORE SURGERY



The table shows comparison of Pre Op and Post Op of Cell Density by Repeated measures of ANOVA were F-value=109.902, p=0.0005<0.01 which shows highly statistical significance at p <

0.01 level and whereas inPairwise Comparisons it shows highly statistical significant at p < 0.01 and no statistical significant at p > 0.05 level respectively

Table 13 : Comparison of Pre Op andPost Op of CCT by Repeated measures of ANOVA

CCT	Mean	SD	N	F-value	p-value
Pre Op	501.50	23.15	40	51.179	0.0005 **
Post OP D1	535.25	28.66	40		
Post Op W4	504.35	22.86	40		
Post Op W6	502.13	24.49	40		
Post OP W12	503.28	22.28	40		

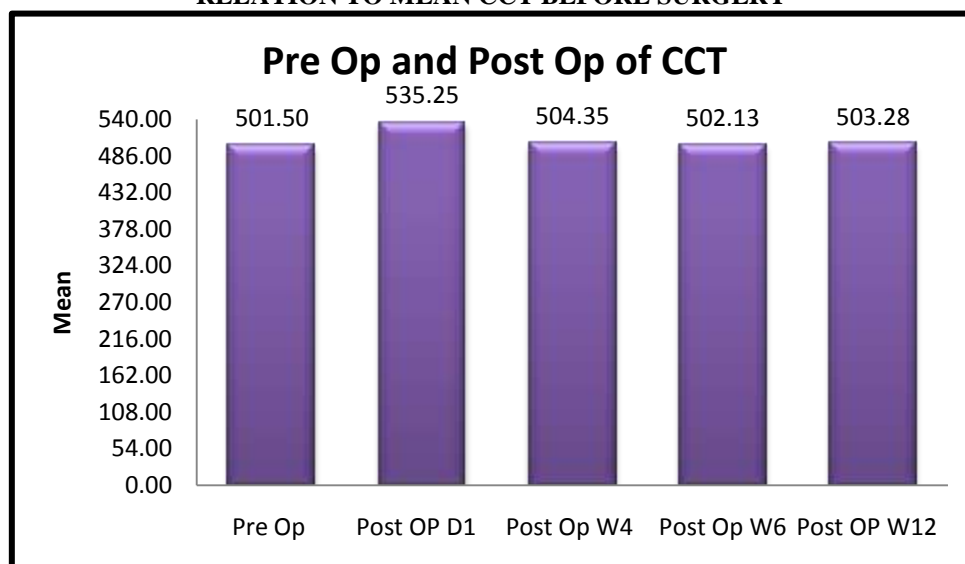
** Highly Statistical Significance at p < 0.01 level

Pairwise Comparisons						
(I) CCT		Mean Difference (I-J)	Std. Error	p-value	95% C.I	
					LB	UB
Pre OP	Post OP D1	-33.750*	3.947	0.0005 **	-45.495	-22.005
	Post Op W4	-2.850	1.465	0.589 #	-7.209	1.509
	Post Op W6	-.625	2.528	1.000 #	-8.147	6.897
	Post OP W12	-1.775	1.804	1.000 #	-7.142	3.592
Post OP D1	Post Op W4	30.900*	3.802	0.0005 **	19.586	42.214
	Post Op W6	33.125*	4.007	0.0005 **	21.202	45.048
	Post OP W12	31.975*	3.833	0.0005 **	20.570	43.380
Post Op W4	Post Op W6	2.225	1.810	1.000 #	-3.160	7.610



	Post OP W12	1.075	1.521	1.000 #	-3.450	5.600
Post Op W6	Post OP W12	-1.150	2.131	1.000 #	-7.491	5.191
** Highly Significant at p < 0.01 and # No Statistical Significance at p > 0.05 level						

FIG 12 BAR GRAPH SHOWING MEAN DIFFERENCE IN CCT AT VARIOUS TIMES IN RELATION TO MEAN CCT BEFORE SURGERY



The above table shows comparison of Pre Op and Post Op of CCT by Repeated measures of ANOVA were F-value=51.179, p=0.0005<0.01 which shows highly statistical significance at p < 0.01 level and whereas in Pairwise Comparisons it shows highly statistical significant at p < 0.01 and no statistical significant at p > 0.05 level respectively.

III. DISCUSSION

In this study, conducted in a tertiary care hospital, 40 patients who fulfilled the inclusion and exclusion criteria were considered.

All of them underwent MSICS with PCIOL implantation by a single surgeon to avoid bias in the study.

All the patients underwent visual acuity testing, specular microscopy before and after surgery and were examined post operatively on day 1, 4th week, 6th week, 12th week

Demographic characteristics of the patients were studied. Studies have shown that pseudoexfoliation is more common in patients older than 60 years, and the prevalence further increases with age. In our study, the age distribution were 41-50 yrs is 10%, 51-60 yrs is 30%, 61-70 yrs is 45%, 71-80 yrs is 12.5%, >80 yrs is 2.5%. Sufi et al⁽⁴⁾ in their study with PXF of 1117 patients with PXS ranging in age from 49-89

yrs, noted that mean age of patients with PXF as 72.61 yrs

There are conflicting reports about gender predilection. Arvind et al⁽⁵⁾ Reported that there is no sex predilection, but Avramides et al⁽⁶⁾ showed female preponderance. Pranathi et al⁽⁷⁾ in their study of 52 patients noted 53.8% males and 46.2% females. In our study, there were males 24(60%), females 16(40%).

Pseudoexfoliation syndrome has been described to be an asymmetrically bilateral disease by Hammer et al⁽⁸⁾ and 25 patients (62.5%) in our study had bilateral involvement similar to the study done by Hegde et al⁽⁹⁾ in which 6% patients had bilateral PXF and 36% had unilateral PXF

As described in the literature, nuclear cataracts are more common with pseudoexfoliation. Our study shows nucleus grading distribution were nuclear sclerosis 2 has highest percentage 13(32.5%) and NS 1, Brown cataracts has lowest percentage (5%). Joshi et al⁽¹⁰⁾ in his study noticed 25% patients having nuclear cataract, 98% hypermature cataract, 50% mature cataract

The distribution of pseudoexfoliative material in our cases followed the pattern described in the literature. All our cases (100%) had deposits on the peripheral anterior capsule and the pupillary border.



The sequelae of pseudoexfoliation were also in concurrence. With those reported in various studies. Reduction of stromal elasticity by the accumulation of pseudoexfoliation material may play a role in poor mydriasis. In 7 eyes (17.5%) in our study, the pupil size was less than 5 mm after pharmacological dilatation preoperatively. **Alfaite et al⁽¹¹⁾** noticed significantly insufficient mydriasis ($P < 0.001$) in their study. Fourteen (9.2%) patients had weak zonules detected during examination and surgery, while **Futa et al⁽¹²⁾** and **Moreno et al⁽¹³⁾** reported a similar incidence of iridophacodonesis in 8.4% and 10.6%, respectively. **Naik et al⁽¹⁴⁾** in their study noted 13% cases with poor pupillary dilatation, 67% with fair and 30% cases had good pre-operative pupillary dilatation.

In our study, we encountered poorly dilating pupil 17 (42.5%) of which 4 (10%) had phacodonesis, there were 3 (7.5%) case of posterior capsular rupture. In all 3 cases, iris claw was implanted and anterior vitrectomy was done. In study done by **Islam et al⁽¹⁵⁾** 14 cases out of 3334 had posterior capsular rent which was managed similarly.

Jawad et al⁽¹⁶⁾ in a series of 200 cases undergoing conventional extracapsular cataract surgery in a teaching hospital reported the following complications: posterior capsule rupture in 9%, vitreous prolapse in 10.5%, retained lens material in 6%, zonular dialysis in 4%, and iridodialysis in 1%.

A more contemporary study by **Pranathi et al** found poorly dilating pupil in 61.5%, posterior capsule rupture in 7.7%, vitreous loss in 7.7%, retained lens matter in 11.5%, zonular dialysis in 3.8%, and iridodialysis in 1.9% of patients. MSICS or phacoemulsification was performed by a single surgeon in these 52 cases, which is comparable to our study.

The rate of complications in our study was probably less because the surgeries were performed by a single experienced surgeon, and MSICS is a relatively safer technique. However, the complication rate in pseudoexfoliation cases (4%) was at least fourfold more for the surgeon, the rate being $< 1\%$ in cases without pseudoexfoliation and other comorbidities.

Compared to postoperative vision on day 1, the patients showed significant improvement in the subsequent follow-up at 4th, 6th week and 12th week respectively. On the final follow-up at 12th week, 37 cases had BCVA between 6/18-6/6, 3 pts had BCVA between 6/24-6/36 which is similar to the findings noted by **Pranathi et al** in their study.

Mean preoperative IOP value (19.51) showed no statistical difference ($P = 0.393$) compared to mean postoperative day 1 (20.04), 4th week (19.38), 6th (18.97), 12th week (19.38) respectively. **Sastry et al⁽¹⁷⁾** in their study on cataract surgery outcome in patients with PXFG noted mean POD1 IOP as 26.23 ± 11.40 .

Postoperative day 1 complications include epithelial edema due to raised intraocular pressures in 16 patients, Descemet's folds in 32 patients, stromal edema in 6 and combined epithelial and stroma edema in 10 patients.

Corneal edema was noted to be the most common complication on postoperative day 1. However, significant corneal edema with pinhole vision 6/18 or less was seen only in 20 cases. The other complications noted were irregular pupils in 9 cases, severe iritis in 4 cases, and hyphaema in one case.

At 6th week and 12th week postoperatively, the corneal complications had resolved. The complications that persisted at 12th week were irregular pupils in 3 and decentered IOL in 1.

In our study, the preoperative mean central corneal thickness (CCT) 501.50 showed statistical difference ($p = 0.0005$) to 504.35 ± 22.86 mm 502.13 (24.49) 503.28 ± 22.28 mm at 4th, 6th and 12th week postoperatively. Similar to **Goldenberg et al⁽¹⁸⁾** who reported a significant increase in CCT post MSICS in the first postoperative week and first month postoperatively.

A study by **Mathew et al⁽¹⁹⁾** showed an increasing trend in CCT after SICS for the first 2 weeks followed by a decrease in the thickness.

Miyake et al⁽²⁰⁾ and **Inoue et al⁽²¹⁾** reported lower endothelial cell density in patients with PXF undergoing cataract surgery.

Mean endothelial cell loss noted was 7.79% and 10.68% respectively at 1 and 3 months postoperatively. **Kaljurand et al⁽²²⁾** reported a higher loss at 1 month (18.1%) following phacoemulsification in patients with PXF. Our study showed a statistically significant decrease in mean endothelial cell density from $2422.40 (\pm 182.44)$ cells/mm² to $2211.5 (\pm 146.39)$ at 4th week, 2176.23 cells/mm³ at 6th week and $2219.90 (+151.99)$ cells/mm² at 12th week postoperatively ($P < 0.001$).

Higher complication rates were reported in MSICS compared to phacoemulsification and among trainees compared to consultants in a comparative study by **Singh et al⁽⁵⁹⁾**. Our study shows comparable complication rates and good outcomes,

but the limitation is that the surgeries were performed by a single experienced surgeon



and there was no comparison with phacoemulsification. The other limitation was a short follow-up period of 3 months owing to patients not complying with a longer follow-up .

IV. CONCLUSION

Pseudo exfoliation syndrome patients when presented for cataract surgery posed certain specific challenges. Thorough pre-operative evaluation for signs of Pseudo exfoliation syndrome helped in diagnosis.

Proper follow-up of patients after surgery is needed to evaluate endothelial cell function, intraocular pressure rise, inflammation and centration of intraocular lens

Good postoperative visual outcomes can be achieved with MSICS by careful preoperative evaluation of risk factors and surgical plan, knowledge and the ability to manage the complications, and timely and adequate surgical modifications such as sphincterotomy , use of CTR depending on the rigidity and level of mydriasis to reduce intraoperative complications

Manual SICS is a good operative technique for patients having Pseudo exfoliation syndrome with cataract .

SOURCE OF INTEREST-NONE

CONFLICT OF INTEREST :NONE

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