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COMPLEXITIES OF SMALL INCISION CATARACT SURGERY IN SENILE CATARACT WITH PSEUDO EXFOLIATION SYNDROME AND ITS MANAGEMENT

Ophthalmology

Dr. Anil Pathak Associate Professor, Department of Ophthalmology, Government Medical College Patiala, Punjab

Dr. Reagan Madan* Senior Resident, Department of Ophthalmology, Government Medical College Patiala, Punjab *Corresponding Author

Dr. Seema Yadav Junior Resident, Department of Ophthalmology, Government Medical College, Patiala

ABSTRACT

Purpose: To evaluate the complexities of small incision cataract surgery in senile cataract with pseudoexfoliation syndrome and its management

Methods: This Observational clinical trial was conducted on the patients with cataract and PXF presenting themselves directly to ophthalmology OPD of Rajindra hospital Patiala from Feb 2017 to Nov 2017. All patients will be given systemic antibiotics on the preoperative day. On the day of surgery pupil of the operating eye is dilated adequately using instillation of 0.8% tropicamide and 5% phenylephrine eye drops (phenylephrine eye drops avoided in hypertensives) every 10 minutes for 3 times, one hour before surgery. Under aseptic precautions the Manual Small Incision Cataract Surgery will be carried out under Local anesthesia. The patients were reviewed 1st week, 4th week and 6th week post operatively recording unaided vision and finally unaided vision and best corrected visual acuity on 45th day.

Results: There were stastically significant Difficulty during anterior capsulotomy, nucleus delivery, Corneal endothelial touch was noted in patients, Descemet's membrane detachment was not noted in any patients, Zonular dialysis , Posterior capsular rent, Vitreous loss , Residual lens material , Iridodialysis was noted in patients. For management Viscomydriasis/manual iris stretching , sphincterotomy, Use of iris hooks, CTR implantation, anterior vitrectomy was done patients.

Conclusion: Patients with cataract and PXF posted for manual small incision cataract surgery have to be carefully assessed preoperatively for insufficient mydriasis, zonular weakness, subluxation or dislocation of cataractous lens, because these pre- operative factors have bearing on the intraoperative complications and visual outcome.

KEYWORDS

Pseudoexfoliation syndrome, Senile cataract ,Small incision cataract surgery

INTRODUCTION

PXF is usually a senile condition involving primarily ocular structures with systemic involvement. It is characterized by the progressive pathological production and accumulation of an abnormal fibrillar extra-cellular material in many intraocular tissues. The disease tends to be bilateral but usually asymmetric. This well-known entity with wide spectrum of intra ocular risks during cataract surgery-cataract extraction and IOL implantation, entitles renewed interest.

In the eye, PXF is characterized clinically by dandruff like small white deposits of material in the anterior segment most commonly in the pupillary border and the anterior lens capsule.

EPIDEMIOLOGY

PXF is distributed worldwide. The reported prevalence of PXF both with and without glaucoma has varied widely. This reflects a combination of true difference due to racial and ethnic or unknown factors. In India, the incidence rate reported was 7.4%Lamba and Giridhar[1] (1984). A study carried out by Aravind H et al[2] in 2003 reported prevalence of pseudoexfoliation 3.8% in South India . while the Andhra Pradesh Eye Disease Study reported prevalence as 3.01%[3]. The Framingham Eye Study[4] revealed the overall prevalence of PXF to be 0.6% in the age group 52 - 64 years old, rising to 5% in age group 75 - 85years old in US population.

Clinical manifestations of PXF Syndrome

Tissue involved		*Clinical signs*
Ocular	Cornea	Reduced endothelial cell count, Corneal decompensation, Corneal endothelial proliferation,
	Iris	Vaculopathy: blood aqueous barrier defect, pseudo-uveitis, anterior chamber hypoxia, capillary hemorrhage, iris rigidity, posterior synechiae, poor mydriasis, asymmetric pupillary reaction, stromal/pigment epithelial atrophy, melanin release
	Trabecular meshwork	Increased resistance to aqueous outflow, elevated intraocular pressure
	Lens	Phacodonesis, Subluxation, Nuclear cataract,
	Zonules	Zonular instability:rupture/dialysis
Extraocular	Skin, Extraocular muscles, heart, liver, kidney, meninges.	Yet unknown

Complications of PXF

Spontaneous	Ocular hypertension/glaucoma Lens Subluxation, Nuclear cataract, Pseudo-uveitis, Corneal endothelial decompensation
Preoperative (by mydriatics)	Poor dilatation, Melanin dispersion, iris hemorrhage.
	Posterior synechiae, Pupillary block, Ciliary block.
Intraoperative (SICS)	Poorly dilating pupil, Difficulty during anterior capsulotomy, Difficulty in nucleus delivery, Corneal endothelial touch, Decements membrane detachment, Iridodialysis, Posterior capsule rupture, Zonular dehiscence, Vitreous loss.

MATERIALAND METHODS

This Observational clinical trial was conducted on 60 patients with cataract and PXF presenting themselves directly to ophthalmology OPD of Rajindra hospital Patiala from Feb 2017 to Nov 2017 and those patients who appear to the camps whenever conducted in various peripheral villages, whose occupation is mainly agriculture and residing in rural area.

INCLUSION CRITERIA:

1. All male and female patients diagnosed with PXF.
2. Cataractous changes including cortical, nuclear, sub capsular, capsular.
3. Normal posterior segment findings.
4. Patients willing to undergo surgery (manual SICS).

EXCLUSION CRITERIA:

1. Previous ocular trauma, manifest luxation or extensive sub-luxation of the lens.
2. Previous intra-ocular surgery & laser treatment

3. Patients with Diabetes Mellitus, secondary cataract & anterior uveitis
4. Glaucoma cases
5. Patient not willing to give consent.

A written and informed consent is taken from all the patients included in the study, after explaining the purpose and procedure of the study. Patients were admitted 1-2 days prior to the surgery. A proforma was devised containing all essential details of history, examination, intra operative complications, management and visual outcome, the following procedures were followed and documentation done.

PRE-OPERATIVE EVALUATION.

1. Detailed history.
2. Visual acuity for distance and near using Illiterate E chart/Snellen's distant chart and near vision charts respectively.(un corrected and best corrected VA)
3. External ocular examination.
4. Slit lamp bio microscopic examination for evidence of the following findings.

- Pseudoexfoliation material in the pupillary margins.
- Morphological alterations of the cornea
- Anterior chamber depth and pigment dispersion in the anterior chamber
- Iridodonesis.
- Presence of posterior synechiae.
- Zones of Pseudoexfoliation on the anterior surface of the lens capsule.
- Phacodonesis
- frank subluxation/dislocation of lens. (For exclusion)
- Measurement of pupil size before and after dilatation of pupil.
- Pupillary reactions.

5. Tonometry.
6. Gonioscopy with Goldmann three mirror lens in all patients with PXF.
7. The pupils were then dilated with a combination of 5% phenylephrine and tropicamide 0.8mg 1 drop was instilled every 5 minutes over a 15 minute interval.
8. This was followed by slit lamp examination for

- measuring pupil dilation
- examination of lens capsule for central and peripheral zones of pseudoexfoliation material deposition.
- evaluation of lens for type of cataract

9. Fundoscopy
10. Lacrimal patency test
11. Keratometry
12. A-scan and Intraocular lens power calculation by SRK-2 formula. Other investigations included

- Urine examination for detection of sugar and albumin.
- Random blood sugar

Surgical technique

All patients will be given systemic antibiotics on the preoperative day. On the day of surgery pupil of the operating eye is dilated adequately using instillation of 0.8% tropicamide and 5% phenylephrine eye drops (phenylephrine eye drops avoided in hypertensives) every 10 minutes for 3 times, one hour before surgery. To sustain the pupil dilatation the NSAID's drops such as flurbiprofen will be instilled three times one day before surgery and half hourly for two hours immediately before surgery.

Under aseptic precautions the Manual Small Incision Cataract Surgery will be carried out under Local anesthesia.

Postoperatively all the patients are administered a course of topical antibiotic with steroid eye drops hourly and systemic antibiotic for 5 days.

The patients are reviewed 1st week, 4th week and 6th week post operatively recording unaided vision and finally unaided vision and best corrected visual acuity on 45th day. The patients are also advised to appear SOS in case of sudden onset of pain, blurring vision, redness or bleeding.

OBSERVATIONS & RESULTS

Table 1: Age distribution of patients studied

Age in years	*No. of patients*	*%*
<60	8	13.3
60-70	34	56.7
71-80	16	26.7
81-90	2	3.3
Total	60	100.0

As shown in table 1, in our study there were 8 (13.3 %) patients of age group below 60 years, 34 (56.7%) patients of age group 60-70 years, 16 (26.7 %) of age group 71- 80 and 2(3.3%) of age group81-90years. The average age of patients was 67.58±8.58 years and about 52 (86.3 %) of patients were above 60 years of age.

Table 2: Gender distribution of patients studied

Gender	No. of patients	%
Female	31	51.7
Male	29	48.3
Total	60	100.0

Table 3: Gender wise age distribution of patients studied

Age in years	*Gender*		*Total*
	Female	*Male*	
<60	7(22.6%)	1(3.4%)	8(13.3%)
60-70	18(58.1%)	16(55.2%)	34(56.7%)
71-80	4(12.9%)	12(41.4%)	16(26.7%)
81-90	2(6.5%)	0(0%)	2(3.3%)
Total	31(100%)	29(100%)	60(100%)

P=0.010, not significant

As shown in table 3, in our study there were 8 (13.3 %) patients of age group below 60 Years(7 females and 1 male), 34 (56.7%) patients of age group 60-70 years(18 females and 16 males), 16 (26.7 %) of age group 71- 80years(4 females and 12 males),and 2(3.3%) of age group81-90years(2 females). There is no significant age distribution between males and females.

Table 4: Intra ocular pressure (mm Hg) range

Intra ocular pressure (mm Hg)	*Gender*		*Total*
Female		*Male*	
<12	12(38.7%)	11(37.9%)	23(38.3%)
12-18	18(58.1%)	16(55.2%)	34(56.7%)
>18	1(3.2%)	2(6.9%)	3(5%)
Total	31(100%)	29(100%)	60(100%)

P=0.917, not significant

As shown in Table 4, 23(38.3%) patients had IOP less than 12mm Hg,34(56.7%) patients had IOP between 12-18mm Hg, 3(5%) had IOP above 20mm Hg. Out of 60 patients in the present study group, the range of IOP was from 8 mm Hg to 20 mm Hg with an average IOP reading of 12.66 mm Hg.

Table 5: Complications

Complications	*Total (n=60)*	*P value*
Difficulty in anterior capsulotomy	21(35%)	0.123
Difficulty in nucleus delivery	22(36.7%)	0.205
Corneal endothelial touch	8(13.3%)	1.000
Descemet's membrane detachment	0(0%)	1.000
Zonular dialysis	4(6.7%)	0.613
Posterior capsular rent	4(6.7%)	0.346
Vitreous loss	4(6.7%)	0.346
Residual lens material	6(10%)	0.196
Iridodialysis	2(3.3%)	1.000

As shown in table 5, Difficulty during anterior capsulotomy was noted in 21(35%) patients. Difficulty in nucleus delivery was noted in 22(36.7%)patients, Corneal endothelial touch was noted in8(13.3%)patients, Descemet's membrane detachment was not noted in any patients, Zonular dialysis was noted in 4(6.7%)patients, Posterior capsular rent was noted in 4(6.7%)patients, Vitreous loss was noted in 4(6.7%)patients, Residual lens material was noted in 6(10%)patients, Iridodialysis was noted in 2(3.3%)patients.

TABLE 6: Management

Management	*Gender*		*Total (n=60)*	*P value*
	Female (n=31)	Male (n=29)		
1. No special intervention	10(32.3%)	11(37.9%)	21(35%)	0.645
2. Viscomydriasis	15(48.4%)	9(31%)	24(40%)	0.170
3. Sphincterotomy	3(9.7%)	8(27.6%)	11(18.3%)	0.073
4. Use of iris hooks	1(3.2%)	2(6.9%)	3(5%)	0.606
5. CTR Implantation	2(6.5%)	0(0%)	2(3.3%)	0.492
6. Anterior Vitrectomy	1(3.2%)	3(10.3%)	4(6.7%)	0.346

As shown in table 6, No special intervention was required in 21(37.9%) patients, viscomydriasis/manual iris stretching was used in 24(40%)patients, sphincterotomy done in 11(18.3%) patients, Use of iris hooks was done in 3(5%)patients, CTR implantation was done in 2(3.3%) patients and anterior vitrectomy was done in 4(6.7%)patients.

Table 7: Outcome

Outcome (n=60)	UCVA on Day 1	BCVA on Day 45	% change
6/6-6/9	15(25%)	44(73.3%)	48.3%
6/12-6/18	29(48.3%)	15(25%)	-23.3%
6/24-6/36	5(8.3%)	1(1.7%)	-6.6%
6/60	4(6.7%)	0(0%)	-6.7%
<6/60	7(11.7%)	0(0%)	-11.7%

As shown in table 7, post-operative vision of 6/6-6/9 was noted in 15(25%)patients on day1 as UCVA and in 44(73.3%)patients on day 45 as BCVA.

post-operative vision of 6/12-6/18 was noted in 29(48.3%)patients on day1 as UCVA and in 15(25%)patients on day 45 as BCVA.

post-operative vision of 6/24-6/36 was noted in 5(8.3%)patients on day1 as UCVA and in 1(1.7%)patient on day 45 as BCVA.

post-operative vision of 6/60 was noted in 4(6.7%)patients on day1 as UCVA and in none patient on day 45 as BCVA.

post-operative vision of <6/60 was noted in 7(11.7%)patients on day1 as UCVA and in none patient on day 45 as BCVA

Discussion

Present study consisted of 60 eyes of 60 patients with PXF with cataract who underwent manual small incision cataract surgery in Rajindra Hospital Patiala, Punjab. As shown in table 1, in our study there were 8 (13.3 %)patients of age group below 60 years, 34 (56.7%) patients of age group 60-70 years, 16 (26.7 %) of age group 71- 80 and 2(3.3%) of age group 81-90years.

The average age of patients was 67.58 years and about 86.3 % of patients were above 60 years of age. The ages of most of the patients diagnosed with PXF in this study were in 60-80 years age group. Epidemiological studies of PXF have shown that it is more common in patients older than 60 years and prevalence further increases with age.[5-6]

Of the 60 patients, 29 (48.3.3%) were males and 31 (51.7%) were females, with a male: female ratio of 1:1.06.previous reports regarding sex predilection in PXF are conflicting. Some previous study reports showed male preponderance, according to Arvind *et al*. in 2003 there is no sex predilection90 Avramides, Sakkias and Traindis showed a female preponderance.[7]

As shown in table 5, Difficulty during anterior capsulotomy was noted in 21(35%) patients. The main reason behind this complication was poor mydriasis of pupil. Difficulty in nucleus delivery was noted in 22(36.7%)patients, a reason behind this complication was presence of large and hard nucleus with inadequate mydriasis. Corneal endothelial touch was noted in 8(13.3%)patients giving rise to corneal edema on the first post op day. The endothelial touch invariably occurred during nucleus delievery. Zonular dialysis in 4(6.7%)patients, posterior capsular rent in 4(6.7%)patients, vitreous loss in 4(6.7%) patients, residual lens material in 6(10%)patients and Iridodialysis in 2(3.3%)patients were observed.

Scrolloli et al[8] (1998) have found that PXF patients were five times more likely to develop intraoperative complications during cataract surgery compared to patients without the condition.

Schonherrs U et al[9] (1989) found a statistically significant increase in intraoperative and postoperative complication in eyes with PXF in their study of 436 patients.Various studies in eyes with PXF have quoted the incidence of Zonular dehiscence-13.1% by Avramides S (1997)[7] and 14.8% by Lumme P, Laatikanan (1993)[10]

25% of the moderately dilated patients and 84.6% of good dilated patients were not required any special intervention. (P value is <0.001) Viscomydriasis procedure was used in 1(14.3%) poorly dilated patient, 22(55%)moderately dilated patients and 1(7.7%) good dilated patient.(P value-0.003)

anterior vitrectomy was done in 4(6.7%)patients, all of these 4 patients had posterior capsular rupture and vitreous loss, this procedure was done in 2(28.6%) poorly dilated patient, 2(5%)moderately dilated patients and none in good dilated patient. measures were taken to clear the vitreous from anterior chamber.

Visual outcome was observed as follows(As shown in table7):
Post-operative vision of 6/6-6/9 was noted in 15(25%)patients on 1st day and in 44(73.3%)patients on 45th day. 6/12-6/18 was noted in 29(48.3%)patients on 1st day and in 15(25%)patients on 45th day. 6/24-6/36 was noted in 5(8.3%)patients on 1st day and in 1(1.7%)patient on 45th day. 6/60 was noted in 4(6.7%)patients on 1st day and in no patient on 45th day. <6/60 was noted in 7(11.7%)patients on 1st day and in no patient on 45th day.

Pranathi K et al[11](2014) have studied intra operative complications during Cataract Surgery in 52 eyes having pseudoexfoliation,and has found Post-operative visual acuity of 6/6-6/12 in 23.1% of patients,6/18-6/36 in 69.2% of patients and6/60 or less in 7.7% of patients

Conclusion

Patients with cataract and PXF posted for manual small incision cataract surgery have to be carefully assessed preoperatively for insufficient mydriasis, zonular weakness, subluxation or dislocation of cataractous lens, because these pre- operative factors have bearing on the intraoperative complications and visual outcome.

Poor mydriasis and zonular weakness are the major pre-operative conditions in eyes with PXF which may lead to intraoperative complications like difficulty during anterior capsulotomy and nucleus delivery, zonular dialysis, posterior capsular rent and vitreous loss.

corneal endothelial touch leading to corneal edema was observed post operatively in some cases. PXF has an increased intraoperative complications which increases as the level of cataract maturity increases. Hence, it is advisable to operate early on cataracts in patients with PXF to have better visual outcome and to minimize the complications.

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