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Original Research Paper

Ophthalomology

STUDY ON INTRAOPERATIVE COMPLICATIONS OF CATARACT SURGERY IN PATIENTS WITH PSEUDOEXFOLIATION

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ABSTRACT

Background and objective: Pseudoexfoliation syndrome is an age related systemic microfibrillopathy that involves eyes through gradual deposition of abnormal fibrillar extracellular material in ocular tissues. The pseudoexfoliative material is deposited on the corneal endothelium, trabecular meshwork, angle structures, iris, pupillary margins, ciliary processes, zonules, anterior lens capsule, and anterior hyaloid phase. Pseudoexfoliation syndrome is associated with an increased incidence of nuclear cataracts. This study is done to analyse the intraoperative complications of cataract surgery in patients with pseudoexfoliation. **Materials and methods:** It is an observational study conducted in the department of Ophthalmology in a tertiary care hospital from January 2021 to December 2022. A total of 78 eyes of 78 patients aged more than 40 years diagnosed with cataract and associated with pseudoexfoliation were included in the study. After assessing best corrected visual acuity (BCVA), detailed anterior and posterior segment evaluation was done along with keratometry, contact A-scan biometry. Intraocular lens (IOL) power was calculated. All patients underwent small incision cataract surgery (SICS) under peribulbar anaesthesia and intraocular lens was implanted. Intraoperative complications were reported. BCVA was recorded on day 1, 1st week and 6th week. **Results:** Out of 78 eyes of 78 patients, 42(53.8%) were males and remaining i.e. 36(46.2%) were females. Out of these 61.5 % had bilateral involvement. The intraoperative difficulties observed during cataract cataract surgery was poor pupillary dilation, which was seen in 41% patients. The intraoperative complications like rhexis extension, posterior capsular rent, zonular dialysis, vitreous loss were noted. The BCVA of 6/12 and more was noted in 80.8% patients on post op 6th week. **Conclusion:** Inadequate mydriasis is one of the major preoperative risk factors in patients with Pseudoexfoliation syndrome which in turn result in the intraoperative complications. Although Cataract surgery in patients with pseudoexfoliation is challenging, if the surgeon is aware of the condition pre-operatively and pays meticulous attention to the surgical technique, the intraoperative complications can be managed and a good outcome can be expected.

KEYWORDS : Pseudoexfoliation syndrome, Cataract, Small incision cataract surgery (SICS), Intraoperative complications, Best Corrected visual acuity (BCVA)

INTRODUCTION:

Pseudoexfoliation syndrome is an age related systemic microfibrillopathy that involves eyes through gradual deposition of abnormal fibrillar extracellular material in ocular tissues.[1]

Pseudoexfoliative material was also found in skin and visceral organs like heart, lungs, liver, kidney, gallbladder, and blood vessels leading to the concept that pseudoexfoliation syndrome is the ocular manifestation of a systemic disorder.[1]

Pseudoexfoliation was first described by Lindberg in 1917, and a detailed description was given by Alfred Vogt in 1918.[2,3,4]The exact pathogenesis of pseudoexfoliation is unclear. Mutation in the LOXL1 gene (locus 15q22) is responsible for the overproduction of elastic microfibrillar components like fibrilin-1.Pseudoexfoliation is more common in the elderly, aged between 75 -85 years. Although there is no established sex predilection for PXF, a female preponderance has been reported in some studies.[4]

Pseudoexfoliation is highly prevalent in eyes with cataract. The pseudoexfoliative deposits in the eye are produced by abnormal basement membranes of aging epithelial cells of trabecular meshwork, pre-equatorial lens capsule, pupillary margin of iris, and ciliary body of the eye.[5]

The pseudoexfoliative material is also deposited on the corneal endothelium, trabecular meshwork, angle structures, iris, pupillary margins, ciliary processes, zonules, anterior lens capsule, and anterior hyaloid phase. Pseudoexfoliation syndrome is associated with an increased incidence of nuclear cataract which appears earlier and progresses faster in these patients.[1,5]

Pseudoexfoliative deposits on iris (iridopathy), lens (phacopathy) and zonules (zonulopathy) result in poor pupillary dilatation, zonular weakness resulting in phacodonesis making cataract surgery a challenging task and can cause many surgical complications intraoperatively as well as postoperatively which can affect the visual outcome adversely. Pseudoexfoliation is associated with decreased corneal endothelial cell count which can lead to early corneal decompensation after cataract surgery.[6] Pseudoexfoliation is frequently associated with open angle glaucoma, poor pupillary dilatation and zonular weakness which has been identified as the most significant risk factors for surgical complications. All these difficulties posed by pseudoexfoliation syndrome make its diagnosis very important. Otherwise, it may go unnoticed and result in unexpected complications.

MATERIALS AND METHODS:

It is a descriptive observational study conducted in the Department of Ophthalmology at a tertiary care hospital in Maharashtra. The study period was from January 2021 to December 2022. A total of 78 eyes of 78 patients aged more than 40 years diagnosed with cataract and associated with pseudoexfoliation, of either gender who visited Ophthalmology OPD were included in the study. Those patients with a history of trauma, previous intraocular surgeries, traumatic cataract, previous history of using miotics and systemic conditions predisposing to subluxation of lens were excluded. Written informed consent was taken from all the patients after explaining to them the procedure and associated risks. Detailed history of patents was obtained including age, address, occupation, past history and personal history. Uncorrected and best-corrected visual acuity was

measured using Snellen's chart. Detailed anterior segment examination was done by slit lamp biomicroscope, undilated and under full mydriasis with tropicamide to assess the type of cataract and grading was done according to Lens Opacities Classification System II. Cataract was classified morphologically as nuclear sclerosis, cortical and posterior subcapsular. Pseudoexfoliative deposit was looked for on the cornea, iris and pupillary margin, on the anterior capsule of the lens. Atrophy of the pupillary ruff and pigment dispersion were two associated anatomical findings that were looked for. Intraocular pressure was measured by Goldmann applanation tonometer, and angle evaluation was done by Goldmann 4 mirror gonioscope and graded by Shaffer's classification. Dilated fundus examination was done using a 90D lens and indirect ophthalmoscope. B-scan ultra sonography was performed when fundus was not visible. Lacrimal sac syringing, noncontact keratometry, contact A-scan biometry was done. Intraocular lens (IOL) power was calculated using Sanders-Retzlaff-Kraff – II (SRK- II) formula. Systemic examination and preoperative investigations including blood sugar level, serology, urine routine and complete blood count were done.

All patients were operated by a single surgeon. Pre-operative pupillary dilatation was done by mydriatic-cycloplegic drops and nonsteroidal anti-inflammatory drugs. Pupillary diameter after dilation was measured and graded as good (7-9 mm), fair (5-6 mm), and poor (2-4 mm). All patients underwent small incision cataract surgery (SICS) under peribulbar anaesthesia and an intraocular lens was implanted. Intraoperative complications were noted. Postoperatively all patients were advised topical antibiotic-steroid (moxifloxacin with prednisolone acetate) eye drops for 6 weeks in tapering dose. The postoperative follow up were scheduled on day 1, 1st week and at 6th week to evaluate the best corrected visual acuity (BCVA), intraocular inflammation, decentration/tilt of IOL and corneal decompensation.

This study was done to evaluate the intraoperative complications during cataract surgery in patients having pseudoexfoliation.

Statistical analysis:

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was seen by using Chi-square/ Fischer's exact test. Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered highly significant.

RESULTS:

A total of 78 eyes of 78 patients were evaluated during the study period, attending Ophthalmology OPD at our tertiary care hospital. Out of the total, 42(53.8%) were males and remaining i.e. 36(46.2%) were females as shown in Table 1. Out of these, 61.5 % had bilateral involvement. Age distribution is shown in Table 2, majority belong to 61-70 years of age. The mean age of the study population was 65.52±9.84 years. Out of total patients in our study, 67.9% patients were from rural areas. Distribution according to place of residence is shown in Table 3. The prevalence of diabetes in our study was 59%, hypertension 48.7%, IHD 6.4% and stroke 3.8% as shown in Table 4. Based on the morphology of cataract associated with pseudoexfoliation, nuclear cataract was most common, seen in 30.8% patient (Figure 5). Distribution of pseudoexfoliative material was most frequently seen on the pupillary margin (Table 6). During surgery 39.7% patients (31 eyes) showed fair pupillary dilation, 19.2% (15 eyes) showed good pupillary dialation and remaining 41% (32 eyes) showed poor pupillary dilation (Table 7). The intraoperative complications seen during surgery are shown in Table 8. Posterior capsular rupture was the most commonly seen complication seen in 29.5% patients. The immediate post-operative complications (on post-operative day 1) were also recorded (Table 9), corneal edema was noted in 34.6% of patients. The comparison of best corrected visual acuities on post-operative day 1, 1st week and 6th week is shown in Table 10. The BCVA of 6/12 and more was noted in 80.8% patients on post-op 6th week as compared to 34.6% patients on day 1. However, decreased visual acuities (BCVA 6/60 and less) were seen in 4 eyes on post-operative 6th week, it was mainly because of posterior capsular opacification.

Table 1: Distribution according to gender

		Frequency	Percent
Gender	Male	42	53.8%
	Female	36	46.2%
	Total	78	100.0

Table 2: Distribution according to age

		Frequency	Percent
Age group in years	50-60	25	32.1%
	61-70	41	52.6%
	71-80	12	15.4%
	Total	78	100.0

Table 3: Distribution according to place of residence

		Frequency	Percent
Urban/rural	Rural	53	67.9%
	urban	25	32.1%
	Total	78	100.0

Table 4: Distribution according to comorbid conditions

		Frequency	Percent
Comorbid conditions	DM	46	59.0%
	Hypertension	38	48.7%
	IHD	5	6.4%
	Stroke	3	3.8%

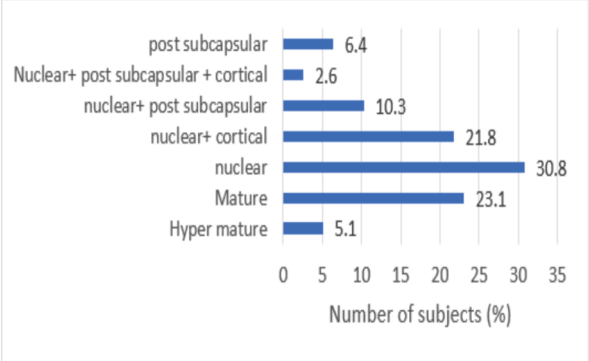

Figure 5: Bar diagram showing Distribution according to type of cataract

Table 6: Distribution according to Distribution of PEX material

		Frequency	Percent
Distribution of PEX material	Pupillary margin	52	66.7%
	pupillary margin + lens	9	11.5%
	pupillary margin + iris	2	2.6%
	pupillary margin+ lens +iris	15	19.2%
	Total	78	100.0

Table 7: Distribution according to pupillary dilation

		Frequency	Percent
Pupillary dilation	Fair	31	39.7%
	Good	15	19.2%
	Poor	32	41%
	Total	78	100

Table 8: Intraoperative complications

		Frequency	Percent
Intraoperative complications	Posterior capsular rent	23	29.5%
	Rhexis extension	13	16.7%
	Vitreous loss	10	12.8%
	Retained lens matter	7	9%
	Zonular dialysis	4	5.1%
	Lens dislocation	2	2.6%

Table 9: Postoperative complications on day 1

		Frequency	Percent
Postoperative complications	Corneal edema	27	34.6%
	Irregular pupil	10	12.8%
	Retained lens matter	7	9%
	Hyphema	5	6.4%

Table 10: Comparison of vision postoperative Day 1, Day 7 and 6th week

		Day 1	Day 7	6th week
BCVA	6/6 - 6/12	27 (34.6%)	53 (67.9%)	63 (80.8%)
	6/18 - 6/36	32 (41%)	21 (26.9%)	11 (14.1%)
	6/60 or less	19 (24.4%)	4 (5.1%)	4 (5.1%)

DISCUSSION:

This study consists of 78 eyes of 78 patients having cataract associated with pseudoexfoliation syndrome who underwent small incision cataract surgery at our Tertiary care hospital. Out of 78 patients, majority were from 61-70 years age group i.e. 41(52.6%) followed by 25(32.1%) from 50-60 years and least i.e. 12(15.4%) from 71-80 years age group. Mean age of the study population was 65.52±9.84 years. Out of 78 cases, majority were males i.e. 42(53.8%) and remaining i.e. 36(46.2%) were females. 67.9% were from rural area and 32.1% from urban area. A study conducted by Dr. Aditi. S. Sinha et al[7] shows that 6 (12%) patients of age group 50 – 59 years, 37(74%) patients of age group 60 – 70 years and 7 (14%) of age group 71- 80 %. The average age of patients was 66.28 years and about 37 (74%) of patients were above 60 years of age. Various studies have concluded that pseudoexfoliation syndrome occurs majority in the age group 60 to 80 years. The studies regarding gender distribution are conflicting. According to study conducted by Pranathi K et al[8], male: female ratio is 7:6, whereas some other studies reported female preponderance.

In our study, pseudoexfoliative material was distributed on the pupillary margin in 66.7% of patients, on the pupillary margin, lens, and iris in 19.2% of patients, on the lens in 11.5% of patients, and on the pupillary margin and iris in the remaining 2.6% of patients. Study conducted by Deepa R. et al[9] reported that majority of the patients (19 eyes, 36.53%) showed equal distribution of pseudoexfoliative material in iris, pupillary margin and lens. In our study, based on the morphology of cataract associated with pseudoexfoliation, nuclear cataract was most common, seen in 30.8% patient. It was followed by mature cataract (23.1%), combined nuclear with cortical cataract (21.8%), nuclear with posterior subcapsular cataract (10.3%), posterior subcapsular cataract (6.4%), hyper mature (5.1%) and nuclear with posterior subcapsular and cortical cataract (2.6%). Joshi et al. in his study reported 25% patients with nuclear cataract, 98% with hypermature and 50% with mature cataract. Whereas, Shilpi Kapoor et al[10] in her study reported that 19 (27.94%) patients had mature cataract, 19 (27.94%) had nuclear sclerosis, 16 (23.52%) had posterior subcapsular cataract, 5 (7.35%) had phacodonesis and 3 (4.41%) were subluxated lenses. In our study, the preoperative pupillary dilation was poor in 41% cases, fair in 39.7% and good in 19.2% cases. Islam MN et al[11] in their study reported that there was poor pupillary dilatation in spite of the use of standard mydriatic drops and nonsteroidal anti-inflammatory drugs was the most common finding in 334 (65.32%) cases. A poorly dilated pupil makes capsulorhexis difficult, increases iris prolapse incidence and increases surgical risk due to poor visualization of the lens. The most common intraoperative complication observed in our study was posterior capsular rent which was seen in 29.5% patients. It was followed by rhexis extension (16.7%), vitreous loss (12.8%), retained lens matter (9%), zonular dialysis (5.1%) and lens dislocation (2.6%). On post-operative day 1, 34.6% patients had corneal edema. It was the most commonly observed post-operative complication in our study. Other post-operative complications were irregular pupil (12.8%), retained lens matter (9%) and hyphema (6.4%).

The BCVA of 6/12 and more was noted in 80.8% patients on post-op 6th week as compared to 34.6% patients on day 1. However, decreased visual acuities (BCVA 6/60 and less) were seen in 5.1% (4 eyes) on post-operative 6th week, it was mainly because of posterior capsular opacification and remaining 14.1% patients had between 8/18 to 6/36 BCVA on 6th week.

CONCLUSION:

Inadequate mydriasis is one of the major preoperative risk factors in patients with Pseudoexfoliation syndrome which in turn result in intraoperative complications like posterior capsular rent, vitreous loss, and zonular dialysis. Although Cataract surgery in patients with pseudoexfoliation is challenging, if the surgeon is aware of the condition pre-operatively and pays meticulous attention to the surgical technique, the intraoperative complications can be managed and a good outcome can be anticipated.

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Conflict Of Interest:

All contributing authors declare no conflict of interest.

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