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COMPLICATIONS OF MANUAL SMALL INCISION CATARACT SURGERY AMONG PATIENTS WITH PSEUDOEXFOLIATION

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Abstract:

Background: Pseudoexfoliation (PXF) syndrome is a condition caused by accumulation of grayish white fibrogranular extracellular material produced by abnormal basement membranes of ageing epithelial cells in lens epithelium, iris stroma, pupillary margin, corneal endothelium, anterior hyaloid surface, zonular fibers, trabecular meshwork. Pseudoexfoliation was first described by Lindberg in 1917, followed by a detailed description which was made by Alfred Vogt in 1918. Mutation in the LOXI.1 gene (locus 15q22) has been attributed which is responsible for overproduction of elastic microfibrillar components such as fibrilin-1. Ocular deposition of exfoliative material on the pupillary margin, iris, near the ciliary processes, and anterior lens capsule causes iridopathy (poor pupil dilatation) and zonulopathy (zonular weakness) leading to high risk of intraoperative and postoperative complications. **Materials and Methods**: This Retrospective observational study was conducted on 40 patients in the Department of Ophthalmology at Shridevi Institute of Medical Sciences and Research Hospital, Tumkur for a period of 6 months. Prior to the initiation of the study, Ethical and Research Committee clearance was obtained from Institutional Ethical Committee. **Results**: The study includes 40 patients with Pseudoexfoliation, which has 22(55%) male patients and 18(45%) female patients. Out of 40 patients, 12 patients(30%) were 51-60 years of age, 22 patients(55%) were 61-70 years of age, 6 patients(15%) were 71-80 years of age. Pseudoexfoliation was unilateral in 11 cases(27.5%) and bilateral in 29 cases(72.5%). Out of 40 patients, 7 patients had Immature NS1 Cataract(17.5%), NS2 in 15 patients(37.5%), NS3 in 3 patients(7.5%), Mature cataract in 11 patients(27.5%), Hypermature cataract in 4 patients(10%). The complications of MSICS in Pseudoexfoliation are poor dilating pupil in 24 cases(60%), zonular weakness in 6 cases(15%), posterior capsule rupture in 1 case(1%), retained lens matter in 1 case(2.5%), AC reaction in 5 cases(12.5%), corneal edema in 8 cases(20%).**Conclusion:** Cataract surgery in patient with pseudoexfoliation has higher incidence of intraoperative and postoperative complications. A complete preoperative workup reduces intraoperative complications and maximises the postoperative results.

Keywords: Cataract, Pseudoexfoliation, Manual small incision cataract surgery.

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ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

Introduction

Pseudoexfoliation (PXF) syndrome is a condition caused by accumulation of grayish white fibrogranular extracellular material produced by abnormal basement membranes of ageing epithelial cells in lens epithelium, iris stroma, pupillary margin, corneal endothelium, anterior hyaloid surface, zonular fibers, trabecular meshwork.[1-3]Pseudoexfoliation was first described by Lindberg in 1917, followed by a detailed description which was made by Alfred Vogt in 1918.[4-6]Mutation in the LOXI.1 gene (locus 15q22) has been attributed which is responsible for overproduction of elastic microfibrillar components such as fibrilin-1.[7] Exfoliation syndrome is more common in older age-groups, with most cases occurring in the late 60s and early 70s.The prevalence of PXF in South Indian population has been reported as 0.69-3.8% and in the rural population in central India as 0.95%.[8]Ocular deposition of exfoliative material on the pupillary margin, iris, near the ciliary processes, and anterior lens capsule causes iridopathy (poor pupil dilatation) and zonulopathy (zonular weakness) leading to high risk of intraoperative and postoperative complications.[9,10] Scorolli et al. has found that cataract surgery in pseudoexfoliation eyes had 5 times greater risk of intraoperative complications compared to the normal eyes.[11]

Material and Methods

This Retrospective observational study was conducted on 40 patients in the Department of Ophthalmology at Shridevi Institute of Medical Sciences and Research Hospital, Tumkur for a period of 6 months. Prior to the initiation of the study, Ethical and Research Committee clearance was obtained from Institutional Ethical Committee.

Study Design: A Retrospective observational study.

Study Location: Ophthalmology OPD, Shridevi Institute of Medical Sciences and Research Hospital, Tumkur.

Study Duration: From July 2023 to December 2023

Sample size: 40 patients.

Sample size calculation: It is calculated using a study conducted in India by Sandeep K et al[12] in 2017. The study indicates a 20% prevalence of complications in pseudoexfoliation, with a 95% confidence level and 5% absolute allowable error.

The calculation of the sample size is carried out using the following formula.

$$\text{Sample size}(n) = \frac{Z^2_{1-\alpha/2} \times p \times q}{d^2}$$

$$= \frac{2.7060 \times 0.038 \times 0.962}{0.0025}$$

$$= 39.57 \approx 40 \text{ participants}$$

Where,

n = Sample size

q = 1-p

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

$Z^2_{1-\alpha/2}$ = Standard normal deviate (two tailed) at level of significance (α) is 0.05 and 95% CI it is 1.96 and

at 90% CI it is 1.645.

The prevalence rate of pseudoexfoliation in the Indian population is 3.8%.

d = Absolute precision or marginal error.

The study involved 40 suspected participants.

Inclusion criteria:
Patients >50 years of age of both sex diagnosed as cataract with pseudoexfoliation.

Exclusion criteria:

1. Patients with age < 50 years
2. Patients with age > 80 years
3. Traumatic cataract
4. Congenital cataract
5. Corneal scar
6. Retinal pathology.

Procedure methodology

- The study includes patients over 50 years old diagnosed with pseudoexfoliation for cataract surgery.
- Preoperative examinations include a history of complaints, SLE to examine the corneal status, anterior chamber depth, pseudoexfoliative material deposit structures, pupil size, cataract type, and nuclear sclerosis grade and a postoperative segment examination using indirect ophthalmoscopy and 20D lens. Investigations include intraocular pressure estimation using noncontact tonometry and IOL power measurement using manual keratometry and ultrasound biometry. Patients underwent MSICS with PCIOL implantation under local anesthesia. Patients were given prophylactic Ofloxacin 3% eye drops one day before surgery, followed by dilating the pupil with 0.8% Tropicamide and 5% Phenylephrine eye drops every 10 minutes thrice before surgery. All surgeries were performed under peribulbar anesthesia with injection Lignocaine2% with Adrenaline 1:200000 mixed with 1500 units of Hyaluronidase.

- Patients were closely monitored postoperatively for various factors such as visual acuity, wound status, corneal edema, and IOL position.
- The intraoperative and postoperative complications were documented. Patients were prescribed Ofloxacin 3%with Dexamethasone 0.1% Eye drops in a tapering dose for six weeks. Patients are monitored on postop day1, after 7 days, and after 1month using Snellen's chart, Slit lamp examination at each follow-up.

Statistical analysis

All the data collected will be compiled and entered into Microsoft excel worksheet. The descriptive statistics for demographic variable group comparisons using paired t-tests and chi-square tests statistics will be used for categorical data, statistical analysis test will be analysed using statistical software Jamovi version 2.5.3, with a significance level of $p < 0.05$.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

Result

Table no 1 : AGE DISTRIBUTION OF PATIENTS

AGE GROUP [YRS]	NO. OF PATIENTS	PERCENTAGE
51-60	12	30%
61-70	22	55%
71-80	6	15%
TOTAL	40	100%

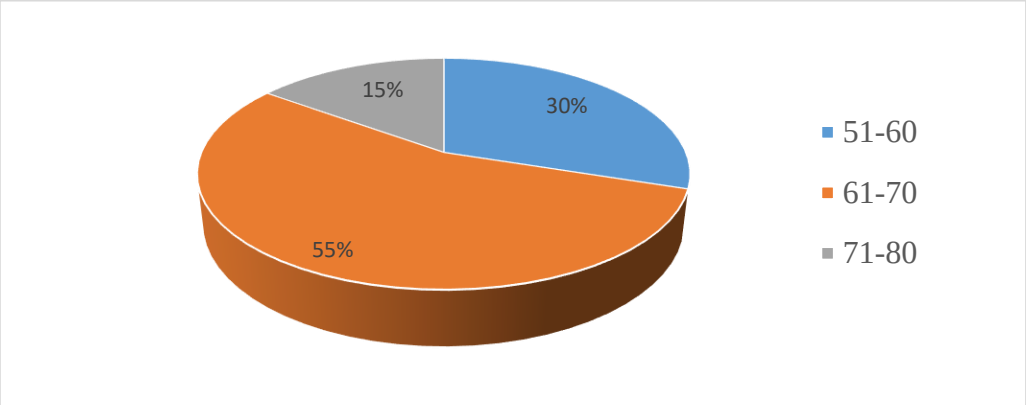


Table no2: GENDER DISTRIBUTION OF PATIENTS

GENDER	NO. OF PATIENTS	PERCENTAGE
MALE	22	55%
FEMALE	18	45%
TOTAL	40	100%

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

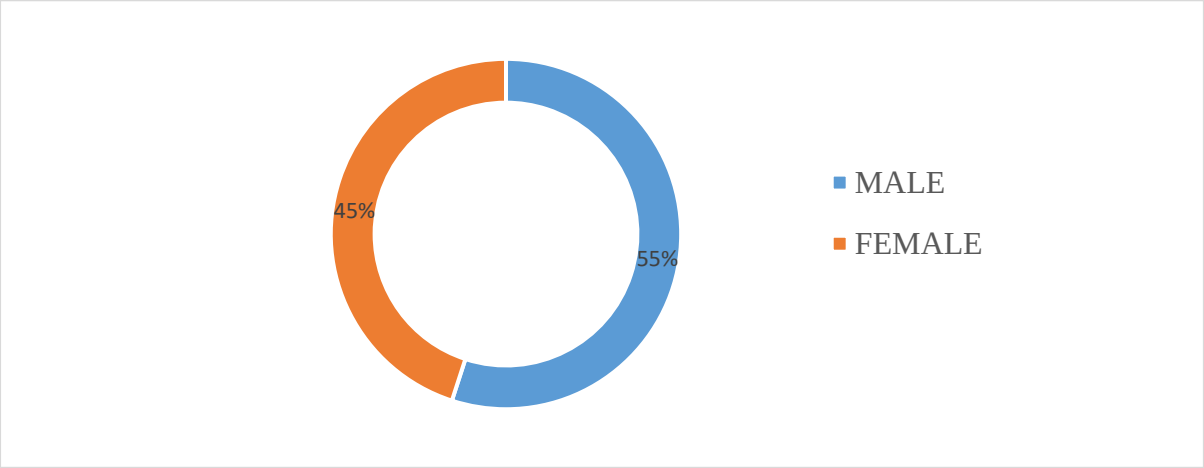


Table no 3: LATERALITY OF PSEUDOEXFOLIATION

LATERALITY OF PSEUDOEXFOLIATION	NO. OF PATIENTS	PERCENTAGE
UNILATERAL	11	27.5%
BILATERAL	29	72.5%
TOTAL	40	100%

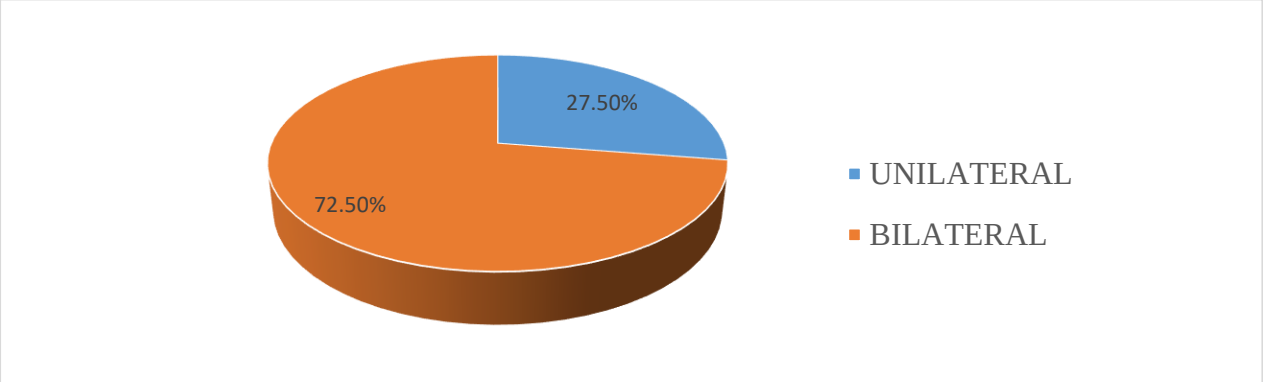


Table no.4: MORPHOLOGY OF CATARACT

MORPHOLOGY OF CATARACT	NO. OF PATIENTS	PERCENTAGE
IMMATURE NS1	7	17.5%
NS2	15	37.5%
NS3	3	7.5%
MATURE	11	27.5%
HYPERMATURE	4	10%
TOTAL	40	100%

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

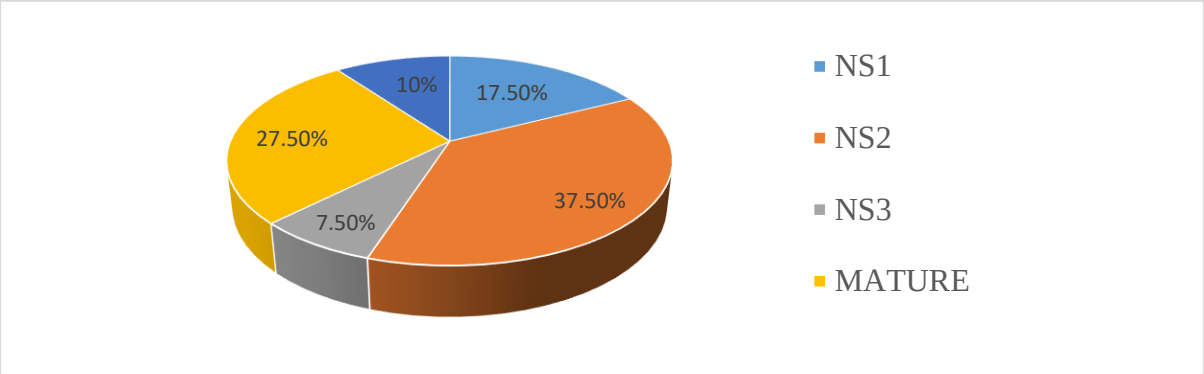


Table no 5: SURGICAL COMPLICATIONS OF MSICS IN PSEUDOEXFOLIATION PATIENTS

SURGICAL COMPLICATIONS	NO. OF CASES	PERCENTAGE
Poorly dilating pupil	24	60%
Zonular weakness	6	15%
Posterior capsule rupture	1	2.5%
Retained lens matter	1	2.5%
Decentered IOL	0	0%
AC reaction	5	12.5%
Corneal edema	8	20%

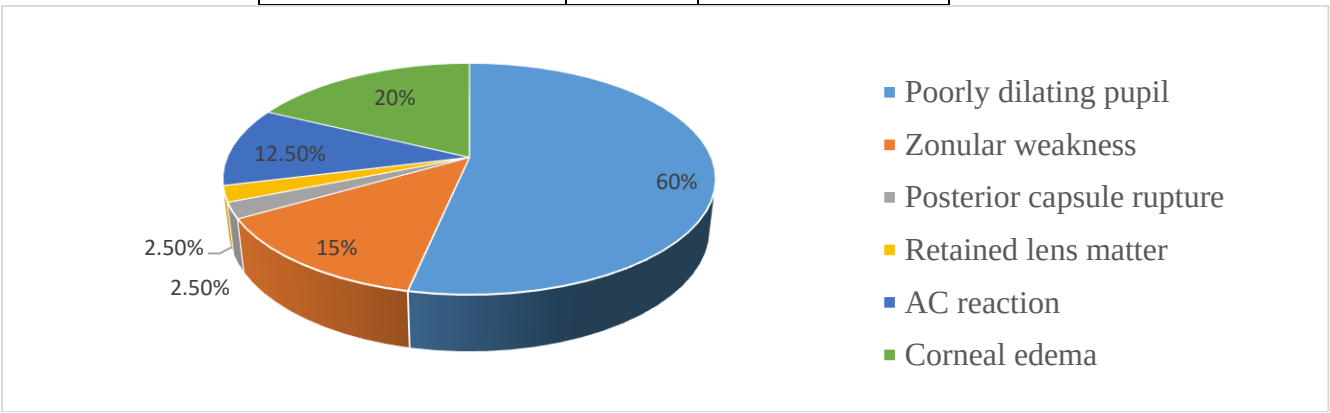
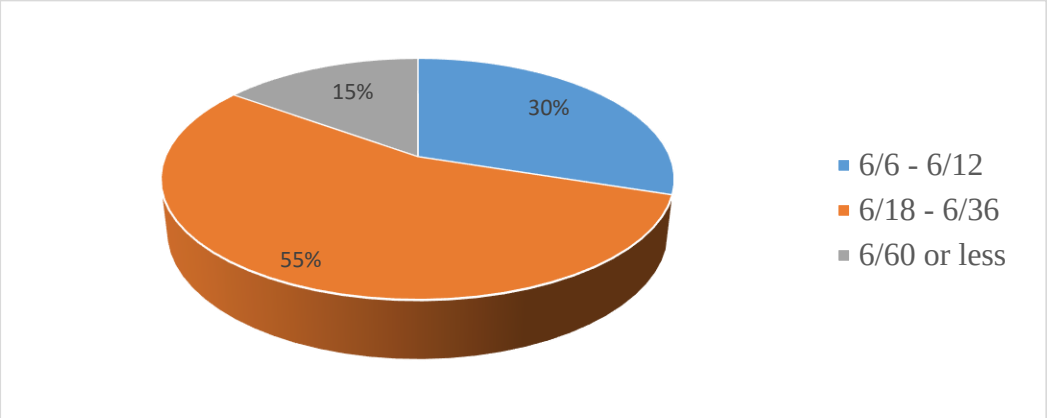


Table no. 6: POSTOPERATIVE VISION AFTER CATARACT SURGERY

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

POSTOPERATIVE VISION	NO. OF CASES	PERCENTAGE
6/6 – 6/12	12	30%
6/18 – 6/36	22	55%
6/60 or less	6	15%



Discussion

Several studies have reported differences in surgical outcomes between eyes with and without pseudoexfoliation during cataract surgery and have reported an increased risk of complications with all types of cataract surgeries.[11,13] Our study aims to analyze the outcomes of MSICS in patients with pseudoexfoliation. Studies have shown that pseudoexfoliation is more common in patients older than 60 years, and the prevalence further increases with age.[14] There are conflicting reports about gender predilection. Arvind et al.[14] reported that there is no sex predilection, but Avramides et al.[15] showed female preponderance, there were 93 (61.2%) females. Studies have shown a high rate of capsular complications with pseudoexfoliation with the incidence of zonular dehiscence reported as 13.1% by Avramides et al.,[15] 14.8% by Lumme et al., and 6.1% in phacoemulsification by Ong et al [16].Jawad et al. (2009) 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%.[14]A more contemporary study by Pranathi et al.[17]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.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

Conclusion

- Cataract surgery in patient with pseudoexfoliation has higher incidence of intraoperative and postoperative complications.
- A complete preoperative workup reduces intraoperative complications and maximises the postoperative results.

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ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

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