

# Clinical Profile, Intraoperative Challenges During Cataract Surgery in Patients with Pseudoexfoliation and Visual Outcome at Rural Set up

Shubhangi Nigwekar<sup>1</sup>, Prashant Nigwekar<sup>2</sup>, Prajakta Kharche<sup>3</sup>, Akshay Beedkar<sup>3</sup>

## ABSTRACT

**Introduction:** Pseudoexfoliation (PXF) is an ocular manifestation of systemic degenerative disorder. Many recent studies have shown that patients with PXF have higher rate of complications during cataract surgeries compared to patients without this disorder.

**Material and method:** In this hospital based, observational, descriptive study, we studied the clinical profile and intraoperative difficulties in 50 patients of senile cataract with PXF undergoing cataract surgery at the rural hospital for two years (September 2013- August 2015).

**Results:** Out of 50 study patients mean age was  $67.4 \pm 7.52$  years. 25 (50%) were males. 31 (62%) patients had clinical bilateral involvement of PXF. 14 (28 %) patients had PXF material deposited on only pupillary margin. 26 (52%) had nuclear cataract. 31 (62 %) patients had insufficient intraoperative mydriasis for which intraoperative mechanical stretching worked well in 25 (50 %) patients while 6 (12%) patients needed additional sphincterotomy. 5 patients (10%) developed posterior capsule rupture (PCR) out of which 2 (4%) had vitreous loss with iridodialysis. 1 patient (2%) had ACIOL while 1 was kept aphakic.

**Conclusion:** Careful preoperative evaluation with slit lamp is mandatory in patients undergoing cataract surgery having PXF, to avoid the intraoperative complications. Surgical modifications for pupil enlargement reduce the intraoperative complications.

**Keywords:** Pseudoexfoliation, PXF, Cataract surgery in PXF, Clinical profile of PFX

lary dilatation is needed as PXF frequently goes undiagnosed leading to unexpected problems in surgical management.<sup>4,5</sup> The risk of intraoperative problems, such as a poorly dilating pupil, zonular weakness, phacodonesis predisposes to capsular break, and vitreous loss and postoperative complications including fibrinoid reaction, posterior synechiae, cell deposits, and capsule contraction.<sup>6</sup> Preoperative and intraoperative measures to avoid or minimize these complications include a careful slit lamp examination after full pupillary dilatation, adequate control of preoperative intraocular pressure, intraoperative adequate pupillary dilatation medically or surgically and avoidance of iris manipulation.<sup>7,8</sup> PXF syndrome should not be considered as harmless anomaly of the anterior segment but as a potentially catastrophic disease. In this study preoperative clinical profile of PXF patients with cataract, the intraoperative events and their management will be studied. With this study one can know the rate of complications, can learn how to avoid them and manage if they occur and may know ocular risk factors which technically lead to the intra-operative complications. Thus, with predictions and judgment one can take proper care of such risk factors and reduce the rate of complications during cataract surgeries in PXF patients. Aim and objective of the study was to study the clinical profile and intraoperative difficulties during cataract surgery in patients with PXF at rural hospital.

## MATERIAL AND METHODS

This descriptive, observational, hospital based study was carried out in 50 patients of senile cataract with PXF undergoing cataract surgery at rural hospital for 2 years i.e. September 2013 to August 2015 which was approved by the

## INTRODUCTION

Pseudoexfoliation is a generalized disorder of extracellular matrix. It is an ocular manifestation of systemic degenerative disorder. Clinically PXF is manifested by presence of whitish granular dandruff-like deposits on iris, pupillary margin, anterior lens capsule, ciliary body, zonules and there may be iris atrophy with moth-eaten appearance of iris on transillumination test.<sup>1</sup> Elevated intraocular pressure (IOP) has been reported in eyes with PXF. Patients with PXF are twice as likely to convert from ocular hypertension to glaucoma and are more likely to develop glaucoma at all IOPs.<sup>2,3</sup> For PXF diagnosis a careful slit-lamp examination after pupil-

<sup>1</sup>Professor, <sup>3</sup>Postgraduate Student, Department of Ophthalmology, <sup>2</sup>Professor, Department of Pediatrics, Rural Medical College of PIMS (DU), Loni, Maharashtra, India

**Corresponding author:** Dr. Shubhangi Nigwekar, Professor, Department of Ophthalmology, Rural Medical College of PIMS (DU), Loni, Maharashtra, India

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Institutional Ethical committee and written informed consent was obtained prior to the study from all patients. All willing patients above 40 yrs admitted for cataract surgery having PXF at Rural Hospital were included while patients with PEX undergoing combined surgeries with previous intraocular surgeries or trauma, posterior synechiae, pigment dispersion were excluded.

### Methodology

We recorded the pre operative, intra operative data in all 50 patients with PXF who were undergoing cataract surgery, from patients' medical records for 2 years.

### Preoperative data

Consisted medical, ocular history, preoperative visual acuity, slit lamp biomicroscopy with and without pupillary dilatation with special emphasis on PXF material at the pupillary margin and anterior capsule of lens as zones of PXF on anterior lens capsule, anterior chamber (AC) depth and pigment dispersion in the AC, iridodonesis, posterior synechiae, phacodonesis or frank subluxation or dislocation of lens, pupillary reactions, measurement of pupil size before and after dilatation of pupil, and IOP apart from routine ocular investigation for cataract surgery like lacrimal sac syringing and IOL power.

### Intra-operative

Intra-operative data was also collected from records as: Pre-operative maximum dilatation of pupil with combination of 5% Phenylephrine Hydrochloride and 0.8% Tropicamide eye drops, technique of extra capsular cataract extraction performed (MSICS), surgical modifications like mechanical stretching, additional sphincterotomy, type of capsulotomy, method of nucleus delivery, type of IOL, any complication occurred and its management were recorded.

### Parameters studied

Pre and intraoperative pupillary size, method of its dilatation, variation in operative procedure due to insufficient mydriasis, type of complication and its management.

## RESULTS

Out of 50 patients with PXF average age of patients was  $67.4 \pm 7.52$  years and 43 (86 %) patients were above 60 yrs of age. 25(50%) were males (Table 1). 31 (62%) had clinical bilateral involvement of Pseudoexfoliation. 36 (72 %) patients had PXF deposition on both peripheral zone and central zone while 14 (28 %) had PXF material deposited only on the pupillary margin. 10 patients (20%) had iridodonesis clinically. 17 (34%) patients had Mature Cataract, 2(4%) had hypermature cataract. 26(52%) had nuclear sclerosis and 5 (10%) had cortical cataracts (Table 3). Range of IOP was from 10.2 mmHg to 20.6 mmHg with an average IOP reading of  $15.49 \pm 2.91$  mmHg. 31 (62 %) patients had

insufficient intraoperative mydriasis (Table 2). 31 (62%) patients required mechanical stretching during surgery because of insufficient mydriasis and out of them 6 (12%) patients required additional sphincterotomy. 5 patients had posterior capsular rent in which 4 (80%) had insufficient mydriasis while 1 (20%) had adequate mydriasis but weak zonules. Out of these 5 PC rent (PCR) patients 3 had only PCR while 2 had Vitreous loss with Iridodialysis (Table 4). Out of 50 patients with PXF, 48 (96%) patients had PCIOL implantation while 1 patient (2%) had ACIOL and 1 (2%) patient was left aphakic.

## DISCUSSION

Pseudoexfoliation being a degenerative condition average age of patients in our study was 65.83 years similar to study conducted by Anuradha et al<sup>23</sup> who showed 22 (73.33%) patients were above the age group of 60 years. They noted exfoliation in 31% of women and 40% of men however in present study there was equal incidence of pseudoexfoliation among males and females.

Clinically evident exfoliative changes are initially unilateral in patients with PXF and later become bilateral over time. The so called "unilateral" PXF may have early subclinical exfoliation.<sup>9</sup> In the study conducted by Jawed et al.<sup>26</sup> It was found that bilateral pseudoexfoliation was more common than unilateral which was in coherence with the present study. Deposition of exfoliative material on anterior lens surface is the most common feature of PXF and is best appreciated after pupillary dilatation.<sup>9</sup> Generally a bull's-eye pattern is seen consisting a translucent central zone and a granular

Age (Years)	Male	Female	Total
40-50	1	1	02
51-60	2	3	05
61-70	16	14	30
71 and above	6	7	13
Total	25	25	50

**Table-1:** Showing age and sex distribution of 50 study patients with PXF

Pupillary Diameter	No Of Cases	%
<6mm	31	62
>6mm	19	38
Total	50	100

**Table-2:** Showing the pupillary diameter in 50 study patients with PXF

Cataract type	No of cases	%
Hypermature	02	04
Mature	17	34
Nuclear sclerosis	26	52
Cortical	05	10
Total	50	100

**Table-3:** Showing distribution of type of cataracts in 50 study patients.

Intra operative challenges	No of cases out of 50	%	Mydriasis
Mechanical stretching	31	62	< 6mm.
Additional Sphincterotomy	6	12	< 6mm.
Conversion of CCC to capsulotomy	18	36	< 6mm.
Difficulty in nucleus prolapse in AC	31	62	< 6mm.
Posterior capsular rent (PCR)	5	10	< 6mm.
PCR+*VL+ Iridodialysis	2	4	< 6mm.
Conversion of PC to AC IOL	1	2	< 6mm.
Conversion to Aphakia	1	2	< 6mm.
(*Same patient had 2 or 3 complications.)			
<b>Table-4:</b> Showing distribution of surgical variations, intraoperative challenges and association of poor mydriasis during cataract surgery in 50 study patients with PXF.			

peripheral zone of deposition separated by an intermediate clear zone presumably due to lens contact with movement of iris. It may be diffusely scattered over not only the peripheral iris surface but may be deposited on or anterior to Schwalbe's line<sup>10,11</sup> (Sampaolesi's line). In 20% of patients with exfoliation, the central zone may be absent and to see the presence of PXF dilatation of pupil and slit lamp examination is mandatory.<sup>12</sup> In our study, 36 (72%) patients had PXF deposition on both peripheral zone and central zone as against Anuradha et al<sup>23</sup> who observed 80% PXF material on the pupillary margin.

Tremuloscence of iris is called Iridodonesis which is associated with phacodonesis or lens luxation in PXF due to degeneration of zonular fibers.<sup>13</sup> Spontaneous dislocation of the lens into the vitreous has been reported. In the present study, pre operative examination revealed presence of iridodonesis in 10 (20%) patients which was higher as compared that observed by Anuradha A et al<sup>23</sup> (3.33%).

Nuclear cataracts and subcapsular cataracts are more frequently found in eyes with PXF than in eyes without PXF and PXF has a higher prevalence in eyes with cataract.<sup>14</sup> Cataract formation may be related to ocular ischemia, aqueous hypoxia, reduced protection against ultraviolet radiation. Ascorbic acid, that plays an important role in protecting the lens from ultraviolet irradiation, has been found reduced in the aqueous humor of patients with PXF deposits. In the study conducted by Pranathi et al<sup>25</sup> (13.46%) 7 eyes of PXF had nuclear cataract while our study showed higher incidence of nuclear cataract 26 (52%) in PXF patients, may be due to rural patients more exposed to sun light, supports the strong association of pseudoexfoliation with nuclear cataracts.

Elevated intraocular pressure (IOP) has been reported in eyes with PXF. Patients with PXF are twice as likely to convert from ocular hypertension to glaucoma and are more likely to develop glaucoma at all IOPs which is known as glaucoma capsularae.<sup>15</sup> Out of 50 patients in the present study group, the pre operative average IOP was 15.49 mmHg which was

on lower side than studies by Pranathi et al, Jawed et al and Sushilkumar KA et al<sup>25,26</sup>

Typically, the pupil dilates poorly in an exfoliative eye. This is partly caused by atrophy and degeneration of the iris muscle cells. Poor mydriasis during surgery has been found to be one of the major factors that lead to complications in patients with pseudoexfoliation during cataract surgery.<sup>16</sup> In present study insufficient mydriasis < 6mm was seen in 31 (62%) patients which was more than other studies as 48% shown by Jawed et al and 14 (46.67%) by Anuradha A et al.<sup>26,23</sup>

Sufficient mydriasis is required intraoperatively. Pharmacologically nonsteroidal anti-inflammatory drops with mydriatics and intracameral adrenaline can help to expand the pupil. Mechanical enlargement of the pupil includes stretching, sphincterotomy as well as iris hooks and pupil dilator rings.<sup>17</sup> To facilitate capsulorrhexis and nucleus delivery mechanical stretching of the pupil is required in ECCE. If pupil cannot be enlarged sufficiently with stretching, radial sphincterotomies can be considered which may not be good cosmetically but give safer pupil access and better post operative results. Increased force needed to extrude the lens through a small pupil with the increased risk of posterior capsule rupture leads higher frequency of intraoperative complications in ECCE.<sup>18</sup> In our study mechanical stretching of the pupil was required in 31 (62%) of the patients Additional sphincterotomy was required in 6 (12%) cases. This finding was contradictory to Sushilkumar K et al<sup>19</sup> where only 12 (20%) patients required mechanical stretching.

Peripheral PXF material which is hidden behind the iris is clinically invisible, but it is responsible for the instability of zonular attachment. In Small incision surgery, controlled paracentesis and adequate hydrodissection are some more useful strategies. Adequate hydrodissection as well as the use of viscodissection to separate cortex from the capsule facilitate cortex removal. In the can-opener capsulotomy, both loops of the one-piece PMMA lenses, provide stronger resistance to capsule contraction due to their haptics.<sup>20,21,22</sup>

Separation of iris from its root is known as iridodialysis which can be due to excess handling of iris during surgery. Insufficient mydriasis may lead to iridodialysis during vectis delivery of nucleus .In present study 2 (4%) patients had iridodialysis.

Insufficient mydriasis may lead to PC rent during nucleus delivery in AC or I/A wash step. We found Posterior Capsular Rent (PCR) in 5 (10%) cases out of which 2(4%) patients had vitreous loss with iridodialysis and 1 of them got ACIOL and one kept aphakic. The other 3 patients had only PCR without vitreous disturbance so implantation of rigid PMMA-PCIOL in sulcus was carried out. Out of 5 (10%) patients with PC rent insufficient mydriasis and rigid pupil was present in 4 (8%).

Pranathi et al<sup>25</sup> observed vitreous loss in 4 (7.7%) patients with PXF. Anuradha et al<sup>23</sup> reported 3 (10%) aphakic patients while Abid Naseem et al<sup>24</sup> reported 2 (6.3%) patients with ACIOL.

## CONCLUSION

Careful preoperative evaluation with slit lamp is mandatory in patients having pseudoexfoliation, who are undergoing cataract surgery to avoid intraoperative complications. Surgical modifications for pupil enlargement reduce the intraoperative complications.

## LIMITATIONS OF STUDY

1. Inclusion of PXF patients with iridodonesis, phacodonesis which is a complication already occurred preoperatively.
2. Inclusion of patients operated by many surgeons and not consideration of the operative skill factor.

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