

STUDY OF INTRAOPERATIVE COMPLICATIONS OF MANUAL SMALL INCISION CATARACT SURGERY IN EYES WITH PSEUDOEXFOLIATION

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ABSTRACT: PURPOSE: To study the clinical features of pseudoexfoliation syndrome, intraoperative complications and techniques to minimize intraoperative complications during manual small incision cataract surgery. **METHODS:** It is a hospital based study of 30 eyes of 30 patients with cataract and Pseudoexfoliation syndrome in a tertiary eye hospital. **RESULTS:** The average age of patients in the study was 63.83 years with a male predominance with equal incidence of unilateral and bilateral involvement with pseudoexfoliation and cataract. In the study, 8(26.67%) of the patients had intraoperative complication while 22(73.33%) did not. 5 (16.67%) of the patients had zonular dehiscence, 5(16.67%) of the patients had Posterior Capsular Rent and 3(10%) of the patients had Vitreous loss. 27(90%) of the patients were implanted with intraocular lens after employment of various surgical modifications. 3(10%) of the patients were left aphakic due to the above mentioned complications. **INTERPRETATION & CONCLUSION:** Inadequate mydriasis is one of the major preoperative complications in eyes with Pseudoexfoliation syndrome which has a bearing on the intraoperative complications. Pupil enlargement procedures are advocated during cataract surgery. Though Small incision cataract surgery in eyes with Pseudoexfoliation syndrome is associated with intraoperative complications, they can be managed well and good outcome can be expected.

KEYWORDS: Pseudoexfoliation syndrome; Manual Small Incision Cataract Surgery; Intraoperative Complications.

INTRODUCTION: Pseudoexfoliation Syndrome is an age related generalized disorder involving abnormal production or turnover of extra-cellular matrix in ocular tissues, orbital tissues, skin and visceral organs. The exact etio-pathogenesis of this condition and chemical composition of the material still remains unknown.

Pseudoexfoliation syndrome is characterized clinically by small white deposits of material in the anterior segment, most commonly in the pupillary border and the anterior Lens capsule. The most consistent diagnostic feature is three distinct zones of pseudoexfoliation material seen on the lens capsule after full dilatation.

Additional subtle clinical signs that help in early diagnosis are loss of pigment from peripupillary area producing transillumination defects, insufficient mydriasis, and pigment dispersion into anterior chamber after mydriasis, deposition of melanin over trabecular meshwork and Schwalbe's line. The existence of posterior synechiae without any other cause and hemorrhage in the iris stroma after mydriasis are also suggestive of pseudoexfoliation syndrome. Deposition of material on the zonular fibres weakens it leading to phacodonesis, subluxation and dislocation of

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lens. The presence of secondary open angle glaucoma is known as glaucoma capsulare. The glaucoma has more serious clinical course and worse prognosis than primary open angle glaucoma, often not responding to medical therapy and requiring early surgical intervention. Angle closure glaucoma may also be seen due to pupillary block by forward displaced lens. The corneal epithelium shows decreased cell count and pleomorphism leading to early corneal decompensation at moderate rises in intraocular pressure and after cataract surgery. An increased incidence of nuclear cataract is seen.

Due to involvement of virtually all structures by pseudoexfoliation material, patients have a significantly greater risk for a variety of complications during cataract surgery. Poor mydriasis, pigment dispersion, combined with phacodonesis and zonular dialysis predisposes to capsular rupture and vitreous loss.

Possible pre-operative and intra-operative measures to avoid or minimize these complications include an increased awareness of pseudoexfoliation syndrome, a careful slit lamp examination after full pupillary dilatation, adequate control of intra-ocular pressure pre-operatively, avoidance of iris manipulation, adequate pupillary dilatation, use of heparin coated intra-ocular lenses and judicious use of steroids post-operatively.

MATERIALS AND METHODS: A total number of 30 patients who had cataract in patients with pseudoexfoliation syndrome attending a tertiary eye hospital, were selected for the study

INCLUSION CRITERIA:

- Patients with pseudoexfoliation and cataract undergoing manual small incision cataract surgery.

EXCLUSION CRITERIA:

- Traumatic cataracts.
- Complicated cataracts.
- Subluxated lens without pseudoexfoliation syndrome.
- Patients with senile cataracts without pseudoexfoliation syndrome.
- Patients posted for other surgeries other than manual small incision cataract surgery in patients with pseudoexfoliation syndrome.

Pre-operative evaluation was done which included;

1. Visual acuity testing for distance and near using Snellen's distant chart and near vision chart respectively.
2. Refraction and correction where required.
3. External ocular examination.
4. Slit lamp biomicroscopic examination for evidence of the following findings.
 - Pseudoexfoliation material in the pupillary margins.
 - Moth eaten appearance of the iris.
 - Morphological alterations of the cornea
 - Anterior chamber depth and pigment dispersion in the anterior chamber

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- Iridodonesis.
 - Presence of posterior synechiae.
 - Zones of Pseudoexfoliation on the anterior surface of the lens capsule.
 - Phacodonesis or frank subluxation/dislocation of lens.
 - Measurement of pupil size before and after dilatation of pupil.
 - Pupillary reactions.
5. Intraocular pressure using Goldmann tonometer.
6. Gonioscopy with Goldmann three mirror lens in all patients with pseudoexfoliation syndrome. The following points were specifically evaluated.
- The extent of trabecular pigmentation which was graded as:
- | | | |
|---------|---|-----------------------|
| Grade 0 | → | Nil |
| Grade 1 | → | Faint Pigmentation |
| Grade 2 | → | Average Pigmentation |
| Grade 3 | → | Moderate Pigmentation |
| Grade 4 | → | Heavy Pigmentation |
- The presence of pseudoexfoliation material in the angle.
 - The presence of Sampolesi's line.
 - The grading of angle width according to Shaffer's grading.
7. The pupils were then dilated with a combination of 10% phenylephrine and tropicamide 1%, 1 drop was instilled every 5 minutes over a 15 minute interval.
8. This was followed by slit lamp examination for
- Measuring pupil dilatation.
 - Examination of lens capsule for central and peripheral zones of pseudoexfoliation material deposition.
 - Evaluation of lens for the 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. All patients were given systemic antibiotics (tablet ciprofloxacin 500mg b.d.) on the preoperative day. On the day of surgery pupils were dilated adequately using instillation of 1% tropicamide and 10% phenylephrine eye drops every 10 minutes before surgery. To sustain the pupil dilatation the anti-prostaglandin eye drops such as flurbiprofen were instilled three times one day before surgery and half hourly for two hours immediately before surgery. Patients who had high intraocular pressure were given intravenous mannitol 20% one gram per kilogram bodyweight and oral acetazolamide 250 milligram 2 times a day depending on level of intraocular pressure preoperative day and also 1 hour prior to surgery.

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RESULTS: Table 1 gives the age distribution in patients with pseudoexfoliation syndrome.

There were 8(26.67%) patients of age group 50 – 59 years, 15(50%) patients of age group 60–70 years and 7(23.33%) of age group 71–80%. The average age of patients was 65.83 years and about 22(73.33%) of patients were above 60 yrs of age. 19(63.33%) were males and 11(36.67%) were females. 15(50%) of patients had clinical bilateral involvement of Pseudoexfoliation syndrome and 15(50%) had unilateral involvement.

80% of patients had Pseudoexfoliative material on the pupillary margin, 12(40%) on the iris surface, 14(46.67%) have Moth Eaten Appearance, 3(10%) have Iris Atrophy, 1(0.33%) have Iridodonesis. Of the 30 patients with Pseudoexfoliation syndrome, 27(90%) of patients had open angles and 3(10%) patients had narrow angles.

18(60%) had peripheral zone, 12(40%) had both peripheral zone and central zone and none of them had only central zone. 9(30%) of the patients had Mature Cataract and 21(70%) of them had Immature cataract with Pseudoexfoliation syndrome.

Table 2 shows the intraocular pressure distribution in patients. 16(53.33%) of patients had sufficient mydriasis, and 14(46.67%) of the patients had insufficient mydriasis in eyes with Pseudoexfoliation syndrome.

Table 3 enumerates the intra-operative complications in pseudoexfoliative syndrome. 27 (90%) of the patients were implanted with intraocular lens after employment of various surgical modifications like Sphincterectomy, Sphincterotomy, manual Anterior Vitrectomy. 3(10%) of the patients were left aphakic due to the above mentioned complications.

Out of the total 30 patients, 8(26.67%) patients who had one intraoperative complications, 5(62.5%) of them had insufficient mydriasis and 3(37.5%) of the patients had adequate mydriasis. 4(13.33%) underwent Synechiolysis, 7(23.33%) patients underwent sphincterotomy and 3(10%) patients underwent both sphincterotomy and Synechiolysis

DISCUSSION: This study consisted of 30 eyes of 30 patients with Pseudoexfoliation syndrome who underwent manual small incision cataract surgery. The average age of patients was 65.83 years and about 22(73.33%) of patients were above 60 yrs of age. Pseudoexfoliation syndrome usually occurs between 60 to 80 yrs, the average age being 70 yrs. Studies regarding the sex distribution of Pseudoexfoliation syndrome are conflicting. Women have predominated in some series while other studies have found equal or greater prevalence in men.

15(50%) of patients had clinical bilateral involvement of Pseudoexfoliation syndrome and 15(50%) had unilateral involvement. A review of literature comparing the frequency of monocular versus binocular involvement in various series is not conclusive.¹

80% of patients had Pseudoexfoliation material on the pupillary margin, 12(40%) on the iris surface, 14(46.67%) have Moth Eaten Appearance, 3(10%) have Iris Atrophy, 1(0.33%) have Iridodonesis, 4(13.33%) had posterior synechie. A study by Ritch Schlotzer. Scherhardt^[2,3] (2001) stated that deposits of Pseudoexfoliation material on the iris sphincter and pupillary margin are seen in 84% patients. Thus next to the lens Pseudoexfoliation material, the most prominent and consistent clinical finding is the Pseudoexfoliation material at the pupillary border.

18(60%) had peripheral zone, 12(40%) had both peripheral zone and central zone and none of them had only central zone. The peripheral zone of pseudoexfoliation material is a

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consistent finding and the central zone is not always apparent.⁴ Tarkkanen found the central zone absent in 18% of cases in his study while Ritch, Schlotzer – Scherhardt found it absent in 20–60% of their cases. 9(30%) of the patients had Mature Cataract and 21(70%) of them had Immature cataract.^[5,6] All of them, i.e. 100%, had Nuclear Cataracts. Cortical Cataract was present along with advanced nuclear cataract and none of the patients had isolated cortical cataract. Seland et al have reported a higher incidence of nuclear cataract in eyes with pseudoexfoliation syndrome with fewer cortical cataracts.^[7] Hietanen J et al have also reported nuclear cataract to be the predominant type of cataract in Pseudoexfoliation syndrome.

In the present study, 13(43.33%) of patients had average trabecular pigmentation, and 10(33.33%) of patients had 'moderate trabecular pigmentation' and 7(23.33%) of patients had 'heavy pigmentation'. None of the patients had 'absent or faint pigmentation'. The extent of trabecular pigmentation has been correlated to the degree of increased intraocular pressure. 7(23.33%) of the patients had Pseudoexfoliation material in the angle and the same was absent in 23(76.67%) of the patients which is close to data in previous studies.^[8]

Out of 30 patients in the present study group, 21(70%), 7(23.33%), 1(3.33%) and 1 (3.33%) of the patients had intraocular pressure \leq 21 mm of Hg, between 22 mm of Hg to 30 mm of Hg, between 30 mm of Hg to 40 mm of Hg and \geq 41 mm of Hg respectively. Out of these patients, 6(20%) had Primary Open angle glaucoma and 3 (10 %) had Secondary angle closure glaucoma.^[9]

Overall 9 patients who had raised IOP were managed by giving intravenous Mannitol 20% one gram/kilogram body weight over a period of 30 minutes to one hour, along with oral acetazolamide 250 milligram twice a day on preoperative day and intravenous Mannitol 20% one gram/kilogram body weight given one hour prior to surgery.

In other studies with pseudoexfoliation syndrome, 20% had glaucoma and increased IOP at the time of diagnosis, as compared to our study where 30% of patients had raised IOP. 15% of such patients develop increased IOP with in 10years. This underscores the need for careful follow-up in patients who have pseudoexfoliation syndrome. Pseudoexfoliation syndrome accounts for 15-20% of cases of open angle glaucoma.

3(10%) of patients had phacodonesis. Futa R. Furnyoshi reported an 8.4% incidence, while Moreno J, Duch S., Harara J (1993) reported a 10.6% incidence of phacodonesis.^[10,11] 1(3.33%) of the patients had iridodonesis. This is because the iris in Pseudoexfoliation syndrome is more rigid due to vascular compromise and various other changes like deposition of Pseudoexfoliation material, Atrophy, Loss of iris stroma – Moth Eaten Appearance.^[12]

As part of management of rigid undilating pupil, 4(13.33%) underwent Synechiolysis, 7(23.33%) patients underwent sphincterotomy and 3(10%) patients underwent both sphincterotomy and Synechiolysis. Alfaite et al in their study of 31 eyes of Pseudoexfoliation syndrome undergoing ECCE noted a statistically significant increase (p value <0.01) in the need to perform sphincterotomies. Kuchle et al noted 3.4% of their 76 patients to require surgical Synechiolysis and/or mechanical dilatation of pupil intraoperatively.^[13]

Amongst 30 patients five patients had zonular dehiscence, 2 of the patients had less than 3 clock hours were implanted with rigid polymethymethacrylate intra ocular lens, 3 of the patients were left aphakic because of vitreous loss.

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CONCLUSION: Small incision cataract surgery in eyes with Pseudoexfoliation syndrome is associated with an increased incidence of complications both pre operatively and intraoperatively. Inadequate mydriasis is one of the major preoperative complications in eyes with Pseudoexfoliation syndrome which has a bearing on the intraoperative complications like posterior capsular rent and vitreous loss. Adequate surgical modifications such as Sphincterotomy and/or Synchiolysis in these eyes with inadequate mydriasis reduce the intra operative complications. These pupil enlargement procedures are advocated during cataract surgery.

All though cataract surgery in Pseudoexfoliation syndrome is challenging, if the surgeon is aware of the condition pre operatively and pays meticulous attention to the surgical technique, a good outcome can be expected.

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Age	Number of patients	Percentage
50 – 59 years	8	26.67
60 – 70 years	15	50
70 – 80 years	7	23.33
Total	30	100

Table 1: age distribution in patients with pseudoexfoliation syndrome

IOP	Number of patients	Percentage
≤ 21 mm Hg	21	70
22 – 30 mm Hg	7	23.33
31 – 40 mm Hg	1	3.33
≥ 41 mm Hg	1	3.33
Total	30	100

Table 2: Intraocular pressure in pseudoexfoliation syndrome

Complications	Number of patients	Percentage
Occurred	8	26.67
Not occurred	22	73.33
Total	30	100

Table 3: Intraoperative complications in pseudoexfoliation syndrome

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