

# Small Incision Cataract Surgery with Trabeculectomy versus Phacotrabeculectomy in Eyes with Pseudoexfoliation - A Retrospective Study

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## ABSTRACT

**Background:** Pseudoexfoliation (PXF) syndrome is very common in Kashmir Valley. Eyes with pseudoexfoliation have a higher incidence of both cataract and glaucoma. Eyes with pseudoexfoliation respond poorly to medical treatment hence the need for early surgical intervention. **AIM:** To evaluate the effectiveness of small incision cataract surgery (SICS) with trabeculectomy versus phacotrabeculectomy in patients with pseudoexfoliative glaucoma with coexistent cataract. **Methods:** Present retrospective study was done in the post graduate department of ophthalmology Sher-i-Kashmir institute of medical sciences (SKIMS) and hospital Bemina. A total of 50 eyes with pseudoexfoliative glaucoma were divided in to two groups, 25 underwent small incision cataract surgery with trabeculectomy and 25 had phacotrabeculectomy done by the same surgeon. Intra and postoperative complications were compared between the two groups, moreover best corrected visual acuity (BCVA) and intra ocular pressures (IOP) were compared at 8 weeks and 6 months. **Results:** In our study we found that there was a significant improvement in best corrected visual acuity as well as getting the desired IOP levels in both groups of patients. However the difference between the two groups in terms of intra and post-operative complications, BCVA and IOP was found to be statistically insignificant. **Conclusion:** Our study concludes that both SICS with trabeculectomy and phacotrabeculectomy are equally effective in management of patients with PXF associated with cataract and glaucoma.

**Keywords:** Pseudoexfoliation, cataract, glaucoma.

## INTRODUCTION

Pseudo exfoliation (PXF) syndrome is a systemic disorder with important ocular manifestations. PXF is an age related, genetically determined, and environmentally influenced elastotic degeneration of various intraocular and extra ocular tissues.<sup>[1]</sup>

PXF material has been found in the lungs, heart, liver, cerebral meninges and blood vessels suggesting the systemic nature of the disease.<sup>[2]</sup> PXF in the eye is diagnosed on slit lamp biomicroscopy by the presence of whitish dandruff like material on the lens capsule, papillary margin, corneal endothelium, trabecular meshwork and zonular fibres of the lens.<sup>[3]</sup> The pathogenesis of PXF has become more clear with the advent of electron microscopy which showed the PXF material to be elastic fibers, collagen and basement membrane.<sup>[3]</sup> This material accumulates pericellularly resulting in

disruption of basement membranes and altered cell matrix interaction, resulting in cellular dysfunction and eventually leading to cellular degeneration, hence the name degenerative fibrilopathy. 4PXF syndrome has a genetic basis as well, documented association with mutations in the Lysyl oxidase – like 1 gene (LOX L1) at the chromosome 15 q 22 has been associated with PXF syndrome.<sup>[5]</sup>

Studies done in Kashmir valley have shown higher prevalence of PXF than other parts of our country, in fact the prevalence of PXF in this part is highest in the country.<sup>[6,7]</sup> Presence of PXF is a major risk factor for both cataract formation and secondary glaucoma.<sup>[8-10]</sup>

In our hospital we see a large number of patients with PXF presenting for the first time with cataract as well as glaucoma. The aim of this paper was to compare two common surgical procedures small incision cataract surgery (SICS) with trabeculectomy and phacotrabeculectomy in patients with PXF associated with cataract and glaucoma. To the best of our knowledge no such study has been done in PXF population and combined with the higher prevalence of PXF in this part of the world makes this study important.

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**MATERIALS AND METHODS**

The present retrospective study was done in the post graduate department of ophthalmology SKIMS Medical College Bemina which is a tertiary care centre. The source of data was hospital case sheets and follow up registry of patients from January 2018 to January 2019. A total of 50 eyes, 25 belonging to SICS Trab group and 25 to phacotrab group were included in the study. Patients with a history of trauma, diabetes, prior ocular surgery, steroid induced glaucoma and other forms of secondary glaucoma were excluded from the study. PXF was diagnosed by slit lamp biomicroscopy and gonioscopy. Visual field analysis and optical coherence tomography was done as and when required. BCVA, IOP, Intra and postoperative complications were compared in the two groups at 8 weeks and 6 months following surgery.

In the SICS Trab group after a fornix based conjunctival flap a triangular flap one third scleral thickness was made using a crescent knife, after entering with the keratome, an enlarger was used to make the internal lip of the incision. SICS was completed with intraocular lens implanted in capsular bag. A Kellys punch was then used to perform trabeculectomy. Single suture (10-0 nylon) at the apex of the flap was given and conjunctiva closed. In the phacotrab group a triangular sclera flap was made and the anterior chamber entered with a keratome, phacoemulsification was completed by stop and chop technique and lens implanted in bag. A Kellys punch was again used to complete the trabeculectomy. Apex of the sclera flap was closed using a 10-0 nylon suture, conjunctiva was closed anterior chamber and bleb formed. All surgeries were done by same surgeon.

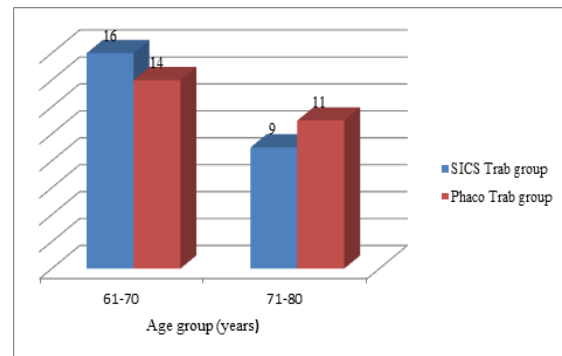
BCVA and IOP were recorded at 8 weeks and 6 months following surgery from the follow up registry of the patients. The data was entered and analyzed in Microsoft Excel 2011 and another statistical software Minitab version 17.0.

**RESULTS**

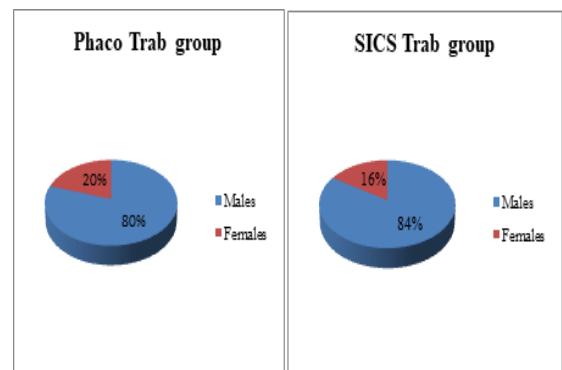
**Table 1: Age distribution of two groups**

Age group (years)	SICS Trab group	Phaco Trab group
61-70	16	14
71-80	9	11
Total	25	25

Mean age of patients in SICS Trab group was 69.1±4.8 years and that in Phaco Trab group was 69.9±4.76 years. The difference in age between the two groups was statistically insignificant. (p=0.556)



**Figure 1: Showing bar chart for age distribution of two groups.**



**Figure 2: Pie Diagram showing sex distribution in two groups.**

In the SICS Trab group, there were 21 males and 4 females; in the Phaco Trab group, there were 20 males and 5 females.  $\chi^2=0.1355$ ,  $p=0.712$ . Thus the two groups were matched for gender.

**Table 2: Showing Pre-op BCVA  $\chi^2=0.802$ ,  $p=0.370$ . Thus the two groups were comparable with respect to pre-operative BCVA.**

BCVA	SICS Trab group	Phaco Trab group
<6/60	18	15
6/24 to 6/60	7	10

**Table 3: Pre-op Intraocular pressure. Mean pre-op IOP in SICS Trab group was 26.4 ±3.38 mmHg and in Phaco Trab group, it was 26.4 ±3.66 mmHg. (p=1.00)**

Pre-op IOP(mmHg)	SICS Trab group	Phaco Trab group
21-25	11	12
26-30	11	9
31-35	3	4

**Table 4: Showing Intra-operative complications in the two groups.  $\chi^2=1.08$ ,  $p=0.297$ . Thus the rate of intra-operative complication was not statistically different in the two groups.**

Intra-op complication	SICS Trab group	Phaco Trab group
Dialysis<180 , CTR implanted with IOL in bag	2 cases (Rigid IOL implanted in bag)	1 case (Foldable IOL in bag)
Whole capsular bag out during cortical wash	1 case (no IOL implanted)	0

**Table 5: Showing Post-operative complications in two groups p=0.683**

Post-operative complication	SICS Trab group	Phaco Trab group
Moderate to severe uveitis with fibrinous exudate	4 cases (managed conservatively in 3 patients, YAG membranectomy needed in 1 case)	3 cases (all cases managed conservatively)

**Table 6: Post-operative BCVA at 8 weeks**

Post-op BCVA	SICS Trab group	Phaco Trab group
6/6 to 6/12	17	19
6/18 to 6/36	5	3
6/60 to 4/60	3	3

68% of patients in SICS Trab group were having a BCVA of 6/12 or better at 8 week post-operative; with a comparable 76% in Phaco Trab group having a BCVA 6/12 or better. Low vision post-operatively was most of the times due to advanced glaucomatous damage.

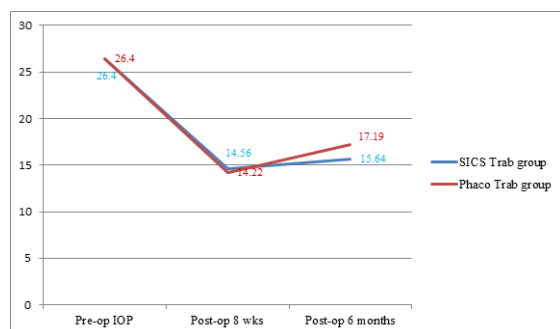
$$\chi^2=0.611, p=0.736$$

There was a significant improvement in 8-week post-operative BCVA in both the groups as compared to pre-operative BCVA. (Fisher exact p-value <0.001 for both the groups).

**Table 7: Post-op IOP at 8 weeks and 6 months.**

	Pre-op IOP (mmHg)	Post-op IOP (mmHg)			
		8 weeks	p-value	6 months	p-value
SICS Trab group	26.4 ±3.38	14.56 ±2.46	0.000	15.64 ±2.43	0.000
Phaco Trab group	26.4 ±3.66	14.22 ±2.24	0.000	17.19 ±2.56	0.000

The IOP was significantly reduced at all follow-up visits from pre-operative value in both the groups (p<0.001). On comparing the IOP in two groups at each follow-up visit, the IOP was not significantly different between the two groups.

**Figure 3: Showing Line chart comparing pre operative IOP with IOP at 8 weeks and 6 months.**

## DISCUSSION

Modern techniques and instruments for combined cataract and glaucoma surgeries have made the surgeon more confident in handling cases of PXF with coexistent cataract and glaucoma. A strong relationship between glaucoma and PXF is well known.<sup>[6,7,11,12]</sup> Our own clinical experience after dealing with a large number of PXF glaucoma patients is that they respond poorly to medical treatment. Kim et al,<sup>[13]</sup> during his study on PXF patients found that they have a weaker and thinner lamina cribrosa which was more susceptible to raised IOP. Various studies have also found an increased association of cataract with PXF.<sup>[7-9]</sup> Ocular ischemia<sup>8</sup> and low concentrations of ascorbic acid<sup>9</sup> in aqueous of patients with PXF could be the reason for the occurrence of cataract in patients with PXF.

In our study we found that intra operative complications [Table 4] were slightly more in SICS Trab group but the difference was not statistically significant P= 0.297, X<sup>2</sup> = 1.08. Similarly comparing post-operative complications [Table 5] in the two groups moderate to severe uveitis was seen in 4 cases with SICS Trab group and only in 3 cases in phacotrab group, again the difference was not statistically significant P = 0.683. These findings are in agreement with other studies done by Mohammed IA,<sup>[14]</sup> Khandelwal et al,<sup>[15]</sup> and Venkataraman et al.<sup>[16]</sup>

Comparing post-operative BCVA at 8 weeks [Table 6] the SICS trab group had 68 % of eyes BCVA > 6/12, whereas in the phacotrab group 76 % of eyes had BCVA > 6/12, the difference however was not statistically significant  $\chi^2=0.611, p=0.736$ . There was a significant improvement in 8-week post-operative BCVA in both the groups as compared to pre-operative BCVA. (Fisher exact p-value <0.001 for both the groups).

In terms of IOP control both groups showed significant IOP control P < 0.001 at all follow up visits [Table 7, Figure 3]. On comparing the IOP in two groups at each follow up visit, the IOP was not significantly different between the two groups. All these findings are in agreement with studies done by other authors.<sup>[14-16]</sup>

The goal of treatment in a patient of cataract with co-existing glaucoma is to provide long term IOP control along with visual rehabilitation so as to improve quality of life of the patient. In our study we found that both the modalities of treatment are equally effective in providing visual rehabilitation and IOP control in patients with PXF in which there are more chances of complications. In a developing country like ours SICS trab may be a more practical option given the cost of phaco machine and the learning curve associated with phacemulsification.

## CONCLUSION

Doing combined procedure is a very good option in patients with PXF glaucoma associated with visually significant cataract. Both BCVA and IOP control showed significant improvement after combined procedure. There was no statistically significant difference between the SICS trab versus phacotrab group in terms of BCVA, IOP control, intra and post-operative complications.

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