Surgical and visual outcome of posterior polar cataract

Manu Bhardwaj[1,*], Bhaskar Dutt[2], Lilaraj Puri[3]

[1]Senior Resident, Govt. Doon Medical College, Dehradun, [2]Attending Consultant, Max Superspeciality Hospital, Dehradun, [3]Medical Superintendent, Sagarmatha Chaudhary Eye Hospital, Nepal

***Corresponding Author:**
Email: manubhardwaj5@gmail.com

Abstract

Introduction: Posterior polar cataract is a rare form of congenital cataract with incidence ranging from 3 to 5 in 1000[1-2]. It is bilateral in 65–80% of the cases with no gender predilection[3]. Posterior polar cataract presents a special challenge to the surgeon because of its predisposition to posterior capsular dehiscence and possible nucleus drop during surgery. The present study aims to evaluate the surgical outcome of phacoemulsification and manual small incision cataract surgery in patients with posterior polar cataract.

Material and Methods: This prospective study included 119 eyes of 118 patients with posterior polar cataract, who underwent surgery at Sagarmatha Choudhary Eye Hospital, Lahan, Nepal, between March 2013 to March 2014. All patients underwent complete ophthalmologic examination including vision, slit-lamp Biomicroscopy, IOP measurement and posterior segment examination. Patients with complicated cataract, glaucoma, corneal opacity/ degeneration, retinal pathology were excluded from the study. Patients were scheduled for cataract surgery either with phacoemulsification or manual SICS with fish hook technique. Informed consent was obtained after explaining the type of surgery and possibility of posterior capsular rupture, a relatively long operative time, secondary posterior segment intervention, and a delayed visual recovery.

Results: 119 eyes of 118 patients were included in the study. There were 63 males (53.39%) and 55 females (46.61%). The mean age was 53.24 (range 17-80) years. Among 118 patients 24 patients had other eye operated previously, 2 patients had lost their one eye due to trauma and in remaining 92 patients, 71 patients had bilateral posterior polar cataract (77.17%). Phacoemulsification was performed in 48 eyes and SICS in 71 eyes.

The most common intraoperative complication was posterior capsule rupture, seen in 22 eyes (18.49%). Of these, 7 eyes(14.58%) had undergone phacoemulsification, 15(21.13%) had manual SICS. 103 intraocular lenses (86.55%) were implanted in the bag and 16 (13.45%) in the sulcus. 7 (5.89%%) eyes needed anterior vitrectomy

Discussion: Posterior polar cataract is a challenge for the cataract surgeon as these cataracts predispose to PC rents and vitreous loss.

In our study the incidence rate of PCR was 14.58% in patients who underwent phacoemulsification and 21.13% in SICS group.

Conclusion: Posterior polar cataract is a true challenge for cataract surgeons because of its higher risk for surgical complication. These cataracts need more gentle maneuvering to reduce pressure over the weak posterior capsule.

In our study, Posterior capsule rupture occurred more frequently in SICS compared to phacoemulsification and in patients with soft nucleus. Phacoemulsification leads to good visual outcome if done carefully with proper technique advised for PPC.

Keyword: PPC, PCR, Vitrectomy

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Introduction

Posterior polar cataract is a rare form of congenital cataract with incidence ranging from 3 to 5 in 1000[1-2]. It is bilateral in 65–80% of the cases with no gender predilection[3]. Posterior polar cataracts are a challenge to the surgeons, because of its predisposition to posterior capsular dehiscence and possible nucleus drop during surgery.

The high incidence of PCR during surgery may be due to adherence of the plaque to a normal capsule, which leads to breach in PC during cortical wash. Sometimes the patients have thin PC underlying the plaque that ruptures to minimal trauma and in some patients PC is absent underlying the PPC.

Duke-Elder classified it as stationary and progressive forms[4], of which stationary form is more common (about 65%), Schroeder[5] graded posterior polar cataract in his pediatric patients according to its effect on pupillary obstruction in the red reflex .Singh classified posterior polar cataract into[2]:

Type 1: The PPC with posterior subcapsular cataract.

Type 2: Sharply defined round or oval opacity with onion ring appearance with or without grayish spots at the edge.

Type 3: Sharply defined round or oval white opacity with dense white spots at the edge often associated with thin or absent PC. These dense white spots are a

diagnostic sign (Daljit Singh sign) of posterior capsule leakage and extreme fragility.

Type 4: combination of above 3 types with nuclear sclerosis.

Clinical presentation

Posterior polar cataract presents as a distinctive disc shaped posterior lens opacity, adjacent to the posterior capsule.

Typical symptoms include increased glare while driving at night and difficulty in reading fine prints.

It may present with strabismus in childhood, which indicates amblyopia in squinting eye.

Surgical indications

Difficulty in carrying out daily activities is the main indication for surgery.

Early intervention is required in these cases because of the possibility of the formation of capsular defects over time in patients with initially intact capsule[2] and possibility of amblyopia in visually significant cataract in childhood.

Counseling

Patient should be informed of the possibility of PC rupture, a relatively long operative time, possibility of requirement of secondary posterior segment intervention, possibility of preexisting amblyopia, and a delayed visual recovery. The present study aims to evaluate the surgical outcome of phacoemulsification and manual small incision cataract surgery in patients with PPC.

Materials and Methods

This prospective study included 119 eyes of 118 patients with posterior polar cataract, who underwent surgery at Sagarmatha Choudhary Eye Hospital, Lahan, Nepal, between March 2013 to March 2014. All patients underwent complete ophthalmologic examination including vision, slit-lamp Biomicroscopy, IOP measurement and posterior segment examination. Patients with complicated cataract, glaucoma, corneal opacity/ degeneration, retinal pathology were excluded from the study. Patients were scheduled for cataract surgery either with phacoemulsification or manual SICS with fish hook technique. Informed consent was obtained after explaining the type of surgery and possibility of posterior capsular rupture, a relatively long operative time, secondary posterior segment intervention, and a delayed visual recovery.

Out of 119 eyes, 48 eyes underwent phacoemulsification and 71 eyes underwent SICS.

After routine preparation, all surgeries were carried out under peribulbar anaesthesia.

In phacoemulsification group, clear corneal incision was made with a 2.5mm knife, in cases of foldable lens implantation and scleral tunnel was made in cases of PMMA lens implantation. Capsulorrhexis was performed with eutrata forcep or 26 gauge bent needle. Hydrodelineation was performed by injecting RL into deeper layers of lens in all cases and hydrodissection was avoided. Viscoelastics were used to maintain deep anterior chamber and to push back the vitreous face. Nucleus was emulsified with direct chop technique, with ultrasound power 50-80%, vacuum 250 mm hg, flow rate 20 ml/min and bottle height 80- 90 cm, and the residual cortex was aspirated by using bimanual irrigation and aspiration probe. The low vacuum and aspiration rates maintain a stable anterior chamber. Acrylic intraocular lenses were implanted in 20 eyes and polymethyl-methacrylate IOL were implanted in 28 eyes.

In SICS group, after routine preparation, external incision was made frown shaped with a chord length of 5.5 mm to 6.5 mm depending on the nuclear grade.

A relatively larger continuous curvilinear capsulorrhexis of about 6 mm was made in some cases and linear capsulotomy was made in some cases. Hydrodissection was avoided in all cases and careful hydrodelineation was performed. Nuclear was delivered by fish hook technique. Cortex and epinucleus were aspirated using simcoe cannula. Anterior chamber was formed with minimum viscoelastic and IOL was placed either in the bag or in the sulcus depending upon the need of the case.

Statistical analysis was done by using Fisher's exact test to compare the difference in visual acuity before and after surgery. p value below 0.05 was considered statistically significant.

Results

119 eyes of 118 patients were included in the study. There were 63 males (53.39%) and 55 females (46.61%). The mean age was 53.24 (range 17-80) years. Among 118 patients 24 patients had other eye operated previously, 2 patients had lost their one eye due to trauma and in remaining 92 patients, 71 patients had bilateral posterior polar cataract (77.17%). Phacoemulsification was performed in 48 eyes and SICS in 71 eyes.

Preoperatively only 8 eyes(6.72%) had uncorrected visual acuity of 6/18 or better, and postoperatively 76 eyes(63.87%) had UCVA of 6/18 or better($p<0.001$, fisher's exact test). Only one eye had UCVA of < 3/60 due to corneal oedema and that also improved to 6/18 under conservative management.

Pre-operative uncorrected visual acuity of operated eyes

Visual Acuiy	PHACO	SICS	Total
6/6-6/18	07 (14.58%)	01(1.41%)	08(6.72%)
<6/18-6/60	06 (12.50%)	05(7.04%)	11(9.24%)
<6/60-3/60	18 (37.50%)	20(28.17%)	38(31.94%)
<3/60-HM	17 (35.42%)	45(63.38%)	62(52.10%)
	48 (100%)	71(100%)	119(100%)

Post-operative uncorrected visual acuity of operated eyes

Visual acuity	PHACO	SICS	Total
6/6-6/18	39(81.25%)	37 (52.11%)	76(63.87%)
<6/18-6/60	08(16.67%)	34 (47.89%)	42(35.29%)
<6/60-3/60	-	-	-
<3/60-HM	01(C.E.) (2.08)	-	01 (0.84%)
	48(100%)	71(100%)	119 (100%)

The most common intraoperative complication was posterior capsule rupture, seen in 22 eyes (18.49%). Of these, 7 eyes (14.58%) had undergone phacoemulsification, 15(21.13%) had manual SICS. 103 intraocular lenses (86.55%) were implanted in the bag and 16 (13.45%) in the sulcus.7 (5.89%) eyes needed anterior vitrectomy.

Grades of nucleus operated by PHACO (48 Eyes) and SICS (71 Eyes)

Among 22 eyes having PCR, 11 patients were male and 11 patients were female. Mean age of the patients, who had PCR was 56.55 years.

Grades of Nucleus	No of eyes underwent Phaco	No of eyes had PCR	No of eyes underwent SICS	No of eyes had PCR in SICS	Total no. of eyes with PCR
0	19(39.58%)	4	17(23.94%)	5	9/36(25%)
1	10(20.84%)	2	12(16.90%)	3	5/32(15.62%)
2	16(33.33%)	1	35(49.30%)	4	5/51(9.80%)
3	03(6.25%)		06(8.45%)	3	3/9(33.33%)
4			01(1.41%)		
Total	48(100%)	7(14.58%)	71(100%)	15(21.13%)	22(18.49%)

Grades of nucleus in eyes with PCR

Grades	No of eyes underwent PHACO	No of eyes underwent SICS	Total no of eyes	No of eyes had PCR
Soft (0-1)	29	29	58	14(24.13%)
2-4	19	42	61	08(13.11%)
Total	48	71	119	22(18.49%)

Out of 22 eyes that developed PCR, the nucleus was soft (grade 0-1) in 14 eyes(63.36%) and relatively hard in 61 eyes, of which PCR occurred in 8 eyes (36.64%).(p value-<0.001, McNemar test)

Discussion

Posterior polar cataract is a challenge for the cataract surgeon as these cataracts are associated with higher complication rate(PCRs and vitreous loss). The rate of posterior capsule rupture in posterior polar cataract cases ranges from 0–40%[1,6,7,8,9,10,11] as compared to 1.1% rate of posterior capsule rupture in cataract surgery.[13] In our study the incidence of PCR was 14.58% in patients who underwent phacoemulsification and 21.13% in SICS group. We didn't tried hydrodissection because posterior polar opacities adhere firmly to the posterior capsule and strong hydrodissection may leads to PCR around the opacity.

Das et al. found a higher incidence of posterior capsular rupture in younger patient (⩽40 years) (55% vs 22%, $p = 0.005$).[8] In other study by Osher et al.[3], no relation was found between PCR and age, sex, or family history. In our study we did not find any relation with age and sex.

Kumar et al[12] looked at the relationship of the size of lens opacity with the surgical outcome. They found that PPC of 4 mm or more were associated with more incidence of PCR(30.43%) than PPC of less than 4mm(5.71%).

Stanić et al[14] found that Posterior capsular rupture is more frequent in posterior polar cataracts in younger patients with soft nucleus and large area of capsular opacification. As in soft cataracts, it is more difficult to maintain the depth of the anterior chamber because soft lens material does not support vitreous face, and so it makes the anterior chamber less stable. In our study PCR was more common in soft cataract (24.13% vs 13.11%).

Hayashi k et al[15] and Vasavada AR et al[16] reported 4% incidence of nucleus drop. In our study none of the patient had nucleus drop.

Conclusion

Posterior polar cataract is a true challenge for cataract surgeons because of its higher risk for surgical complication. These cataracts need more gentle maneuvering to reduce pressure over the weak posterior capsule.so avoidance of hydrodissection, nucleus rotation posterior capsule polishing and excessive IOL manipulation lead to lesser complication rates and higher chances of good visual outcomes. In our study, Posterior capsule rupture occurred more frequently in SICS compared to phacoemulsification and in patients with soft nucleus. Phacoemulsification leads to good visual outcome if done carefully with proper technique advised for PPC.

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