



**ORIGINAL RESEARCH PAPER**

**Ophthalmology**

**INCIDENCE OF POSTERIOR CAPSULAR OPACITY AFTER SMALL INCISION CATARACT SURGERY IN AGE RELATED CATARACT & THE RISK FACTORS ASSOCIATED WITH IT**

**KEY WORDS:** PCO – posterior capsular opacification, CCC – continuous curvilinear capsulorrhexis , hydrodelination .

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**ABSTRACT**

**Background :**Posterior capsular opacification (PCO) is one of the most common late complications of extracapsular cataract extraction. PCO is an important factor for the ocular morbidity after cataract surgery. It is the major cause of decreased vision after cataract surgery. Posterior capsular opacification is even more threatening in young adults and children, with a higher incidence, quicker onset and greater amblyogenic effect. Studies have showed that the incidence rate of PCO varies between 3%- 50% within 5 years of operation .

**Associations:** For the development of PCO like diabetes, myopic eyes, history of uveitis, glaucoma, patients with myotonic dystrophy and retinitis pigmentosa etc.

**Material & Methods:** It is prospective observational cohort study . Period of the study was one year. Patients were informed in their native language and informed consent was taken .

**Results :** A total 125 eyes of 119 patients were enrolled . The mean age was 67.05 years . 61 cases were male and 64 female having male to female ratio 0.953. The 91 cases out of 125 in which hydrodelination was done and 34 cases were hydrodelination not done. 81 cases in which continuous curvilinear capsulorrhexis (ccc) done and 44 cases envelope or linear capsulotomy was done. 37 cases out of 125 shows presence of PCO after six months of cararact surgery. 88 cases show absence of PCO after six months of cataract surgery. 38 cases (p value -0.241) show systemic disease like diabetes with PCO and 49 cases out of 125 shows hypertention (p value -0.161)

**Conclusion :** Continuous curvilinear capsulorrhexis and hydrodelination were associated with decrease in PCO formation.

**INTRODUCTION :**

Posterior capsular opacification (PCO) is one of the most common late complications of extracapsular cataract extraction . Major cause of decreased vision after uneventful cataract surgery . More threatening in young adults and children, with a higher incidence, quicker onset and greater amblyogenic effect . Vision impairment caused by PCO has become one of the major reasons for patients postsurgical dissatisfaction and major ocular morbidity . It represents significant financial burden to health care system . With limited specialty service available and difficulty in follow up, measures should be taken in prevention of PCO .

**AIMS AND OBJECTIVES :**

**General Objectives**

To find out the incidence of posterior capsular opacification after small incision cataract surgery in age related cataract .

**Specific Objectives**

- To find out the demographic profile of patients with PCO
- To find out type of cataract associated with PCO formation
- To compare PCO in relation with type of capsulotomy - continuous curvilinear capsulorrhexis (CCC ) and envelop or linear capsulotomy technique
- To compare PCO in relation with hydrodelination
- To grade PCO after SICS in Madurai grading system

**METHODOLOGY :**

**Study Design:** Prospective one year observational cohort

**study. Place of study:** Department of Ophthalmology, BPKIHS, Dharan. **Sample size:** 125 consecutive eyes with age related cataract undergone small incision cataract surgery.

Calculation of sample size :  $n = z^2 \times p \times q \div l^2$

**Where** n = sample size  
 z = 1.96 at 95% confidence interval ~2  
 p = 15 (expected result)  
 l = 20% of p = 3  
 q = 85

Applying above formula n = 560

According to CDC (WHO):  $CCS = \frac{\text{calculated sample size}}{1 + \text{calculated sample size} \div \text{exp. population}}$

Sample size = 112 + 10% = 125 eyes

\*all the samples will be included in the study.

**Period of study:** one year . **Follow up:** 1 week, 4 week, 12 week and 6 month postoperative .

**Inclusion Criteria:** All the patients with age related cataract (more than 40 years) underwent small incision cataract surgery at BPKIHS .

**Exclusion Criteria:**

- Age < 40 years

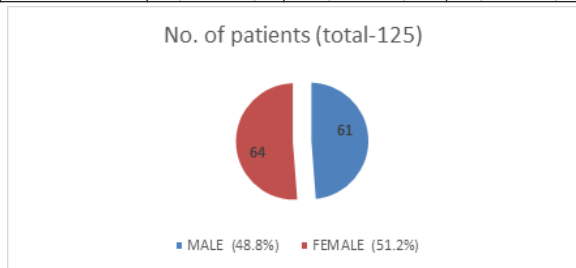
- The patients undergone ICCE
- Patients with anterior chamber intraocular lens
- Posterior capsule rupture intraoperatively
- Patient not giving consent
- Patient lost to follow up
- PCO present intraoperatively
- Patients undergone phacoemulsification
- Pregnant females

**RESULTS :**

All the calculations were done after completion of 6 months postoperative follow up A total 125 eyes of 119 patients were enrolled. The mean age of the study population was 67.05 years with SD ± 10.56 years .

**Age And Gender Distribution**

Age Group	Gender		Total
	Male No (%)	Female No (%)	
≥40-50 years	4 (6.6%)	5 (7.8%)	9 (7.2%)
51-60 years	12 (19.7%)	8 (12.5%)	20 (16.0%)
61-70 years	27 (44.3%)	22 (34.4%)	49 (39.2%)
71-80 years	12 (19.7%)	21 (32.8%)	33 (26.4%)
>80 years	6 (9.8%)	8 (12.5%)	14 (11.2%)
Total	61 (100.0%)	64 (100.0%)	125 (100.0%)



**Distribution Of Gender**

**HYDRODELINEATION :**

TOTAL NO. OF PATIENTS	DONE	NOT DONE
N = 125	N = 91	N = 34
	72.80 %	27.20 %

**CAPSULORRHESIS :**

TOTAL NO. OF PATIENTS	CCC	ENVELOPE/ LINEAR CAPSULOTOMY
N = 125	N = 81	N = 44
	64.80 %	35.20 %

**INCIDENCE OF PCO AFTER 6 MONTHS OF CATARACT SURGERY :**

TOTAL NO. OF PATIENTS	PRESENCE OF PCO	ABSENCE OF PCO
N = 125	N = 37	N = 88
	29.60 %	70.40 %

**GRADE OF PCO /POSTERIOR CAPSULAR OPACIFICATION AT SIX MONTHS OF CATARACT SURGERY :**

Grades of PCO	Frequency (n)	Percent (%)
Grade 0	88	70.4
Grade 1	18	14.4
Grade 2	17	13.6
Grade 3	2	1.6
Total	125	100.0

**GRADE OF PCO AND TYPES OF CATARACT :**

Type of cataract	Grade of PCO				% of PCO in types of cataract	P value
	Grade 0	Grade 1	Grade 2	Grade 3		
NS	11	3	2	0	31.25%	0.241
PSCC	13	0	2	0	13.33%	
MSC	8	3	5	1	52.94%	
NS+ PSCC	29	9	7	0	35.56%	
NS+ PSCC+ Cortical	6	0	1	0	14.29%	
PSCC+ Cortical	21	3	0	1	16%	
Total	88	18	17	2	125	

**SYSTEMIC DISEASE AND PCO:**

Systemic Disease	Number Of Cases	Number of cases with PCO (percentage)	P value
Diabetes	38	14 (36.84%)	0.241
Hypertension	49	18(36.73%)	0.161
Atopic dermatitis	1	0(0%)	1.000*
Arthritis	3	0(0%)	0.554*
COPD	5	2(40%)	0.632*
Thyroid disease	1	0(0%)	1.000*

**TYPE OF CAPSULOTOMY AND PCO:**

PCO	Type of capsulotomy		Total	P value	
	CCC	Envelope			
Yes	18 22.2%	19 43.2%	37 29.6%	0.014	
	No	63 77.8%	25 56.8%		88 70.4%
Total		81 100.0%	44 100.0%		125 100.0%

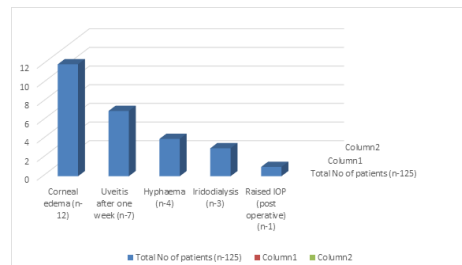
**PCO AND HYDRODELINEATION:**

PCO	Hydrodelineation		Total	P value	
	Done	not done			
Yes	20 22.0%	17 50.0%	37 29.6%	0.020	
	No	71 78.0%	17 50.0%		88 70.4%
Total		91 100.0%	34 100.0%		125 100.0%

**PCO & POSITION OF IOL:**

PCO	position of IOL		Total	P Value	
	Sulcus	In The Bag			
Yes	3 50.0%	34 28.6%	37 29.6%	0.262	
	No	3 50.0%	85 71.4%		88 70.4%
Total		6 100.0%	119 100.0%		125 100.0%

**POSTOPERATIVE COMPLICATION:**



**Intraoperative And Postoperative Complication And PCO:**

Complications	PCO		Total	PValue
	Yes	NO		
Uveitis	5	2	7	0.024
Corneal edema	4	8	12	0.766

Hyphaema	3	1	4	0.077
Iridodialysis	3	0	3	0.024
Rise in IOP	1	0	1	0.296

**DISCUSSION :**

The overall incidence of PCO was 29.4% at 6 months of follow up which is comparable to a study done by Debra et al (28% at 5 years after surgery).

Clinical grading of posterior capsular opacification was done at 6 month follow up visits in a study done in 2005 in outreach microsurgical eye clinic in Nepal, 46% of cases after manual SICS were found to develop PCO of some degree . The occurrence of PCO was significantly less in patients who had CCC capsulotomy compared to envelop technique (p= 0.014) similar to a study by Aminollah Nikeghbali ( p < 0.005). Similarly Okihiro Nishi emphasizes that CCC can contribute to reduce PCO .

In our study the occurrence PCO was significantly less in group undergoing hydrodelineation (22%) as compared to group in whom no hydrodelineation done (50%) with p value 0.02 . Similar to our study, study done by Vasavada et al showed PCO was significantly lower in eyes that had multiquadrant cortical hydrodissection than in those in whom multiquadrant cortical cleaving hydrodissection not done.

In our study, the incidence of PCO is more with PCIOL in ciliary sulcus (50%) than PCIOL in the bag (28.6%) (p value =0.36). Vilhjalmsson et al found that the incidence of capsular opacification was 20% in eyes with sulcus fixation as opposed to 14% for those with capsular bag fixation. There were few intraoperative complications in our study where three cases had iridodialysis, twelve cases of corneal edema, seven cases with uveitis after 1 week, four cases with hyphaema, three cases with iridodialysis and one case with postoperative raise IOP . Similar to this study done M.Reza Dana et al showed uveitis associated with increased risk of PCO.

**RECOMMENDATION:**

Posterior capsular opacity is the second most common cause of decrease vision after cataract.

It can be reduced by performing simple surgical steps like  
 - well centered continuous curvilinear capsulorrhexis (ccc) ,  
 - hydrodissection enhanced cortical clean up along with hydrodelineation, and  
 - in the bag implantation of the posterior chamber intraocular lens (pciol) .

**LIMITATIONS:**

- Small sample size. Short duration of follow up 6 months which is not enough to have final conclusion on incidence of PCO because Elschnig's pearl formation may takes 2-5 years to develop after cataract surgery. Cataract surgeries were conducted by many surgeons in my study so it was difficult to standardize the results. The size of capsulorrhexis diameter was not taken into account . The types of capsulotomy groups, continuous curvilinear capsulorrhexis and envelope technique were not equally distributed . Besides surgical techniques, role of other factors like intraocular lens materials, and designs in the formation of posterior capsular opacity could not be studied due to availability of IOL of only one material type and single design of IOL .

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