

Posterior Capsular Opacification after Cataract Surgery

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ABSTRACT

Objective: To assess the Frequency and the types of Posterior Capsular Opacification after extra capsular cataract extraction and posterior chamber intraocular lens (PMMA) implantation.

Study Design: Descriptive study

Place and Duration of Study: Department of Ophthalmology Holy Family Hospital, Rawalpindi from May 2003 to May 2005.

Materials and Methods: Two hundred patients, with age ranges from 55 to 80 years, having uncomplicated senile mature cataracts who underwent ECCE with PCIOL over a period of one year were selected for the study. At 6th Month post operatively the patients were examined for any evidence of posterior capsular opacification with its type and the results were analyzed.

Results: At 6 months follow up 70 patients (35%) developed posterior capsular opacification. Out of these 70 patients, 40 patients (57%) showed capsular fibrosis and 30 patients (43 %) Elschnig pearls.

Conclusion: Our study revealed that the occurrence of posterior capsular opacification with PMMA intra ocular lens is high leading to significant number of patients with visually disabling complication in the post operative period.

Key words: *Cataract, Posterior capsular opacification, intraocular lens, Elschnig pearls*

Introduction

Cataract is the leading cause of reversible blindness in the world¹. Statistics suggests that there are ten million blinds in the world today. The current global estimate indicates that blindness from cataract affects near 18 million people. 4% of the world's blind population lives in Pakistan; 80% of which is avoidable.²

Currently the only treatment available for cataract is surgery³. In the past intra capsular cataract extraction (ICCE), which is the complete removal of the cataractous lens with its capsule, was the preferred technique available. Now this has been totally replaced by extra capsular cataract extraction in which posterior capsule is left behind so that a posterior chamber intraocular lens can be implanted.⁴ Most recently phacoemulsification with intraocular lens implantation has become the operation of choice. Phacoemulsification is the method of

choice in developed countries.⁵ In the developing countries like Pakistan extra capsular cataract extraction with posterior chamber intraocular lens implantation is the operation most commonly performed mainly because of non-availability of phaco facilities, high cost and less experienced phaco surgeons.⁶ Posterior capsular opacification or "after cataract" is the most common complication of cataract surgery.⁷ Many studies have been documented in international literature regarding the incidence of posterior capsular opacification.⁸ Local research in this aspect is limited. So we present a prospective study to determine the frequency and types of posterior capsular opacification occurring after cataract extraction with posterior chamber intraocular lens implantation in our local population.

Materials and Methods

This prospective study with non-probability convenient sampling was conducted in the Eye Department, Holy Family Hospital, Rawalpindi from May 2003 to May 2005. Two hundred patients, with age

34

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ranges from 55 to 80 years, having uncomplicated senile mature cataracts were selected for the study.

Patients were admitted and the need for the operation with its advantages and implications were explained carefully to the patients and only after this knowledge the patients signed the consent form. Complete preoperative evaluation was done and patients found to have any other ocular morbidly were excluded.

Operative Procedure: All the cases were operated by the single surgeon having expertise in the technique. 5% povidone iodine was instilled in the conjunctival sac after local injection. The conjunctiva was undermined and bleeding vessels were gently electrically cauterized. First a partial thickness vertical 7 - 7.5mm corneoscleral incision was given with surgical blade no. 15, 1mm behind the limbal blue line. Then a horizontal incision was given in the bed of the first incision to make a stepped wound. The wound was deepened temporally for point of entry into the anterior chamber. A canopener capsulotomy was made with the help of a cystitome after filling anterior chamber with a viscoelastic substance. Then the wound was opened with the corneal scissors along the incision line. The nucleus was expressed by pressure and counter-pressure technique with wire vectus and squint hook. The remaining lens matter was removed using Simcoe Irrigation/aspiration canula. The viscoelastic substance was injected and posterior chamber PMMA intraocular lens of 6.5 diameters was implanted. The wound was closed using 10/0 monofilament nylon sutures and the viscoelastic substance was replaced by ringer lactate irrigation. A subconjunctival injection of antibiotic/steroid was given and the eye

was padded for 24 hours. To deal with any intra operative complications the surgical technique was modified accordingly. The data was entered on statistical package for social sciences (SPSS) version 13.0 and the results were calculated in frequencies.

Patients having surgical complications like posterior capsular rent with or without vitreous loss were excluded. At 6th month post operatively the patients were examined for any evidence of posterior capsular opacification with its type and the results were analyzed.

Results

A total of 200 patients were included in the study, within the age group 55 to 80 years, mean age was 62 years with standard deviation of 10.20. Out of the total number of patients, 116 (58%) were male and 84 (42%) were female. Our study revealed that at 6 months follow up 70 patients (35%) developed posterior capsular opacification. Out of these 70 patients, 40 patients (57%) showed capsular fibrosis and 30 patients (43%) showed Elschnig pearls.

Discussion

Posterior capsule opacification (PCO) is the most common complication after cataract surgery leading to reduced vision

Table I: No of patients with PCO at 6 months follow up(n=200)

	No. of Patients Operated	Developed PCO
Male	116 (58%)	48(24%)
Female	84 (42%)	22(11%)

Table II: Type of PCO in patients

Patients with PCO	Elsching Pearls	Capsular Fibrosis	Total
Male	21(30%)	27(38.5%)	48
Female	9(13%)	13(18.5%)	22
Total	30(43%)	40(57%)	70

postoperatively.⁷ PCO, the term itself is not correct. It is not the capsule that undergoes opacification rather it is the attempt of the lens material to form a new lens by proliferation.⁸

Two types encountered most commonly are:

The capsular fibrosis: It is formed by the lens epithelial cells which migrate to the posterior capsular surface when anterior capsulotomy is done. The lens epithelial cells undergo transformation into myofibroblasts and then they proliferate into collagen and hence form an opaque fibrous membrane on the posterior capsule.

Elschnig's pearls: These are a proliferation of cells on the outer surface of the capsule. This type of PCO can be several layers thick and are named due to their similar appearance as of bladder cells.

PCO has medical, social and economic implications. Although it is easy to clear the visual axis by Nd YAG laser capsulotomy, if this is available this technique is not without problems and the cost is still prohibitive. Its complications include damage to intra ocular lens, intra ocular pressure elevation, cystoid macular edema, retinal detachment, intra ocular lens subluxation and localized endophthalmitis exacerbation.⁹

In our study 35% of patients out of 200

developed PCO at six months follow up. Our results are comparable with the study conducted by Sterling and Wood who found that the incidence of PCO after extra capsular cataract extraction with posterior chamber intraocular lens implantation ranged from 19 % to 50 %.¹⁰ Another study done by Shrestha, Pradhan, and Snellingen, showed that extra capsular cataract extraction even in the best of the surgical hands gives PCO in 10 % to 50 % of cases.¹¹ Hollick and co-others, also mention 17 % to 46 % occurrence of PCO after extra capsular cataract extraction with posterior chamber lens implantation.¹²

According to our study the incidence of capsular fibrosis was 57% and Elschnig pearls 43 %.which is contrary to findings of study conducted by Kuasar A et al¹³ which shows greater incidence of capsular fibrosis.

There have been multiple modifications in the IOL design, material, type of heptic and surface to prevent PCO. Some researchers recommended sharp-edged¹⁴ and round-edged IOLs.¹⁵ Others suggested lens design like square edge and single piece.¹⁵ Similarly different lens materials have been introduced. Basti¹⁶ and Koraszewska-Matuszewska¹⁷ used heparin surface modified IOLs. Some authors advocated the use of acrylic intraocular lenses instead of PMMA like Rowe¹⁸ Nihalani¹⁹ and Aasuri²⁰, who found that the incidence of PCO was lesser in acrylic intraocular lenses. But Pavlovic's²¹ found that hydrophobic acrylic material are associated with a much higher rate of posterior capsule opacification (PCO) than previously thought. Similarly Sushma²² found that PCO was more common in eyes implanted with acrylic hydrophobic IOLs as compared to silicone IOLs. So the problem persists despite of

modifications in the lens material and design. We used PMMA IOL in order to find the incidence of PCO as it is the most commonly used lens due to cost restrictions. The use of modern IOLS is the costly option and is not applicable in developing countries like ours.

Extensive research is in progress to reduce the incidence of PCO like use of topical heparin eye drops postoperatively.²³ Dexamethasone-coated IOLs that can deliver slow release molecules²⁴ are also being evaluated. Another new concept is sealed capsule irrigation (SCI), which allows the isolated safe delivery of irrigating solutions containing pharmacological²⁵ or nonpharmacological agents into the capsular bag following cataract surgery such as 5-fluorouracil. 5-fluorouracil was shown to be successful in preventing PCO in young rabbit eyes²⁶ and may also prove successful in human eyes.

Conclusion

Our study revealed that the occurrence of posterior capsular opacification with PMMA intra ocular lens is high leading to significant number of patients with visually disabling complication in the post operative period.

References

1. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol* 2012; 96:614-8.
2. WHO "Visual Impairment and blindness: Fact Sheet N 282 May 2009" cited 22 Mar 2010. <http://www.who.int/mediacentre/factsheets/fs282/en>.
3. Zigler JS Jr, Datiles MB III. Pathogenesis of cataracts. In: Tasman W, Jaeger EA, eds. *Duane's Ophthalmology*. 15th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2011:chap 72B
4. Bourne R, Dineen B, Jadoon Z, Lee PS, Khan A, Johnson GJ, et al. Outcomes of cataract surgery in Pakistan: results from The Pakistan National Blindness and Visual Impairment Survey. *Br J Ophthalmol* 2007; 91:420-6.
5. Lundstrom M, Stenevi U, Thorburn W. The Swedish National Cataract Register: a 9-year review. *Acta Ophthalmol Scand*. 2002; 80:248-57.
6. Haider S, Hussain A, Limburg H. Cataract blindness in Chakwal District, Pakistan: results of a survey. *Ophthalmic Epidemiol*. 2003; 10:249-58.
7. Posterior Capsular Opacification (Secondary Cataract). *Survey of ophthalmology* 2000; 45: 1: 100-19.
8. Geissler FT, Li, DW, James ER. Inhibition of lens epithelial cell growth following exposure to calcimycin: Potential application for inhibition of posterior capsule opacification. *J Ocul Pharmacol Ther* 2001; 17:589-96.
9. Burq MA, Taqui AM. Frequency of retinal detachment and other complications after neodymium:Yag laser capsulotomy. *J Pak Med Assoc*. 2008; 58:550-2.
10. Sterling S, Wood TO. Effect of intraocular lens convexity on posterior capsule opacification. *J Cataract Refract Surg* 1986; 12:655-7.
11. Shrestha JK, Pradhan YM, Snelling T. Outcomes of extracapsular surgery in eye camps of eastern Nepal. *Br J Ophthalmol*. 2001; 85:648-52.
12. Elgohary MA, Hollick EJ, Bender LE, Heatley CJ, Wren SM, Boyce J, et al. Hydrophobic acrylic and plate-haptic silicone intraocular lens implantation in diabetic patients: pilot randomized clinical trial. *J Cataract Refract Surg*. 2006; 32:1188-95.
13. Kausar. Risk factors for early posterior capsule opacification. *Al-Shifa J Ophthalmol* 2010; 6:22-9.
14. Findl O, Buehl W., Bauer P., Sycha T. 2010 Interventions for preventing posterior capsule opacification. *Cochrane Database Syst. Rev* 2.
15. Brar GS, Grewal DS, Ram J, Singla M, Grewal SP. Square-edge polymethylmethacrylate intraocular lens design for reducing posterior capsule opacification following paediatric cataract surgery: initial experience. *Clin*

- Experiment Ophthalmol 2008 ;36:625-30.
16. Basti S, Ausuri MK, Reddy MK, Preetam P, Reddy S, Gupta S, et al. J Cataract Refract Surg 1999;25:782-7.
 17. Koraszewska-Matuszewska B, Samochowiec-Donocik E, Pieczara E, Flilipek E. Heparin-surface-modified PMMA intraocular lenses in children in early and late follow up. Klin Oczna 2003;105:273-6.
 18. Rowe NA, Biswas S, Lloyd IC. **Primary IOL implantation in children: a risk analysis of foldable acrylic v PMMA lenses.** Br J Ophthalmol 2004; 88:481-5.
 19. Nihalani BR, Vasavada AR. **Single-piece AcrySof intraocular lens implantation in children with congenital and developmental cataract.** J Cataract Refract Surg 2006 ;32:1527-34.
 20. Aasuri MK, Fernandes M, Pathan PP. Comparison of acrylic and polymethyl methacrylate lenses in a pediatric population. Indian J Ophthalmol 2006;54:105-9
 21. Pavlovic's. Cataract surgery in children. Med Pregl 2000; 53:257-61.
 22. Sushma B, Jagat R, Jaspreet S, Surinder SP, Sushmita K. Comparison of the outcome of implantation of hydrophobic acrylic versus silicone intraocular lenses in pediatric cataract: prospective randomized study. Can J Ophthalmol 2010;45:531-6.
 23. Mastropasqua L, Lobefalo L, Ciancaglini M, Ballone E, Gallenga PE. Heparin eye drops to prevent posterior capsule opacification. J Cataract Refract Surg 1997;23:440-6.
 24. Kugelberg M, Shafiei K, Vanderploeg I, Zetterström C. 2010 Intraocular lens as a drug delivery system for dexamethasone. Acta Ophthalmol 88, 241-4.
 25. Maloof A, Neilson G, Milverton EJ, Pandey SK. Selective and specific targeting of lens epithelial cells during cataract surgery using sealed-capsule irrigation. J. Cataract Refract 2003; 29:156-68.
 26. Abdelwahab MT, Kugelberg M, Seregard S, Zetterstrom C. Safety of irrigation with 5-fluorouracil in a sealed-capsule irrigation device in the rabbit eye. J. Cataract Refract Surg 2007; 33:1619-23.

