

## Posterior Capsular Rupture And IOL Surgery

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### Abstract:

*Posterior capsule rupture (PCR) is a potentially sight-threatening complication in extracapsular cataract surgery. A prospective analysis of incidence, features and related factors is done starting from residency. 59 cases (3.2%) had posterior capsular rupture out of total 1828 patients during this eight years period (1991-98). 59 cases (3.2%) had PCR, 45 (2.5%) cases were accompanied by vitreous loss. Yearly incidences ranged from 1.5% to 10%. Maximum PCR occurred during residency and during the course of irrigation and aspiration of cortex. Main factors implicated were learning curve, smaller incision, small pupil, and vitreous upthrust. 60% had best corrected visual acuity >6/12. Preoperative Mannitol, capsulorrhexis and secondary implantation helped favourably.*

### Introduction

Posterior capsule rupture is an important intra surgical problem during extracapsular cataract surgery (1) that can adversely affect the visual outcome. This is said to be experience related and has an incidence of 5 to 10% for many surgeons but it is less than 3% in the experienced hands (2). The management of a posterior capsule rupture is probably one of the greatest challenge faced by a cataract surgeon. The removal of cortical remnants, the need for anterior vitrectomy and optimum location of the IOL are the problems faced by the surgeon during operation.

In this prospective study, all the cases with posterior capsule rupture were analysed to examine the visual and surgical outcome. The rate of complications and visual results after vitreous loss due to an unintended rupture of the posterior lens capsule during routine cataract surgery were also evaluated.

### Materials and methods

1828 consecutive cataract patients operated by me from residency to consultancy were the cohorts in

this study. The period ranged from 1991 to 1998. I tried to exclude most patients with prior ocular diseases associated with loss of zonular or posterior capsule integrity. One eye of all eligible patients was included. Surgical procedure is summarised below:

1. Conjunctival flap-fornix based
2. Corneoscleral section.
3. Reformation of anterior chamber with visco elastic substance (2%HPMC).
4. Capsulotomy: canopener or envelope technique.
5. Nucleus delivery.
6. Cortical cleaning manual irrigation aspiration with Simcoe canula.
7. IOL implantation: in-the-bag or sulcus.
8. Removal of viscoelastic substance.
9. Intracameralpilocarpin or carbacol for pupillary constriction.
10. Corneoscleral suturing with 10/0, monofilament, continuous. Reformation of AC.

In addition to basic information viz. patients' name, age, sex and operated eye, surgical details describing type of anterior capsulotomy, nature of cataract (mature, immature, hypermature, cortical/nuclear/posterior cortical), pseudoexfoliation, loose zonular fibres, posterior capsular defects, iris trauma/surgery, method of nucleus delivery (assisted with a needle when ocular hypotony was present). IOL type and position along with additional procedures such as vitrectomy and use of miotics were also recorded. The incidence of PCR was noted according to the clock hour and with respect to the operative steps viz. during capsulotomy/nucleus delivery/irrigation –aspiration/IOL insertion. The

patients were examined postoperatively on a regular basis with a minimum three months followup. Long-term follow-up was understandably not possible in every case.

### Results

A prospective analysis of 1828 extracapsular cataract extractions alongwith intraocular lens implantation performed over 8 years period (1991-1998) of my career was done at three different hospitals. 59 eyes had posterior capsule rupture (3.2%) (Table-1)

Table: 1:Incidence of PCR

Period	No of surgery	No of PCR	Percentage	Remarks
1991	40	4	10	First year residency
1992	40	4	10	Second year residency
1993	60	5	8.3	Third year residency
1994	180	3	1.6	Independent eye surgeon
1995	260	4	1.5	Chief medical officer
1996	288	12	4.1	Consultant (rates decreased
1997	384	13	3.4	after workshop/fellowship)
1998				
<b>Total</b>	<b>1828</b>	<b>59</b>	<b>3.2</b>	<b>comparable to others</b>

Yearly analysis of cases shows gradual decline in the complication rates. Mean age of the patient's ranges from 46 to 75 years (mean 62.8 years) and the male female ratio is 1:1.9 (20:39). IOL could not be implanted in 5 cases due to total disruption of posterior capsule and nonconstriction of pupil or nonavailability of suitable anterior chamber lenses. In one case PCIOL was tilted posteriorly due to poor viscosity of the viscoelastic material and inferior loop was engaged in the rent ripping off the posterior capsule. In another case IOL started sinking after dialing due to extension of the tear to the zonules.

Anterior chamber lens was implanted in 12 cases, 10 Iris claw lenses and 32 posterior chamber lenses could be implanted despite posterior capsule rupture. 36 patients had best corrected visual acuity of 6/12 or better (61%). 8 patients

had pre-existing pathology in the form of optic atrophy (2 cases), macular degeneration (3 cases), primary open angle glaucoma (1 case), central retinal vein occlusion (1 case), severe diabetic retinopathy (1 case). Average postoperative visual acuity was 6/12 in the group with intact posterior capsule and 6/18 in the group with posterior capsule ruptures; average postoperative visual acuity was 2 lines higher in the group with posterior capsule ruptures without vitreous loss as compared with the group with posterior capsule ruptures and vitreous loss; postoperative complications were more frequent in the group with posterior capsule ruptures; intraocular lens decentrations were more frequent and more serious in the group with posterior capsule ruptures. One patient had suffered suprachoroidal hemorrhage when intracameral Carbacol was used after rupture of posterior capsule but this could be

managed conservatively using peroperative Mannitol. Still the patient lost his vision due to retinal detachment. Long term complication associated with PCR cases include:

1. Persistent cyclitis.
2. Cystoid macular edema.
3. Dislocation of IOL.
4. Pupillary defect.
5. Retinal detachment.
6. Pseudophakic bullous keratopathy.

### Discussion

Posterior capsular disruption has become a problem since ECCE with IOL implantation has become the treatment of choice for cataract. Mean incidence of PCR in this study was 3.2%, which is comparable to both national and international reports. (3,4). Maximum incidence of 10% was observed during residency (learning curve) which is again comparable to other reports (5). There is hardly any report in the literature about the transition period – which factors make us experienced enough to avoid this complication. Incidence became high on the following situations:

- Change of instruments or technique (eg. canula)
- Difficult cataracts: hypermature-irrigating cystitome: better, avoid-long tipped cystitome, wide capsulotomy. Nuclear cataract: more plaques use Yag laser.
- Failure to identify posterior capsule: good coaxial, red reflex: chin forehead at same level.
- Failure to recognise ring reflex.
- Good pupillary dilatation is a must.
- Loss of iris tone.

In case of posterior capsule rupture, utmost care is to be taken to prevent further tear and subsequent vitreous loss. Steps found helpful were:

- Immediate partial closure of wound (suture at long axis of tear)
- Intraoperative use of Mannitol.
- Lowering of infusion bottle height by 6 inches.
- Dry aspiration of residual cortex with viscoelastic substance.
- Injection of air in anterior chamber detects vitreous.

If the rent is small posterior chamber lens can be placed at the ciliary sulcus and when the pupil could be constricted an alternative lens was used (anterior chamber or iris claw).

Maximum rupture occurred during irrigation and aspiration (75%). 6 cases had zonular disruption during dialing due to extension of radial tears and one during suturing due to squeezing by the patient. One case had suprachoroidal hemorrhage probably induced by intracameral injection of Carbacol. Visual outcome was slightly less than those in other reports because of poor selection of cases. (4). In 4 cases vitreous was present in the anterior chamber and two patients came with “sunset syndrome” for which IOL exchange was done. Long term complications included persistent cyclitis (commonest), cystoid macular edema (frequent), dislocated IOL (occasional), pupillary defects (innocuous), retinal detachment (dreaded) and pseudophakic bullous keratopathy (hopeless).

### Conclusion

Posterior capsule rupture is the bete’noir of the cataract surgeon throughout his career. What I found is, it is like driving a car. We start with a trainer, stop when face a problem. As a resident, remained extra cautious as I cannot afford lose an opportunity to get another case by spoiling ones I gradually moved towards consultancy, commitment increased, just like owning a car, remain extra careful not to damage the new car. As I become more experienced and full-fledged consultant ego poses problem very much like an experienced driver who may face an accident because of overconfidence.

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