POSTERIOR CAPSULAR RUPTURE MANAGEMENT

Posterior capsular rent, reported to occur in 0.5% to 7.5% of cases is a significant potential complication of cataract surgery. An improperly managed PCR can have an adverse impact on the outcome of cataract surgery. Vitreous loss appears to be the most crucial factor determining the eventual visual outcome.

Posterior capsule rent, with or without vitreous disturbance leads to increased incidence of hyphema, increased persistent post operative inflammation, retained cortex, corneal edema, post operative endophthalmitis, cystoid macular edema (if chronic leading to macular pseudoholes) and tractional retinal detachment in long standing cases.

Predisposing factors where caution is required

Posterior polar cataract (with a pre-existing posterior capsular dehiscence), traumatic cataract, mature cataract, hypermature cataract, post-vitrectomy cataract, eyes with long axial length (with weak bag and weak zonules), eyes with short axial length (with crowded anterior chamber) and pseudoexfoliation cases (with weak bag, weak zonules and poorly dilating pupil).

Poor visibility due to deep set eyes with prominent brow, fluid pooling, dense arcus, corneal scars and small pupil (as in diabetic patients, post-uveitic posterior synechiae, pseudoexfoliation and senile pupillary rigidity) can also be a major challenge during surgery.

Intraoperative events which can lead to a posterior capsular rent

* Extension of radial tears of the anterior continuous curvilinear capsulorrhexis through the capsular fornix into the posterior capsule.

* Large leaky wound
*Vigorous hydrodissection especially in eyes with incomplete rhesis, posterior polar cataract, traumatic cataract, pseudoexfoliation cases, mature and hypermature cataract.

*Occurs during removal of last fragment of nucleus following a transient post-occlusion surge in phacoemulsification.

*Infrequently during intraocular lens placement and dialling.

*In case of incomplete capsulorrhexis, during irrigation aspiration of cortex tags of anterior capsule can be caught into the probe.

*Hydroprolapse of the nucleus or hooking out of the nucleus through a small rhesis can exert undue pressure on the posterior capsule

*Manipulation in the bag without adequately pressurizing the anterior chamber. When the anterior chamber keeps collapsing there are high chances of the lax posterior capsule coming up and getting caught.

*During polishing of the posterior capsule

*Direct hit by phacoemulsification probe, chopper or dialer.

**How to recognize a posterior capsular rent**

Early recognition of a posterior capsule rent is pertinent to its successful management eventually resulting in good visual outcome.

* Sudden deepening of the anterior chamber

* Momentary dilatation of the pupil (snap sign)

* Sudden brightening of the fundal glow

* Nucleus paradoxically moves away on aspiration, sways sideways or falters posteriorly away from the nucleus
Whole of the nucleus or a part of it may suddenly sink or disappear posteriorly into the vitreous cavity

Management of posterior capsular rent

Once the surgeon recognizes a posterior capsular rent, the phaco probe should not be withdrawn instantly in haste. First inject dispersive viscoelastic with the non dominant hand through the sideport to inflate the bag properly and then withdraw. This small precaution will prevent the anterior chamber from collapsing eventually leading to enlargement of the rent, disruption of the anterior hyaloid face and prolapse of the vitreous into the anterior chamber. So maintenance of the anterior chamber throughout the management of the posterior capsular rent is of prime importance to prevent further complications.

Anterior Vitrectomy

It’s important to confirm the presence of vitreous prolapse into the anterior chamber. It can be assessed by following simple maneuvers-

* Sweep a sponge or swab stick along the site of incision. Vitreous if present can be seen as strands along the section. It will also cause pupillary peaking and pull on the capsule rim.

* Insert the spatula from the sideport and sweep from the anterior chamber angle under the incision towards the rent. Vitreous if present will be seen getting dragged as it has a tendency to come towards the wound.

* Stain with preservative free triamcinolone acetonide just adjacent to the margin of the rent. Vitreous if present will get stained.

Anterior vitrectomy must be carried out meticulously to prevent a myriad of post operative complications. Sponge vitrectomy is now obsolete because of the intense vitreoretinal traction it might exert.
Automated vitrectomy should be done. Bimanual technique for infusion during vitrectomy is a much better option than coaxial cannulas. Coaxial infusion cannulas have a tendency to enlarge the rent as well causes vitreous hydration. Vitrectomy should always be done through the side port incisions in order to maintain a closed chamber and prevent further vitreous prolapse. Start vitrectomy from the main incision and then proceed inwards towards the pupil and posterior capsule. Vitrectomy has to be done just beyond the posterior capsule in order to confirm absence of vitreous in anterior chamber. The cutter has to face down towards vitreous cavity in order to avoid further vitreous prolapse. High cut rates with low vacuum and flow rate should be used.

Alternatively, 23gauge or 25 gauge pars plana vitrectomy is recommended as it does not pull the vitreous anteriorly and transects the vitreous at its base which lessens the chance of post-operative vitreoretinal traction to a greater extent.

For confirming the completion of vitrectomy, following simple maneuvers can be used-

*Inject air bubble and look for its fragmentation (not very reliable).

*Inject pilocarpine and look for peaking of pupil.

*Inject triamcinolone acetonide which will stain the vitreous.

**Nucleus management**

Next step is to decide about the management of the nucleus. The management will depend on the extent of the rent and size, position and hardness of the nucleus and surgeon experience.

If the rent is small and the nucleus fragment is small, with the help of a second instrument it can be moved away from the site of rent and phacoemulsification can be continued. Aspiration flow rate should be low.
Vacuum should also be low to prevent post-occlusion surge. Use of lens glide has been advocated by some to facilitate this step.

If a large brunescent nucleus is left back its better to convert to a large incision surgery. If the nucleus has descended partially into vitreous, it’s prudent not to go chasing behind it. Alternatively posterior assisted levitation technique can be used to bring the nucleus into the pupillary plane and anterior chamber through the pars plana route for further management. Retrieval of nucleus from deep vitreous is not recommended and should be dealt with after a suitable interval by a vitreoretinal surgeon.

**Cortical clean up**

Residual cortex and epinucleus should be removed using low flow, low vacuum bimanual irrigation aspiration technique. Cortex remote from the rent should be stripped towards the rent site and not vice-versa. An alternative method is “dry aspiration” which can be done manually using the Simcoe canula. Epinuclear sheet can also be taken out using viscodissection and viscoexpression.

**IOL placement**

IOL placement again depends on the site and extent of rent. If the capsule tear is small and circular, capsular fixation of IOL can be attempted. The single piece foldable IOL is ideal in these situations because of the controlled unfolding and flexible haptic. While implantation a good view of the anterior capsule rim and posterior capsule is important in order to ensure the IOL goes in the bag and not into sulcus or in the vitreous cavity. Care should be taken to ensure the haptics are away from the rent.

In the presence of a large rupture, the best option will be sulcus placement on IOL. Three piece IOL is strongly recommended in these instances as the single piece foldable IOL with its bulky haptics can cause persistent uveal irritation.
After placing the IOL do check for its stability and centration. If the support is inadequate other techniques such as iris or scleral fixated IOL is recommended.

**Postoperative complications**

Care should be taken to avoid post operative hypotony and glaucoma. Posterior segment evaluation is important to rule out complications such as retinal detachment and cystoids macular edema. These patients have a higher risk of endophthalmitis so it’s advisable to use intracameral antibiotics intraop or oral and topical antibiotics post op. Long term follow up is necessary in these patients to identify and manage posterior segment and IOL complications.