Commentary: Pearls in posterior polar cataract

Posterior polar cataract causes significant blurring of vision since it is at the nodal point of the eye and thus the patient presents earlier for cataract surgery. Despite comparatively smaller cataract and rapid recent developments in cataract surgery, there are significant surgical challenges due to preexisting weak or dehiscent posterior capsule.

PITX 3 gene mutation causes dysplastic and abnormal lens fibers to drift posteriorly from the equator resulting in the formation of a central opacity in the posterior capsule.[1] The abnormal lens fibers are adherent to this opacity resulting in a weakened central area of the posterior capsule which can get ruptured during cataract surgery.

According to the literature, the incidence of posterior capsule rupture (PCR) varies from 7%–36%.[2] In this study, Malhotra *et al*. have reported lower incidence of PCR by combining two surgical techniques and various precautions taken during surgery.[3] A PCR usually occurs following sudden collapse of the anterior chamber, inadvertent hydrodissection, nucleus rotation, or during epinuclear plate removal.

Choice of anesthesia can be either topical or local but we feel that local anesthesia may be preferred as it eliminates lid squeezing, thereby reducing the positive vitreous pressure especially in young patients. When the anterior chamber collapses as may occur following leaky incisions or removal of the irrigation ports, there would be anterior movement of the posterior capsule due to the forward vitreous thrust. When there is a preexisting deficient posterior capsule or if it is very thin, the vitreous thrust on the delicate posterior capsule can cause an intraoperative PCR and vitreous prolapse. In order to prevent this, it is imperative that viscoelastics are simultaneously injected through the side port whenever irrigating instruments are removed from the eye to push the posterior capsule back. This avoids the fluctuation and keeps the anterior chamber deep at all stages.

A capsulorrhexis size of 4.5–5 mm is preferred. Too small capsulorrhexis makes removal of the nucleus and epinucleus difficult and a larger one hinders optic capture after intraocular lens insertion in cases of PCR.

Cortical-cleaving hydrodissection causes the fluid wave to pass across the posterior pole leading to development of unnecessary pressure over the posterior capsule. This can lead to dehiscence or enlargement of the posterior capsular defect with consequent vitreous prolapse or nucleus drop. Hence, it is an absolute contraindication though few experienced surgeons perform multiple small jets of hydrodissection without allowing the fluid wave to cross the central posterior plaque.[4] Using viscodissection also helps avoid this complication as it is much more controlled since we inject just sufficient quantity so that the posterior pole is not crossed. It involves injecting a dispersive viscoelastic between the anterior capsule and the cortical matter. A hydrodelineation in multiple planes could be safely performed to separate the endonucleus from the epinucleus.

Rotation of the nucleus is ideally avoided as it exerts stress on the capsule. Various techniques have been described to remove the nucleus like the "V" or "λ" nucleofractis as described in this article, inverse horseshoe technique among other modifications.[5,6] Nucleotomy techniques which will put less stress on the capsule are preferred. It is also safer to delay removing the posterior polar opacity until rest of the nucleus is emulsified. Slow-motion phacoemulsification, which comprises of a low bottle height, ultrasound power, aspiration flow rate, and vacuum, is employed. Lowering the parameters reduces the turbulence within the anterior chamber and helps maintain stability. After emulsification, the epinucleus is viscodissected and slowly aspirated preferably by bimanual irrigation-aspiration cannula. Avoid polishing the central posterior capsule plaque if present.

Preoperatively, noting the size of the posterior polar cataract under the slit lamp is also important as those greater than 4 mm have higher incidence of intraoperative PCR as compared to cataracts <4 mm in diameter.[7]

In this study, the authors have mentioned the use of retro-illumination to look for preexisting posterior capsular dehiscence. If available, anterior segment optical coherence tomography (AS-OCT) should be used to predict the possibility of PCR. It has been reported to have a high negative predictive value suggesting that if the AS-OCT shows an intact posterior capsule, in all likelihood, the surgery would be uneventful.[8] Therefore, specific preoperative counseling may be done for only high-risk patients, thereby saving time and avoiding unnecessary anxiety in patients who have a normal AS-OCT.

Recent advances include femtosecond laser-assisted cataract surgery and zepto precision pulse capsulotomy; however, the cost is a significant limitation to these techniques.

Meticulously following these precautionary measures intraoperatively minimizes the incidence of PCR or vitreous prolapse. PCR without vitreous disturbance does not need an anterior vitrectomy if the anterior hyaloid face is intact. Despite all precautions, PCR is sometimes inevitable. One should always be prepared to deal with posterior capsular dehiscence and vitreous loss and it is advisable to have a standby 3 piece lens for implantation.

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