Handout

Introduction:

Vitreous Prolapse, following a Posterior Capsule Rupture, is a nightmare for every cataract surgeon. Once the vitreous face is broken and it prolapses into the anterior chamber, the surgeon is committed to perform a vitrectomy. Posterior segment surgeons have always propagated the pars plana approach to perform a vitrectomy. However, for the cataract surgeon, the preferred approach has been to perform anterior vitrectomy through the limbal (anterior) route, as most of us are familiar with this approach.

However, we need to re-evaluate this approach. Let us understand this in a step-by-step manner.

Anatomy and Physiology of the Vitreous – What the Cataract surgeon should know:

The anterior vitreous face is strongly attached to the posterior capsule in the centre, via the Wieger’s ligaments. There is also a potential space between the posterior capsule and anterior vitreous face in the centre, the Berger’s space. As described by professor Ian Worst, there are tracts within the vitreous cavity which run from the site of attachment of the vitreous to the posterior capsule (Wieger’s ligaments) up to the retina. Also, the vitreous face and body is strongly attached to the Vitreous Base at the periphery. Additionally, the vitreous is densely adherent to peripheral retinal degenerations such as lattice degeneration. It follows that traction on any part of the vitreous body (which forms one continuum) can lead to the formation of retinal breaks within or at the edge of the lattice degeneration. Any traction on the anterior vitreous is therefore likely to be transmitted to the posterior pole or the vitreous base. This can have serious consequences, such as the development of peripheral retinal breaks. This fundamental anatomy should be kept in mind by all anterior segment surgeons when performing anterior vitrectomy.

Identifying Vitreous Disturbance in a Posterior Capsule Rupture:

Vitreous prolapse is not always easy to identify. The first step to tackle a vitreous disturbance is to identify and determine the extent of vitreous disturbance. We find the use of intra-cameral preservative-free triamcinolone acetonide (4mg/ml) extremely useful for the same.
In the event of a vitreous prolapse, triamcinolone is injected into the anterior chamber, and a triamcinolone guided anterior vitrectomy is performed. Once the appropriate IOL fixation is performed, again inject triamcinolone to once again reconfirm that your IOL fixation manoeuvres have not caused any further disturbance.

**Limbal versus Pars Plana Approach for Anterior Vitrectomy**:

When anterior vitrectomy is performed through the limbal (anterior) route, the vitreous is pulled from above. This also exerts pulling force on the main bulk of the vitreous body upwards. This tends to enlarge the existing posterior capsule rupture. Additionally, the traction on the vitreous body can lead to posterior segment consequences.

In contrast, when anterior vitrectomy is performed through the pars plana (posterior) route, we are draining a smaller volume of vitreous through the rupture. Further, there is no upward traction on the vitreous body, and thereby no further enlargement of the rupture. This is crucial to ensure a limited posterior capsule rupture and facilitate in the bag IOL implantation.

**Role of Anterior Vitrectomy in Stable In-the-Bag IOL Implantation**

We often encounter the clinical scenario, where, following posterior capsule rupture, despite a seemingly perfect limbal anterior vitrectomy, the IOL is not perfectly centered in the capsular bag. While this may not be clinically significant, a critical analysis shows that it does have deleterious effects on the patient’s vision quality. Traditionally, the posterior capsule is thought of as the sole support for IOL placement and stability, and therefore, our aim is mainly to achieve an ‘adequate’ capsular support. What goes unnoticed is that the posterior capsule and anterior vitreous are one conjoined unit, and it is this unit that provides a scaffold for IOL placement. The symmetry and stability of this entire complex is what will ensure IOL stability.

The ergonomics of negotiating the vitrector through the opening in the posterior capsule in the anterior approach limit the removal of anterior vitreous to the area behind the PCR. This leads to pockets of anterior vitreous that are not removed. In turn leading to an asymmetric scaffold for the IOL. Whereas, when introduced through the pars plana, the vitrector has unrestricted access to the anterior vitreous circumferentially. It therefore, allows a complete and symmetric removal of the anterior vitreous behind the IOL. The result, a symmetric scaffold for the IOL.

**Performing Pars Plana Anterior Vitrectomy**:
Though it requires some practice, it is not difficult for the cataract surgeon to perform a pars plana approach. Most newer phaco machines are now equipped with high cut rate vitrectomy cutters and good fluidic control. A single pars plana entry is made 3.5 mm behind the limbus using a trocar canula. The vitrector is introduced through the trocar. The direction of entry of the trocar should be vertical, as if, pointing towards the optic nerve. This will ensure that the posterior capsule is not inadvertently damaged.

For irrigation, the irrigation cannula of the bimanual i/a is introduced through the limbal paracentesis. An adequate and symmetric removal of anterior vitreous is performed. The vitrector has 2 modes of functioning. The preferred mode is the ‘Cut-I/A’ mode, where the cutter first cuts and then aspirates.

If using a 23-G trocar, it is generally a self-sealing wound. However, if using 20 G vitrectomy cutter, suturing of the scleral entry wound is required.

**Consequences of Anterior Vitrectomy**

It is important to remember that whenever there is a vitreous face disturbance, and a vitrectomy is performed, the risk of retinal break formation increases. There are also higher chances of postoperative inflammation and glaucoma. Therefore, a regular follow-up is required to assess peripheral retina, macula (OCT) and intraocular pressure. The patient should also be educated about the need for continuous follow-up.

**What to Do when faced with a vitreous disturbance in a basic setup?**

When in a basic setup (eg basic phaco machine with limited vitrectomy facilities), or inexperienced surgeon, the aim should be to be not inflict further damage to the eye. In case of dropped nuclear material, no attempt should be made to fish out the material from the vectis. In trying to do this, there is a chance of causing traction on the vitreous base. Instead, try to clear the anterior chamber of any vitreous, and refer the case to a retina surgeon.

**Summary**

Pars Plana Vitrectomy is a better approach to perform limited anterior vitrectomy. It is not difficult for anterior segment surgeons to master.