



Posterior Polar Cataract Management: My Approach

Sudhir Singh

J Watumull Global Hospital and Research Center, Mount Abu, Sirohi, Rajasthan, India.

Abstract

Posterior polar cataracts (PPC) are cataracts lying on the posterior pole of the lens. They are slied to the posterior capsule, so there are many times more chances of the post capsule ruptures and related sequelae. In this article, I will share my approach regarding the pre-operative considerations and plans, including patient counseling, anesthesia type, capsulorhexis, hydro procedures, intraocular lens types, cataract surgery methods, and the manual small incision cataract surgery, phacoemulsification and femto laser-assisted cataract surgery. This article will also discuss complications arising from posterior capsule ruptures and their management. This is an e-video article so each section is embedded with the video links and QR codes under the subject with the help of the surgical videos.

ARTICLE INFO

*Correspondence:

Sudhir Singh
drsudhirsingh@gmail.
com
MS Senior Consultant &
HOD JW Global Hospital
Research Centre Mount
Abu, India.

Dates:

Received: 10-12-2021
Accepted: 23-03-2022
Published: 25-04-2022

Keywords:

Posterior polar cataract,
Hydroprocedures,
Posterior capsule
rupture

How to Cite:

Singh S. Posterior
Polar Cataract
Management: My
Approach. UP Journal
of Ophthalmology.
2022;10(1): 1-6. DOI:
10.56692/upjo.2022100101

INTRODUCTION

Posterior polar cataracts (PPC) are cataracts lying on the posterior pole of the lens. They are slied to the posterior capsule, so there are many times more chances of the post capsule ruptures and related sequelae. In this article, I am going to share my approach.

Pre-operative Considerations and Plans

- **Patient counseling:** Patient counseling is very important and it requires substantial chair time with the patient and relative to explain the complexities of the disease, procedure, and chances of re-surgeries in writing.
- **Anesthesia and akinesia:** My preferred choice is peribulbar local anesthesia with good akinesia.
- **Capsulorhexis size:** I prefer moderate-size central capsulorhexis
- **Hydro procedures:** I prefer hydro delineation and gentle hydro dissection. Many surgeons do not advise doing hydro dissection. I found the hydro-dissection in the posterior capsular cataracts very useful as it separates the epinucleus from the posterior capsule naturally. The hydro delineation in posterior cataracts is also very beneficial as it separates the nucleus from the epinucleus. Fine et al.¹ used minimal hydrodissection and hydro delineation, nuclear emulsification from within the epinuclear shell, and gentle viscodissection of the epinucleus and cortex to avoid unnecessary pressure on the posterior capsule and to protect the region of the greatest potential weakness throughout the procedure.¹

© UPJO, 2022 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <https://creativecommons.org/licenses/by-nc-sa/4.0/>.

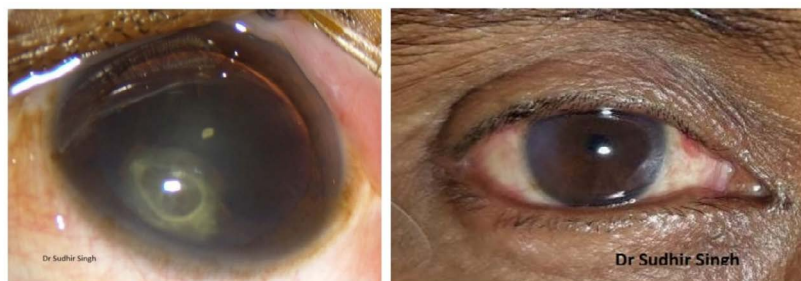


Figure 1: Pre operative and post operative day 1 vision 6/9 undaided and 6/6 corrected following 6 mm manual small incision cataract surgery. Please follow the link or QR code for the surgery video of the manual small incision cataract surgery on the YouTube (<https://www.youtube.com/watch?v=2ICFx-Y2eAc>)

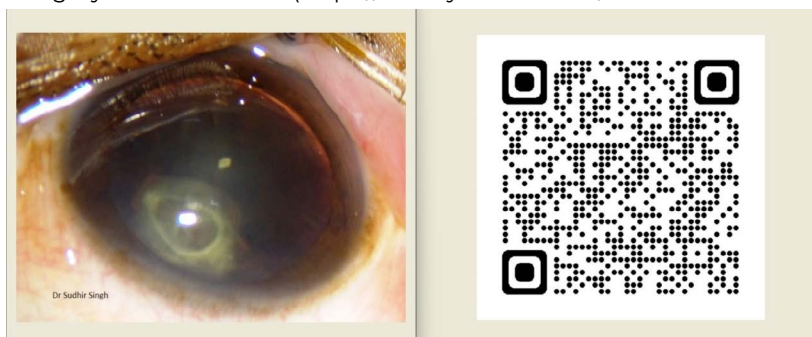


Figure 2: Please follow the link or QR code for the surgery video of the manual small incision cataract surgery on the YouTube (<https://www.youtube.com/watch?v=2ICFx-Y2eAc>).

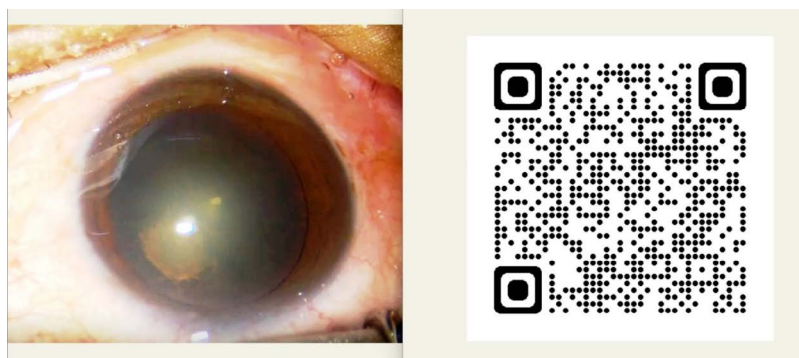


Figure 3: Please follow the link or QR code for the surgery video of phacoemulsification In the Posterior polar cataract on the YouTube (<https://www.youtube.com/watch?v=62v78L4SoWU>).

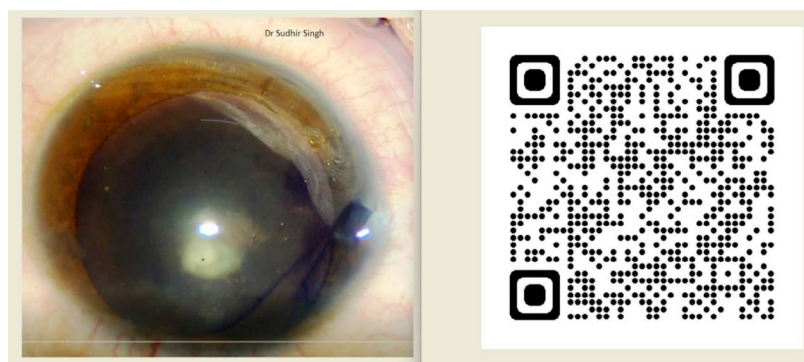


Figure 4: Please follow the link or QR code for the surgery video of phacoemulsification In the Posterior polar cataract on the YouTube (<https://www.youtube.com/watch?v=1wRRv5dPiDo&t=7s>).

- **Intraocular lens:** If the posterior capsule remains intact then any hydrophobic lens if I have planned phacoemulsification. Poly methyl methacrylate (PMMA) intraocular lens for manual small incision cataract surgery (MSICS) and posterior capsule rupture with intact anterior capsulorhexis. In the case of the medium, large posterior capsule rent (PCR) and the sulcus, my preferred lens is PMMA IOL.
- Always keep your vitrectomy machine on standby

MANAGEMENT

Posterior Polar Cataract Management Options

Manual Small Incision Cataract Surgery (MSICS)

The MSICS is low pressure, with no turbulence, and is an inside-out procedure. The posterior capsule is weak posterior polar cataracts. The MSICS does not put extra pressure on the posterior capsule in contrast to phacoemulsification. Phacoemulsification is high pressure, high turbulence, and outside in procedure. It put more pressure on the already weak posterior capsule due to the posterior polar capsule. The manual small incision is the procedure of choice.

Pre-operative and post-operative day 1 vision 6/9 unaided and 6/6 corrected following 6 mm manual small incision cataract surgery.

Please follow the link or QR code for the surgery video of the manual small incision cataract surgery on the YouTube

(<https://www.youtube.com/watch?v=2ICFx-Y2eAc>)

Phacoemulsification in the Posterior Polar Cataract

The phacoemulsification is technically less safe the manual small incision cataract. I plan medium-sized centrally located capsulorhexis gentle hydro-dissection and hydro delineation is done. The nucleus is emulsified with low parameters. Till this step everything is easy. The posterior pole cortex removal is the main challenge. The remaining cortex removed very gently and the anterior chamber should be stable as much as possible.

Please follow the link or QR code for the surgery video of phacoemulsification In the posterior polar cataract on the YouTube (<https://www.youtube.com/watch?v=62v78L4SoWU>)

Please follow the link or QR code for the surgery video of phacoemulsification In the posterior polar cataract on the YouTube (<https://www.youtube.com/watch?v=1wRRv5dPiDo&t=7s>)

Femto Laser Assisted Cataract Surgery (FLAC)

Some surgeon advocating for the femto laser-assisted cataract surgery. But it does not increase the safety of the posterior capsule as the posterior capsule rupture occurs during the cleaning of the cortical matter. The nucleus management is not an issue in the posterior capsular cataracts. It can be easily managed either in manual small incision cataract surgery or by standard phacoemulsification. Vasavada and Singh found that rupture occurs most commonly during epinucleus removal in phacoemulsification.² While Osher *et al.* found it to happen during the removal of the posterior polar opacity or during the cleaning of the posterior capsule after plaque removal

In my opinion, it's a misuse of the technology without any benefit, and patients pay more unnecessarily.³

Management of Posterior Capsule Ruptures

Despite all precautions, if the posterior capsule ruptures. The management is as follows

Vitrectomy After Vitreous Prolapse

The aim of anterior vitrectomy is to remove all vitreous strands from the anterior chamber, making sure that no vitreous is incarcerated in the incisions. Bimanual anterior vitrectomy is a simple procedure that every cataract surgeon should master. First, the vitrectomy cutter and irrigating cannula are passed through different side port incisions. Flow from the irrigation cannula should be directed toward the angle of the anterior chamber. A low bottle height, high cut rate (600–1,000 cuts/sec), and low aspiration rate (150–200 mm Hg) will

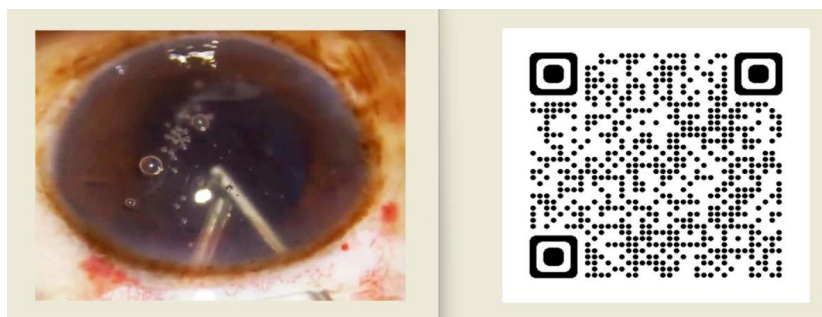


Figure 5: Please follow the link or QR code for the surgery video of the bimanual anterior vitrectomy HD on the YouTube (<https://www.youtube.com/watch?v=GtIRZjAsIgA>) .



Figure 6: Please follow the link or QR code for the surgery video of anterior vitrectomy after the PCIOL implantation following posterior capsule rupture HD on the YouTube (<https://www.youtube.com/watch?v=vw0vTE6S6kY>).

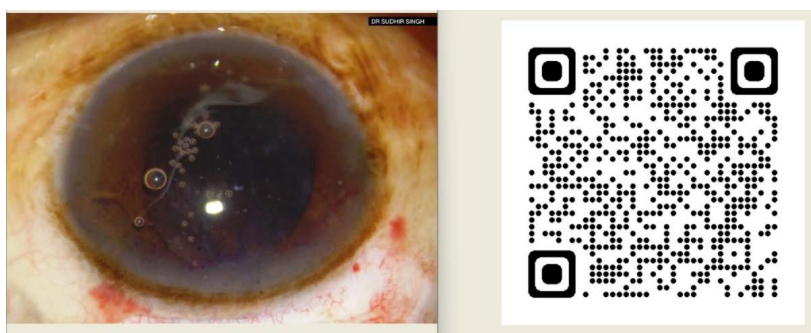


Figure 7: Please follow the link or QR code for the surgery video Anterior Vitrectomy with implantation of the PMMA IOL in the sulcus on the YouTube.

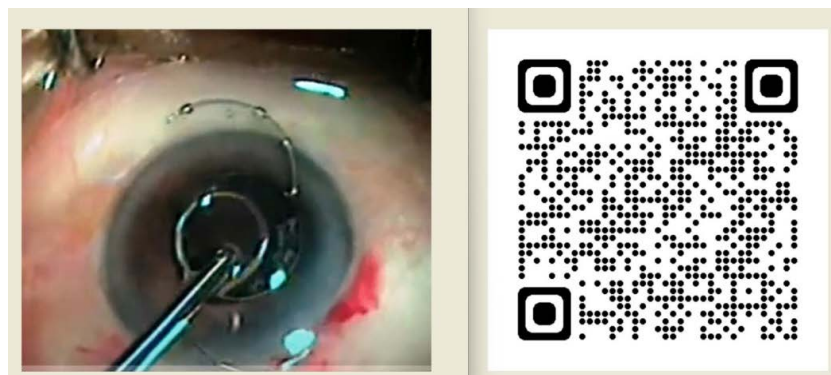


Figure 8: Please follow the link or QR code for the surgery video of the implantation of the PMMA IOL in the sulcus on the YouTube (<https://www.youtube.com/watch?v=Nvv3q4JSyD0>).

minimize vitreous traction. The vitreous cutter is passed through the PCR into the vitreous cavity; its port is positioned just behind the posterior capsule to minimize the risk of PCR enlargement during vitrectomy. Most of the vitreous that has prolapsed into the posterior and anterior chambers can be easily drawn backward and removed. Preservative-free intracameral triamcinolone acetonide may be used to enhance vitreous visibility.⁴

Please follow the link or QR code for the surgery video of the bimanual anterior vitrectomy HD on the YouTube

<https://www.youtube.com/watch?v=GtIRZjAsIgA>

IOL Implantation After the Posterior Capsular Rupture

Protocol for a Small Posterior Capsular Rupture

After a small posterior capsule rupture, the remaining nuclear fragments and cortical matter are removed from the capsular bag. If any vitreous is present, vitrectomy should be used to clear the posterior chamber. The posterior capsule rupture is then sealed with a cohesive OVD, the capsular bag is inflated with a dispersive OVD, and the IOL is implanted in the bag with the leading haptic directed toward the capsular bag equator and the trailing haptic left outside of the bag. The IOL can then be dialed gently into the capsular bag.⁴

A one-piece PMMA IOL is much easier to implant than a foldable IOL, as control over PMMA IOLs is easier. After the lens is implanted, it is important to remove OVD thoroughly, as residual OVD can produce a severe inflammatory reaction in the anterior chamber and vitreous cavity. OVD can be washed from the anterior chamber with the irrigation aspiration cannula and cleared from behind the IOL with the vitrector.⁴

Please follow the link or QR code for the surgery video of anterior vitrectomy after the PCIOL implantation following posterior capsule rupture HD on YouTube (<https://www.youtube.com/watch?v=vw0vTE6S6kY>).

Protocol for a Large Posterior Capsule Rupture

After a large posterior capsular rupture, the best approach is to implant the IOL in the sulcus. First,

the sulcus should be filled with a dispersive OVD around 360°. To do this, the anterior capsule is first identified, then OVD is injected from the center to the periphery over the anterior surface of the anterior capsule. This ensures proper filling of the sulcus.⁴

I prefer rigid PMMA IOLs in these situations, and this requires enlargement of the corneal incision to accommodate the IOL can then be inserted through the main incision, with the leading haptic directed toward the sulcus opposite from the entry incision and the trailing haptic resting on the anterior surface of the iris. After ensuring that the leading haptic is placed over the anterior surface of the anterior capsule, the IOL can be dialed into the sulcus; the IOL should not be tilted after dialing. Foldable IOLs can also be implanted in the sulcus. The leading haptic is directed toward the sulcus, the optic unfolds at the pupillary plane, and the trailing haptic is placed over the anterior surface of the iris. Before the IOL is dialed into the sulcus, the leading haptic should be well positioned in the sulcus. The OVD is washed thoroughly from the anterior and posterior chambers and behind the IOL with the help of the I/A cannula and vitreous cutter). Complete removal of OVD is mandatory to avoid the development of complications such as severe inflammatory reactions, hazy media, exudative membranes, secondary glaucoma, and cystoid macular edema. Intracameral miotic agents such as carbachol or pilocarpine can be used to constrict the pupil and prevent IOL destabilization after implantation. Any peaking of the pupil after constriction indicates that the vitreous is incarcerated in that region. It should be immediately cleared with the vitreous cutter. The anterior chamber is formed with a balanced saline solution, with or without air, and the main and side port incisions are sealed with hydration. I prefer to use 10-0 sutures for the main and side port incisions, as vitrectomized eyes are prone to hypotony.¹

Please follow the link or QR code for the surgery video Anterior Vitrectomy with implantation of the PMMA IOL in the sulcus on the YouTube. <https://www.youtube.com/watch?v=ZPAJseMziYg>

Please follow the link or QR code for the surgery video of the implantation of the PMMA IOL in the sulcus on the YouTube

<https://www.youtube.com/watch?v=Nvv3q4JSyD0>

Protocol After Posterior Capsular Rupture with Nucleus Fragments Dropped into the Vitreous Cavity

After PCR, sometimes the nucleus or nuclear fragments drop into the vitreous cavity. Management should be executed as discussed previously. If a vitreoretinal surgeon is available, the case should be transferred immediately for management. Otherwise, anterior vitrectomy is done, passing the vitreous cutter through the PCR and performing core vitrectomy under direct visualization. The IOL can be implanted in the capsular bag or sulcus, according to the size and extent of the PCR. The patient must then be referred to a vitreoretinal center for management. Protocol after zonular dehiscence. Small zonular defects (up to 3 clock

hours) can be treated using a capsular tension ring; however, large defects require suture fixation of the capsular bag to the scleral wall.

REFERENCES

1. Singh, S. IOL Implantation After PCR. *Cataract & Refractive Surgery Today Europe*. April 2014;55-58 http://crstodayeurope.com/wpcontent/themes/crste/assets/downloads/0414CRSEuro_Singh_F3.pdf
2. Vasavada A.R., Singh R. Phacoemulsification with posterior polar cataract. *J Cataract Refract Surg*. 1999;25:238–245. [PubMed] [Google Scholar]
3. Osher R.H., Yu B.C., Koch D.D. Posterior polar cataracts: a predisposition to intraoperative posterior capsular rupture. *J Cataract Refract Surg*. 1990;16:157–162. [PubMed] [Google Scholar]
1. Fine I.H., Packer M., Hoffman R.S. Management of posterior polar cataract. *J Cataract Refract Surg*. 2003;29:16–19. [PubMed] [Google Scholar]