

PNEUMATIC RETINOPEXY: COMMON MYTHS DISPELLED



PnR should be considered as first-line therapy in certain cases of retinal detachment.

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Pneumatic retinopexy (PnR) can be an alternative for select cases of rhegmatogenous retinal detachment (RRD), as it avoids the potential complications of invasive procedures such as scleral buckle or pars plana vitrectomy (PPV). However, advances in PPV have made it the standard procedure for RRD in most parts of the world.¹

Despite the popularity of PPV, there are specific cases where PnR tends to be the better technique. In this article, we address the misconceptions that cause retina specialists to shy away from PnR as first-line therapy.

THE EVIDENCE FOR PNEUMATIC RETINOPEXY

Hilton et al reported a success rate of 84% in their series of 100 RRD cases treated primarily with PnR.² The first randomized controlled trial that compared PnR with scleral buckle reported a single-operation success (SOS) rate of 73% versus 82%, respectively. However, any subsequent procedure, including additional laser, cryoretinopexy, or supplemental gas injection, was considered a treatment failure in this study.³ In 2019, the PIVOT trial showed that primary anatomic reattachment was achieved at 12 months in 80.8% of cases with PnR versus 93.2% with PPV.⁴

The PIVOT trial also demonstrated that visual acuity outcomes with PnR exceeded those with PPV by 4.9 ETDRS letters at 12 months. In addition, the composite 25-item National Eye Institute Visual Function Questionnaire scores were superior for PnR at 3 and 6 months, and vertical metamorphopsia scores were superior for the PnR group compared with the PPV group at 12 months. Of phakic patients in the PPV arm, 65% underwent cataract surgery in the study eye before 12 months versus 16% in the PnR group.⁴

Brosh et al showed that retinal displacement was evident in 44.4% of cases with PPV versus 7% with PnR.⁵ The subsequent ALIGN trial demonstrated similar results and found an association between retinal displacement and postoperative aniseikonia.⁶

PNEUMATIC RETINOPEXY MYTHS DISPELLED

Below, we address 10 of the most common myths causing retina surgeons to avoid PnR as a first-line treatment for appropriate RRD cases.

1 Myth: PnR should be avoided, as it has a lower SOS rate than PPV.

Although it is true that vitrectomy has a marginally higher SOS, surgeons should remember that PnR can provide better functional outcomes in some cases. It is also important to consider that even though the SOS with PPV is marginally higher, the “integrity” of retinal reattachment in terms of retinal displacement, outer retinal folds, and outer retinal band discontinuity is worse with PPV.

Based on the 12% difference in SOS in the PIVOT trial (93% for PPV vs 81% for PnR), surgeons who choose PPV over PnR each time may be performing PPV unnecessarily on 8.33 patients to spare one patient from needing a second operation.⁷

Although SOS is an important outcome, functional and visual outcomes are more important to patients and should be more important to surgeons. The PIVOT trial has shown that PnR patients experienced better visual acuity outcomes by 1 line, less vertical metamorphopsia, improved vision-related quality of life, and a lower incidence of cataract in phakic patients.⁴

2 Myth: Patients will not adhere to the PnR postoperative positioning.

Positioning is important for the success of PnR, and there are patients who will have difficulty with this aspect. However, the same is true for PPV, and with proper coaching and encouragement, most patients are motivated and will try their best to avoid the need for more invasive surgery. Surgeons must educate patients and their companions regarding the proper sequence of postoperative positioning.

In our clinic, we provide the positioning instructions on

ALTHOUGH SINGLE-OPERATION SUCCESS IS AN IMPORTANT OUTCOME, FUNCTIONAL AND VISUAL OUTCOMES ARE MORE IMPORTANT TO PATIENTS AND SHOULD BE MORE IMPORTANT TO SURGEONS.

a handout as a written reminder. Showing patients their widefield fundus photos before and after the procedure will allow them to see their progress and further encourage them to adhere to the postoperative instructions.

3

Myth: Frequent follow-up visits create a higher burden.

With PnR, the procedure can be offered in-office at the time of presentation without delay, so the patient will not need to make another visit for surgery. If a two-step PnR is done (as is our preference), patients will be seen 1 to 2 days later for laser retinopexy. Our usual protocol is to bring the patient back in 2 days to maximize the likelihood of complete resolution of subretinal fluid (SRF) under the tear and improve our ability to perform laser retinopexy without the need for an extra visit.

The next follow-up visits are usually scheduled at weeks 1, 2, 4, and 2 months. This is approximately one more visit than is often scheduled for PPV patients, and this small difference is corroborated by the PIVOT trial.⁴ When surgeons are just starting with PnR, it might be wise to bring patients back more frequently, until they become more comfortable.

4

Myth: PnR makes subsequent PPV more challenging.

In a phakic patient with intraocular gas, vitrectomy can be more difficult due to posterior lens feathering while lying supine, which can be easily mitigated.

In the preoperative period, patients should not lie supine, but they can be upright with their head down. In addition, they should avoid lying on their backs until it is time for the block to be given or until the time of surgery. This will prevent lenticular gas touch and reduce the risk of intraoperative cataract or lens opacification. The surgeon must remove the gas at the start of the vitrectomy.

Another complication that can arise with PnR is the presence of subretinal gas. This is exceedingly rare and can almost always be avoided with proper technique. If it does occur, most subretinal gas can be massaged out of an open break with a scleral depressor with the patient lying supine. If there is a small amount of subretinal gas that is away from the break, it is usually of no consequence.

Most pneumatic cases that require surgery have already had an incomplete response to PnR, and what may have previously been a bullous fovea-off RD is generally considerably less bullous, often with the fovea attached, which makes the vitrectomy and the shaving of the vitreous base easier.

5

Myth: Lasering under the gas bubble is too difficult.

Surgeons should start with simple cases and more compliant patients. Careful initial examination and mapping the exact location of the retinal tear(s) in relation to the retinal blood vessels, adjacent hemorrhages, or pigment serves as a roadmap as to where surgeons should be applying laser treatment after gas injection.

Taking widefield fundus photos can also help guide surgeons. For small breaks that may be hard to find, consider applying laser around the tear with scleral depression if the RRD is not too bullous, or at the ora in the same meridian where the retinal tear is before the gas injection.^{8,9}

In some cases, surgeons should place the scleral depressor directly over the sclera when performing scleral depression. This can allow the surgeon to indent posteriorly enough to open the flap and confirm visualization of the retinal tear, which has flattened post-retinal reattachment. Subconjunctival anesthesia can help make the patient more comfortable during the laser treatment.

Another option is to apply cryopexy to the break(s) prior to gas injection. Although we prefer a two-step approach, cryopexy is a good option for a one-step procedure.

6

Myth: PPV more effectively addresses floaters with RRD.

While true, the important question is whether patients are bothered enough by floaters post PnR to justify PPV. In our experience, symptomatic floaters are rarely mentioned by patients after successful PnR, and vitrectomy is rarely needed, as supported by the PIVOT trial.⁴

7

Myth: The need to perform laser 1 to 2 days post-procedure can be a challenge.

PnR has its own timing requirements when it comes to follow-up visits and laser application,

but colleagues can help. If surgeons are unavailable to perform laser retinopexy within 48 hours, they should provide their colleague with widefield fundus photos or a careful drawing to indicate the location of the causative breaks and the landmarks near them. Other options include using cryotherapy prior to the gas injection or marking the meridian where the break is with laser at the ora.

8

Myth: Incorporating PnR will compromise surgical outcomes.

When surgeons are first incorporating PnR into practice, they may face more challenges than expected. In our profession, we must always be open to new techniques that offer better and safer results. We have an obligation to gain familiarity with all techniques to do what is best for our patients at any given time.

9

Myth: PnR promotes the development of proliferative vitreoretinopathy.

There is no evidence to support this. As with any recurrent or persistent RRD, surgeons must know when and how to intervene. Both the PIVOT trial and the Pneumatic Retinopexy Trial demonstrated that there was no increased risk of proliferative vitreoretinopathy in the PnR groups.^{3,4} In addition, when a PnR is failing, it is important that the surgeon move to another technique in a timely fashion to optimize final outcomes.

10

Myth: Residual or persistent SRF is more common with PnR.

PnR is a non-drainage procedure that relies mainly on the retinal pigment epithelium to pump out most of the SRF. Delayed resorption of SRF is sometimes encountered in PnR, similar to scleral buckle, with a reported incidence ranging from 4% to 20%.^{6,10} This can usually be attributed to the chronic and viscous nature of the SRF or to the reduced capacity of the RPE pump to remove SRF.

Persistent SRF can also be seen after PPV with a reported incidence of 15%.¹¹ Whether the SRF is foveal or extrafoveal, there was no association between persistent subfoveal SRF and visual acuity outcomes at 1 year.¹¹

There are two scenarios where residual or persistent SRF may be encountered with PnR. First, with post-PnR positioning, SRF can shift, often inferiorly. This is almost always seen in the first few days after PnR, and if it is not associated with an open break, the fluid should resolve.

In the second scenario, loculated SRF blebs are seen under the fovea on OCT. Although this finding may be undesirable and the patient may experience some reduced visual acuity or distortion as a result, it is not associated with adverse long-term visual outcomes. As with scleral buckle and vitrectomy, the SRF will resolve in time, with corresponding improvements in visual acuity.

STRENGTHEN YOUR SKILL SET

As retina surgeons, we must master all the techniques of RRD repair and offer the best procedure for each patient, which includes PnR. There is no procedure that works in every patient's case, and a failed pneumatic case should not affect the success of any additional retinal procedure that may be required.⁴ ■

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