Pneumatic Retinopexy (PnR) versus Pars Plana Vitrectomy (PPV) for Rhegmatogenous Retinal Detachment (RRD): Systematic Review and Meta-Analysis

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Introduction:

Rhegmatogenous retinal detachment (RRD) is the most common form of retinal detachment. RRD has an acute onset and requires surgical intervention to seal retinal tears and prevent recurrence.

Several studies compare the surgical procedures suitable for RRD such as pneumatic retinopexy (PnR) and pars plana vitrectomy (PPV)[1-6].

This is the first meta-analysis that aims to amalgamate the data from the studies to confirm whether PnR or PPV is more effective and safer for the management of RRD.

Aim:

Compare the outcomes of pneumatic retinopexy (PnR) versus pars plana vitrectomy (PPV) for rhegmatogenous retinal detachment (RRD).

Methods:

- A systematic review and meta-analysis as per PRISMA guidelines.
- Primary outcomes included anatomical success (rate of attachment) and complications eg cataract development and increased IOP
- Secondary outcomes included changes in visual acuity
- Review Manager 5.3 software was used for data synthesis.

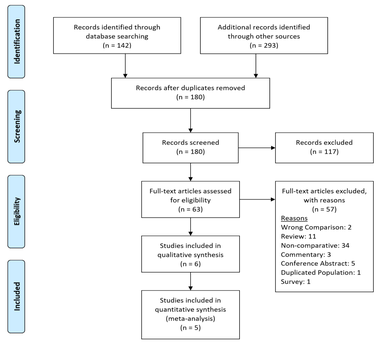


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Diagram. The PRISMA diagram details the search and selection processes applied during the overview.

Results:

- Study Sample: Six studies enrolling 1061 patients were identified.
- Primary Outcomes:
  - Anatomical success: statistically significant difference in the odds ratio analyses favouring the PPV group over PnR (OR = 0.29, CI = 0.19 to 0.45, P =<0.00001); figure 2
  - Complications
    - Cataract development no statistically significant difference (OR = 0.34, CI = 0.01 to 20.11, P = 0.61); figure 3. A high level of heterogeneity was found amongst the studies (I^2 = 94%, P < 0.00001)
    - Schaal et al. demonstrated 6% of cases in both groups had increased IOP
    - Ross et al. - new retinal tear (1 case in PnR), post-operative proliferative vitreoretinopathy (11 cases in PnR), epiretinal membrane (1 case in PnR) and subluxated intraocular lens (1 case in PPV)
- Secondary Outcomes:
  - Visual Acuity: Hillier et al. reported a statistically significant difference, Schaal et al. assessed visual acuity highlighting no significant difference between PnR group versus PPV group
- Subgroup analysis
  - Statistically significant difference showing that PPV had higher rates of reattachment than PnR both as primary interventions (OR = 0.29, CI = 0.18 to 0.48, P <0.00001) or secondary procedure after failed PnR (OR = 0.28, CI = 0.11 to 0.72, P = 0.008)
  - Overall, there was no significant subgroup differences in the rate of reattachment of eyes operated on by PnR and PPV as a primary procedure or secondary procedure after failed PnR (P = 0.95).

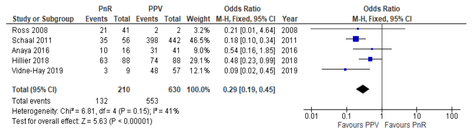


Figure 2: Forest Plot for Odds Ratio of Pneumatic Retinopexy (PnR) versus Pars Plana Vitrectomy (PPV) – Rate of Reattachment .

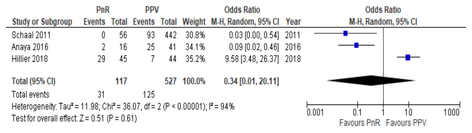


Figure 3: Forest Plot for Odds Ratio of Pneumatic Retinopexy (PnR) versus Pars Plana Vitrectomy (PPV) – Cataract.

Conclusion:

The findings of the PPV group were comparable to those treated with PnR regarding treatment success and complications. The study also showed that PPV has higher rate of reattachment compared to PnR in the treatment of RRD. This is in agreement to existing studies exemplifying better anatomic success rate in PPV compared to PnR. It is therefore appropriate to consider PPV to remain as the gold standard procedure in treating RRD for the clinical practice. However, PnR can be used as alternative if depending on patient and surgeon factors. The authors recommend further clinical trials be performed to assess the findings of this study.

Reference List:

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