Pneumatic Retinopexy (PnR) versus Pars Plana Vitrectomy (PPV) combined with Scleral Bulking (SB) for Rhegmatogenous Retinal Detachment: Systematic Review and Meta-Analysis

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Introduction:

Rhegmatogenous retinal detachment (RRD) is caused by a discontinuity or defect in the retina itself, allowing fluid travel from the vitreous cavity into the subretinal space potentially causing blindness if left untreated. Thus, it is an ophthalmic emergency that indicates immediate surgical repair [1,2]. Surgical repair strategies commonly include scleral buckling (SB), pars plana vitrectomy (PPV), a combination of PPV and SB, and pneumatic retinopexy (PnR) [3]. Despite recent advancement in surgical success rates for patients with non-complex RRD, much remains to be explored about the best interventions to correct it, manage subsequent complications and prevent retinal detachment recurrence. At present, there are several comparative studies of PnR and PPV plus SB [4-7]; however, there has been no metanalysis of their outcomes for comparison.

Aim:

To compare the outcomes of Pneumatic Retinopexy (PnR) versus Pars Plana Vitrectomy (PPV) with Scleral Bulking (SB) in the treatment of rhegmatogenous retinal detachment (RRD).

Methods:

A systematic review and meta-analysis were conducted in accordance with the PRISMA guidelines[9]. An electronic search was performed to identify all comparative studies comparing PnR versus PPV with SB in the treatment of RRD . Primary outcomes included rate of reattachment and rate of complications. Secondary outcome measures were visual acuity and change in refractive error. . Fixed-effect modelling was used for the analysis.

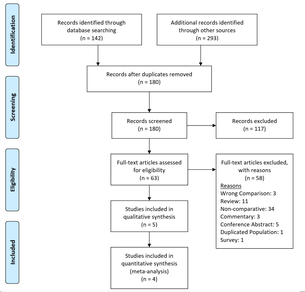


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Diagram. The PRISMA diagram details the search and selection processes applied during the overview.

Results:

- Study Sample: Four studies that enrolled 483 cases were identified in the literature

- Primary Outcomes:
  - Rate of reattachment : Statistically significant difference was seen between the two interventions as PPV with SB outperformed PnR (Odds Ratio (OR) = 0.10, P < 0.00001).
  - Complications: Varied depending on the adverse event. PPV with SB patients experienced a higher cataract development (OR = 0.05, P = 0.0002), yet both techniques produced a similar amount of intraocular pressure changes, and PnR produced a greater number of new retinal tears and post-operative proliferative vitreoretinopathy.

- Secondary Outcomes:
  - Visual acuity: both interventions improved visual acuity; more profoundly in the PPV with SB group. Additionally, this group also saw a correction in their refractive error.
  - Subgroup analysis showed no significant difference in the rates of reattachment of eyes operated on by PnR and PPV with SB as a primary procedure or secondary procedure after failed PnR (P = 0.60).

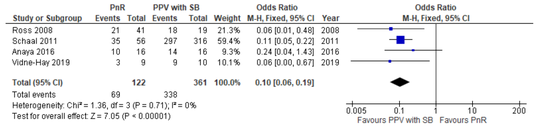


Figure 2: Forest plot for odds ratio of pneumatic retinopexy (PnR) versus pars plana vitrectomy (PPV) with scleral bulking (SB) – Rate of reattachment. A statistically significant difference in the rate of reattachment favouring PPV with SB group.

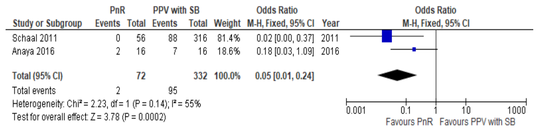


Figure 3: Forest plot for odds ratio of pneumatic retinopexy (PnR) versus pars plana vitrectomy (PPV) with scleral bulking (SB) – Cataract. A statistically significant difference in the rate of reattachment favouring PnR group.

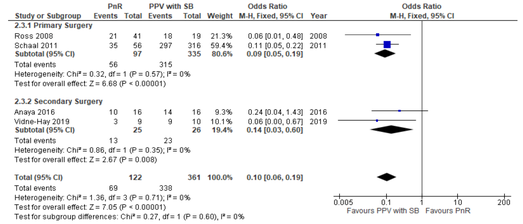


Figure 4: Forest plot for subgroup analysis of primary surgery and secondary surgery after failed pneumatic retinopexy (PnR) – Rate of Reattachment. There was no statistically significant subgroup difference in the rate of reattachment of eyes operated on by PnR and pars plana vitrectomy (PPV) with scleral bulking (SB) as a primary procedure or secondary procedure after failed PnR.

Conclusion:

PPV with SB is a comparable treatment option to PnR for patients with RRD as it is associated with a higher reattachment rate and similar improvement in vision.

Reference List:

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