

Effect of Retinectomy with Pars Plana Vitrectomy in Proliferative Vitreoretinopathy: Surgical Success and Recurrence Rate (A Comparative Study)



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ABSTRACT

Purpose: To assess anatomical and functional success of pars plana vitrectomy with retinectomy in cases of proliferative vitreoretinopathy (PVR grade C).

Study Design: Retrospective chart review.

Place and Duration of Study: AL-Ferdous Private Eye Hospital, Baghdad, from July, 2019- June, 2023.

Methods: Thirty eyes of thirty patients with PVR grade C were included in the study. One group (n=15) underwent pars plana vitrectomy (PPV) without retinectomy, while the other group (n=15) underwent PPV with retinectomy. Complications, anatomic success, and visual acuity were documented and evaluated. The relationship between retinectomy duration and postoperative visual acuity was examined using a chi-square test, with a p-value less than 0.05 considered statistically significant.

Results: Mean age of the patients was 46.13±13.95 years. Retinectomy group had 8 (53.3%) males and 7 (46.7%) females. The other group had 10 (66.7%) males and 5 (33.33%) females. In group 1 there were 5 phakic and 10 pseudophakic eyes while in group 2, there were 4 phakic and 11 pseudophakic eyes. Postoperative complete retinal re-attachment was achieved in 100% eyes in retinectomy group. After six months, the first group had 5 eyes (33.3%) with improved visual acuity, stable visual acuity in 7 eyes (46.6%) and worsening of vision in 3 eyes (20%). For the second group, 8 eyes (53.3%) showed improvement, stability in 4 eyes (26.7%), and worsening vision in 3 eyes (20%) with p-value > 0.05.

Conclusion: Retinectomy is beneficial in treating severe PVR and improves, ultimate retinal reattachment rate.

Key Words: Proliferative Vitreoretinopathy, Retinectomy, Retinal Detachment, Retinotomy.

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INTRODUCTION

Vitreoretinal surgery is a challenging procedure when rhegmatogenous retinal detachment (RRD) is

complicated by proliferative vitreoretinopathy (PVR).¹ Most common cause of recurrent retinal detachment after retinal surgery is PVR (grade C).² Traditional endo-tamponade like silicone oil do not fully cover the inferior retina leading to inferior PVR and recurrent retinal detachment.^{5,6} To counter this, some surgeons prefer to do PPV with scleral buckling (SB) in order to augment the effect of tamponade. However, SB is associated with prolonged surgical time, high refractive errors, potential retinal blood

flow reduction, and the risk of anterior segment ischemia.^{7,8}

Retinectomy and retinotomy were specifically designed for complex retinal detachments as supplementary measures to achieve retinal flattening.^{9,10} Retinectomies are conducted in cases where there is retinal shortening caused by retinal fibrosis and PVR.¹¹

Currently, the majority of surgeons prefer primary vitrectomy as the initial treatment option for advanced PVR, rather than scleral buckling as the principal procedure.^{12,13} Challenging cases characterized by impending surgical failures, such as complex tractional retinal detachments, severe PVR and post-traumatic retinal detachments are managed with retinectomy.¹²

The goal of this study was to evaluate the efficacy of retinectomy as a primary treatment for advanced PVR grade C with primary RRD. Additionally, the study aimed to investigate the potential effects of retinectomy on postoperative complications and changes in visual Acuity.

METHODS

Thirty eyes of thirty patients with PVR grade C (as defined by the Retina Society) were included in the research. Following approval from AL-Ferdous Private Eye Hospital, Baghdad, medical records spanning from July 2019 to June 2023 were evaluated. Two groups were identified (15 eyes in each group). One group consisted of patients who underwent Pars plana Vitrectomy (PPV) without retinectomy. Second group consisted of patients who underwent PPV plus retinectomy. Patients with age 20 years or more and who presented with primary RRD and PVR grade C were included. Patients with choroidal detachment, proliferative diabetic retinopathy, eyes with previous retinal surgery, PPV or scleral buckle, giant retinal tears, retinal dialysis, macular abnormalities, trauma, or retinal vascular disorders were excluded. All patients underwent complete ocular examination including Slit Lamp Biomicroscopy and indirect ophthalmoscopy. Data included age, gender, visual acuity, type and location of retinal break, extent of RRD and PVR. An experienced vitreoretinal surgeon performed all surgeries. PPV was performed (using Constellation Vision System, Alcon) after general or retrobulbar anesthesia. Perfluorocarbon was used to flatten the retina and retinectomy was done when

residual traction failed to release within the requisite range of 180° to 360°. A 360° endo laser photocoagulation was performed. 5000 Centistokes silicone oil was used as internal tamponade. Complications, anatomic success, and visual acuity were documented and evaluated. Anatomical efficacy was determined by the reattachment of the retina within six months following the procedure. The other group underwent all the procedures except primary retinectomy.

Statistical analysis was done using SPSS version 13. To assess the normality of data, the Kolmogorov-Smirnov test was used. The variables were described as median with interquartile range for quantitative variables (due to the nonparametric nature of the data) and frequencies and percentages for the qualitative variables in accordance with normal distribution assumptions, and mean ± SD for the mean. To examine the relationship between duration of retinectomy and postoperative visual acuity, a chi-square test was utilized. A p-value less than 0.05 was considered statistically significant.

RESULTS

Thirty eyes of 30 patients were included in current study with a mean age of 46.13±13.95years. The first group of 15 patients who underwent only PPV without retinectomy had 8 (53.3%) males and 7 (46.7%) females. The group that underwent PPV with retinectomy had 10 (66.7%) males and 5 (33.33%) females. In group 1 there were 5 phakic and 10 pseudophakic eyes while in group 2, there were 4 phakic and 11 pseudophakic eyes. Table 1 shows the status of pre-operative visual acuity. Postoperative

Table1: Pre-operative visual acuity in two groups.

Visual Acuity	PPV without Retinectomy	PPV with Retinectomy
Counting finger (CF)	3 (20.0%)	5 (33.3%)
Hand movement (HM)	9 (60.0%)	7 (46.6%)
Light perception (LP)	3 (20.0%)	3 (20.0%)

complete retinal re-attachment was achieved in 15 (100%) of 15 eyes as shown in Table 2. After six months, the first group had 5 eyes (33.3%) with improved visual acuity, stable visual acuity in 7 eyes (46.6%) and worsening of vision in 3 eyes (20%). For

Table2: Anatomical outcome in the two groups.

Anatomical	PPV without	PPV with
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Outcome	Retinectomy(n=15)	Retinectomy(n=15)
Successful rate	10 (66.7%)	15 (100%)
Failure rate	5 (33.3%)	0(0.0%)

the second group, 8 eyes (53.3%) showed improvement, stability in 4 eyes (26.7%), and worsening vision in 3 eyes (20%) with p-value > 0.05 signifying no relation between Visual acuity and retinectomy (Table 3).

Table3: Post-operative visual acuity in the two groups.

Status of Visual Acuity	PVR peeling without Retinectomy(n=15)	PVR Peeling with Retinectomy(n=15)
Improved	5 (33.3%)	8 (53.3%)
Stable	7 (46.6%)	4 (26.7%)
Worsened	3 (20.0%)	3 (20.0%)

P= 0.667

DISCUSSION

Proliferative vitreoretinopathy is a primary cause of surgical failures related to retinal detachment.¹⁴⁻¹⁶ Severe PVR requires additional maneuvers to prevent recurrent retinal detachment which may include relaxing retinotomies and retinectomies, use of 5-Fluorouracil and peeling of internal limiting membrane.¹⁷⁻¹⁹ In this particular study we used retinectomy in primary RRD with advanced PVR to prevent recurrent retinal detachment. The final success rate following retinectomy was one hundred percent, which is comparable to the success rates of 52 to 98.8 percent found in previous studies evaluating the efficacy of retinectomy.²⁰⁻²³ Differences in the extent of retinectomy, severity of the condition, inclusion and exclusion criteria and the surgical methods might have contributed to the variability in results.

Improvement in best-corrected visual acuity (BCVA) shown in this research mirrors the findings of Tranos et al, with BCVA increasing by 72%, staying the same in 22% of cases, and worsening in 6% of cases.¹¹ In contrast, Grigoropoulos et al, reported a less favorable outcome in their series, with stable vision in 73 eyes (24%), improvement in 138 eyes (45%), and deterioration in 89 (29%).²² Grigoropoulos included post-traumatic and tractional RRDs, endophthalmitis, acute retinal necrosis, and cases of retinal vasculitis in his research, along with RRD and PVR. Tseng et al, found that lens removal may not be necessary in instances with PVR, unlike the technique of Quiram et al., which typically entails removing the crystalline lens or intraocular lens during dissection of the

anterior base.^{10,21} Size of retinectomy was also considered as a modifier of visual function.²⁴ However, another researcher revealed a lack of statistically significant association between the extent of retinectomy and postoperative visual acuity.¹⁷ Furthermore, there was no statistically significant correlation observed in this study between magnitude of retinectomy and anatomical and functional outcomes. The eyes with the highest postoperative BCVA were those whose preoperative visual acuity was superior. Recurrent retinal detachment is caused by the regeneration of membranes along the posterior edge of the retinectomy and formation of new tears. According to Shalaby et al, 18.4% of recurrent RRD was attributed to increased growth of epiretinal membranes near the posterior edge of the retinotomy.¹⁷

The limitations of this study include the small sample size, short follow-up time, and the absence of a comparator group that underwent both vitrectomy and scleral buckling for advanced PVR therapy.

CONCLUSION

The most common reason for RRD surgery failure is proliferative vitreoretinopathy, and in certain cases in order to achieve retinal flatness, it may be necessary to do many surgeries several times. Through the process of relaxing the rigid retina, retinectomy has the potential to yield an enhanced outcomes in terms of ultimate visual acuity or ocular hypotony. This may result in a greater anatomical success rate in advanced cases of Proliferative vitreoretinopathy (PVR).

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Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board (EAC-1452).

REFERENCES

1. Tseng W, Cortez RT, Ramirez G, Stinnett S, Jaffe GJ. Prevalence and risk factors for proliferative vitreoretinopathy in eyes with rhegmatogenous retinal

- detachment but no previous vitreoretinal surgery. *Am J Ophthalmol.* 2004;**137**(6):1105-1115.
Doi: 10.1016/j.ajo.2004.02.008
2. **Mancino R, Aiello F, Ciuffoletti E, Di Carlo E, Cerulli A, Nucci C.** Inferior retinotomy and silicone oil tamponade for recurrent inferior retinal detachment and grade C PVR in eyes previously treated with pars plana vitrectomy or scleral buckle. *BMC Ophthalmol.* 2015;**15**:1-7. Doi: 10.1186/s12886-015-0167-z
 3. **Sabatino F, Banerjee P, K Muqit MM.** Clinical therapeutics for proliferative vitreoretinopathy in retinal detachment. *Surv Ophthalmol.* 2024:S0039-6257(24)00024-9.
Doi: 10.1016/j.survophthal.2024.03.007.
 4. **Foster RE, Meyers SM.** Recurrent retinal detachment more than 1 year after reattachment. *Ophthalmology.* 2002;**109**(10):1821-1827.
Doi: 10.1016/s0161-6420(02)01182-x
 5. **Tanner V, Minihan M, Williamson T.** Management of inferior retinal breaks during pars plana vitrectomy for retinal detachment. *Br J Ophthalmol.* 2001;**85**(4):480. Doi: 10.1136/bjo.85.4.480
 6. **Ge L, Su N, Fan W, Yuan S.** Risk Factors and Management of Intraocular Pressure Elevation After Vitrectomy Combined with Silicone Oil Tamponade. *Int J Gen Med.* 2024;**17**:447-456.
Doi: 10.2147/IJGM.S446617.
 7. **Machemer R.** Retinotomy. *Am J Ophthalmol.* 1981 Dec;**92**(6):768-774.
Doi: 10.1016/s0002-9394(14)75627-2.
 8. **Fallico M, Alosi P, Reibaldi M, Longo A, Bonfiglio V, Avitabile T, et al.** Scleral Buckling: A Review of Clinical Aspects and Current Concepts. *J Clin Med.* 2022;**11**(2):314. Doi: 10.3390/jcm11020314.
 9. **Mukhtar A, Ishaq M, Dildar MT.** Anatomical Success In Patients After Retinectomy For Complex Retinal Detachment: Retinectomy For Complex Retinal Detachment. *Pak Armed Forces Med J.* 2015;**65**(2):231-234.
 10. **Bleicher I, Miller JB.** Giant Retinal Tears: A Review With a Focus on Trauma. *Int Ophthalmol Clin.* 2024;**64**(2):107-123.
 11. **Tranos P, Vakalis A, Asteriadis S, Lokovitis E, Georgalas I, Stavrakas P.** Anatomic and functional outcomes of retinectomy for the management of complicated retinal detachment with proliferative vitreoretinopathy. *Ther Clin Risk Manag.* 2015;**11**:1515-1521. Doi: 10.2147/TCRM.S89467.
 12. **Adhi MI, Siyal N, Aziz S.** Anatomical and functional outcomes of retinectomies in retinal detachments complicated by proliferative vitreoretinopathy. *Saudi J Ophthalmol.* 2017;**31**(4):216-223.
Doi: 10.1016/j.sjopt.2017.09.005.
 13. **Haritoglou C, Wolf A.** Operative Möglichkeiten bei Ablatio retinae [Surgical management of retinal detachment]. *Klin Monbl Augenheilkd.* 2015;**232**(5):669-675. German.
Doi: 10.1055/s-0034-1383068.
 14. **Patel SN, Salabati M, Mahmoudzadeh R, Obeid A, Kuriyan AE, Yonekawa Y, et al.** Surgical Failures After Primary Scleral Buckling For Rhegmatogenous Retinal Detachment: Comparison of Eyes With and Without Proliferative Vitreoretinopathy. *Retina.* 2021;**41**(11):2288-2295.
Doi: 10.1097/IAE.0000000000003214.
 15. **Kwon OW, Song JH, Roh MI.** Retinal Detachment and Proliferative Vitreoretinopathy. *Dev Ophthalmol.* 2016;**55**:154-162. Doi: 10.1159/000438972.
 16. **Ferro Desideri L, Artemiev D, Zandi S, Zinkernagel MS, Anguita R.** Proliferative vitreoretinopathy: an update on the current and emerging treatment options. *Graefes Arch Clin Exp Ophthalmol.* 2024;**262**(3):679-687. Doi: 10.1007/s00417-023-06264-1.
 17. **Shalaby KA.** Relaxing retinotomies and retinectomies in the management of retinal detachment with severe proliferative vitreoretinopathy (PVR). *Clin Ophthalmol.* 2010;**4**:1107-1114. Doi: 10.2147/OPHTH.S4934.
 18. **Idrees S, Sridhar J, Kuriyan AE.** Proliferative Vitreoretinopathy: A Review. *Int Ophthalmol Clin.* 2019 Winter;**59**(1):221-240.
Doi: 10.1097/IIO.0000000000000258.
 19. **Ganekal S, Dorairaj S.** Effect of intraoperative 5-fluorouracil and low molecular weight heparin on the outcome of high-risk proliferative vitreoretinopathy. *Saudi J Ophthalmol.* 2014;**28**(4):257-261.
Doi: 10.1016/j.sjopt.2014.03.005.
 20. **Tseng JJ, Barile GR, Schiff WM, Akar Y, Vidne-Hay O, Chang S.** Influence of relaxing retinotomy on surgical outcomes in proliferative vitreoretinopathy. *Am J Ophthalmol.* 2005;**140**(4):628-636.
Doi: 10.1016/j.ajo.2005.04.021.
 21. **Quiram PA, Gonzales CR, Hu W, Gupta A, Yoshizumi MO, Kreiger AE, et al.** Outcomes of vitrectomy with inferior retinectomy in patients with recurrent rhegmatogenous retinal detachments and proliferative vitreoretinopathy. *Ophthalmology.* 2006;**113**(11):2041-2047.
Doi: 10.1016/j.ophtha.2006.05.039.
 22. **Grigoropoulos VG, Benson S, Bunce C, Charteris DG.** Functional outcome and prognostic factors in 304 eyes managed by retinectomy. *Graefes Arch Clin Exp Ophthalmol.* 2007;**245**(5):641-649.
Doi: 10.1007/s00417-006-0479-z.
 23. **Banaee T, Hosseini SM, Eslampoor A, Abrishami M, Moosavi M.** Peripheral 360 degrees retinectomy in complex retinal detachment. *Retina.* 2009;**29**(6):811-818. Doi: 10.1097/IAE.0b013e31819bab1d.
 24. **Han DP, Lewis MT, Kuhn EM, Abrams GW, Mieler WF, Williams GA, et al.** Relaxing retinotomies and retinectomies. Surgical results and predictors of visual outcome. *Arch Ophthalmol.* 1990;**108**(5):694-697.

Doi: 10.1001/archopht.1990.01070070080039.

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