Pars Plana Vitrectomy in Rhegmatogenous Retinal Detachment - A Survey of 230 Eyes

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Abstract

Purpose: To evaluate the efficacy of pars plana vitrectomy (PPV) in treating patients with rhegmatogenous retinal detachment (RRD)

Methods: In a retrospective study, we reviewed hospital records of patients with RRD operated by PPV at Farabi Eye Hospital between 2002 and 2004. The indications for PPV were proliferative vitreoretinopathy (PVR) grade B or C, holes posterior to the equator and holes greater than 90 degrees.

Results: Two hundred and thirty patients were included in this study. The mean visual acuity improved from 2.6±0.61 logMAR to 2.1±0.77 logMAR after surgery (P=0.0001). The failure and redetachment rates after the first operation were 14.8% and 23.5%, respectively. In 202 of 230 eyes (87.8%), the retina was ultimately reattached with subsequent operations. The mean follow-up period was 9±7.2 (range: 3–48) months.

Conclusion: Our outcomes are comparable with those of the previous studies and show that PPV is an effective procedure for most of the RRDs complicated by PVR.

Keywords: rhegmatogenous retinal detachment, pars plana vitrectomy, proliferative vitreoretinopathy


Introduction

Rhegmatogenous retinal detachment (RRD) can be treated with different surgical procedures. 1,2 Scleral buckling is considered as an appropriate treatment for many uncomplicated cases. However, in complicated cases of RRD like those with proliferative vitreoretinopathy (PVR), breaks at the posterior pole, breaks with vitreous hemorrhage, and giant retinal tears, pars plana vitrectomy (PPV) with endotamponade is indicated. 2-4 In the present study, we evaluated the results of PPV in a group of complicated RRD patients in the retina service of the department of ophthalmology of Tehran university of medical sciences.
Methods
This historical cohort study reviewed the charts of 230 consecutive patients undergoing PPV for RRD. All surgeries were performed between January 2002 and December 2004 at Farabi Eye Hospital, Tehran, Iran. All patients were followed for at least 3 months after surgery. Patients with penetrating trauma or combined rhegmatogenous and tractional retinal detachments were excluded from the study.

A standard three-port method was used for PVR. The vitrectomy techniques included deep vitrectomy, releasing vitreous traction around the breaks, and an attempt was made to remove the peripheral vitreous as much as possible. Fluid–air exchange was performed following perfluorocarbon liquid injection and subretinal fluid was drained through the original tears. Chorioretinal adhesions were created by endolaser photocoagulation around the breaks.

Silicone oil or sulfur hexafluoride (SF6) was used as internal tamponade, and the patients were instructed to maintain a prone position for 1 week following surgery in SF6 group.

The preoperative variables included age, sex, best-corrected visual acuity (BCVA), the presence of macular detachment, retinal breaks (number, location), lens status (phakic, aphakic, and pseudophakic) and grading of PVR. Intraoperative options were the placement of encircling band and using SF6 or silicone oil as postoperative tamponade. Postoperative variables were the initial and final anatomical success, final BCVA after follow-up period, complications and subsequent surgical interventions for retinal redetachments.

Baseline data and outcomes of the surgeries are summarized in Table 1.

Results
There were 139 (60.4%) male and 91 (39.6%) female patients, aged 7 to 89 years (the mean age of 52.2±19.02 years). The mean duration of follow-up was 9.03±7.2 months (range: 3–48 months). Forty-three eyes (18.7%) were aphakic, 64 (27.8%) pseudophakic and 123 (53.5%) phakic. Fifty-three of 230 eyes (23%) had high myopia (more than -8 diopters).

Macula was detached in 220 of 230 eyes (95.7%). Thirty-seven patients (16%) had grade B, 122 (53%) grade CP and 71 (31%) grade CA of PVR.

The failure (detachment within 1 month after the first operation) and redetachment (detachment after 1 month of the first operation) occurred in 34 of 230 (14.8%) and 54 of 230 (23.5%), respectively.

Final retinal reattachment after second or third vitrectomy was achieved in 202 of 230 eyes (87.8%).

Final reattachment occurred in 94.6%, 87.7% and 84.5% of patients with PVR grade B, CP, and CA respectively. The difference was not statistically significant (P=0.7).

Mean BCVA was 2.6±0.61 logMAR preoperative and 2.1±0.77 logMAR postoperative. The difference (0.47±0.82) was statistically significant (P=0.0001).

One hundred and twenty-four of 230 eyes (53.9%) had no encircling band and no buckle, 48 (20.9%) had only encircling band, 25 (10.9%) had encircling band and buckle and 32 (13.9%) had segmental buckle. There was no significant difference with respect to failure rate between these groups.

Silicone oil tamponade was used in 164 eyes (71.3%) and SF6 tamponade in 66 eyes (28.7%).

Failure rate in SF6 group was 22.7% and in silicone oil group was 11.6%. The difference was statistically significant (P=0.04).

Postoperative complications were PVR (24.3%), Ocular hypertension (27.8%), choroidal hemorrhage (2.6%), vitreous hemorrhage (3.9%), and postoperative cataract progression (51.4%).
**Table 1. Baseline data and outcomes of the surgery**

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/Female</td>
<td>139/91</td>
<td>60.4/39.6</td>
</tr>
<tr>
<td>Aphakia</td>
<td>43</td>
<td>18.7</td>
</tr>
<tr>
<td>Pseudophakia</td>
<td>64</td>
<td>27.8</td>
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<tr>
<td>Phakic state</td>
<td>123</td>
<td>53.5</td>
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<tr>
<td>PVR grade B</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td>PVR grade CP</td>
<td>122</td>
<td>53</td>
</tr>
<tr>
<td>PVR grade CA</td>
<td>71</td>
<td>31</td>
</tr>
<tr>
<td>SF6 tamponade</td>
<td>66</td>
<td>28.7</td>
</tr>
<tr>
<td>Silicone oil injection</td>
<td>164</td>
<td>71.3</td>
</tr>
<tr>
<td>Failure</td>
<td>34</td>
<td>14.8</td>
</tr>
<tr>
<td>Redetachment</td>
<td>54</td>
<td>23.5</td>
</tr>
<tr>
<td>Final attachment</td>
<td>202</td>
<td>87.8</td>
</tr>
</tbody>
</table>

* PVR: proliferative vitreoretinopathy, CP: grade C posterior, CA: grade C anterior, SF6: Sulfur Hexafluoride

**Discussion**

In this retrospective study, single procedure success rate in reattachment was approximately 62%. Following the second and third operations, our final reattachment rate was approximately 88%. Schmidt JC et al\(^5\) reported complete reattachment of the retina by one operation in 71.2% and by a second intervention in 95.2%. Tanner et al\(^8\) reported an overall 89% success rate of reattachment with one procedure. One possible explanation for the lower success rate in our study could attribute to the relatively lower quality of instruments. Another explanation is the relatively small sample size. In our study, final reattachment occurred slightly more frequent in PVR grade B relative to PVR grade C, but this was not statistically significant (P=0.7).

In our study failure rate after SF6 tamponade was more than silicone oil tamponade (22.7% vs. 11.6%) (P=0.04) which is similar to the previous studies.\(^6\)

In our study, in 147 of 230 eyes, breaks were localized. Fifty-five percent (81/147) of breaks were located at inferior quadrants and 44.9% (66/147) of breaks were located at superior quadrants. There was no statistically significant difference between failure and redetachment rates with respect to break locations (P=0.46). This finding is not similar to the previous studies, mentioned that eyes with breaks located at the inferior quadrants have a worse prognosis than the eyes with breaks at the superior quadrants.\(^10,11\) The possible explanation for this discrepancy may be the small number of patients which their breaks carefully localized.

The most serious complication following RD surgery is PVR, which has been reported in 8-20% of vitrectomy cases.\(^12,13\) In the present study PVR developed in 24.3% of the patients (56/230).

Afrashi et al\(^4\) found cataract progression in 22.7% of the vitrectomized phakic eyes. El Asrar\(^14\) found progressive posterior subcapsular and nuclear sclerosis cataract in 22% of the phakic eyes. The incidence of nuclear cataract following vitrectomy in patients older than 55 years has been reported to be very high.\(^15\) This is the major drawback of vitrectomy; for this reason simultaneous cataract surgery can be performed in older patients. Furthermore combined surgery in selected cases also facilitates intraoperative viewing and safe manipulation at the vitreous base, and achieves not only a high reattachment rate but also early visual recovery by virtue of simultaneous IOL implantation.\(^4\) In our study lens extraction was performed in 53 of 123 phakic eyes and cataract progression occurred in 36 of the remaining 70 phakic eyes (51.4%).

**Conclusion**

In conclusion, similar to the previous studies, our study showed that PPV is remarkably effective in anatomical terms and considerably improves visual acuity in patients with RRD.

**References**


