ANATOMICAL AND FUNCTIONAL OUTCOME FOLLOWING PRIMARY RETINAL RE-ATTACHMENT SURGERY IN PHAKIC AND PSEUDOPHAKIC RHEGMATOGENESIS RETINAL DETACHMENT

Asfandyar Asghar, Aziz ur Rehman, Waseem H Jafri, Yawar Zaman, Nasir Bhatti, Mazhar ul Hassan
Isra Postgraduate Institute of Ophthalmology, Al-Ibrahim Eye Hospital, Malir, Karachi

Background: Rhegmatogenous Retinal detachment (RRD) is relatively unusual in general population; annual incidence is 1:10,000. However, variety of ocular conditions like high myopia, pseudophakia, aphakia, blunt and penetrating trauma increase chances of RRD. Incidence of pseudophakic RRD ranges from 0.4–1.3%. The features of RRD in pseudophakic eyes have been different from those in phakic ones. In pseudophakic eyes, the preoperative evaluation and surgical treatment is rendered more difficult by restricted view of the peripheral fundus and for this reason, the anatomical outcome of reattachment surgery in pseudophakic eyes is deemed to be poorer than in phakic ones. Also RRD in pseudophakic eyes is more extensive, macula has been observed to be detached more frequently, resulting in poor visual rehabilitation after reattachment surgery. The anatomical and functional outcome of RRD surgeries in developed world is well known, but less is known in developing countries.

Our study was aimed to compare the anatomical and functional outcome of primary reattachment surgery in phakic and pseudophakic RRD at a tertiary eye care facility in Pakistan.

MATERIAL AND METHODS
This case series comparative study was conducted at retina clinic of Al-Ibrahim Eye Hospital, Karachi, from July 2008 to June 2009. A total of 71 eyes of 69 patients who underwent RRD surgery, either in phakic (Group-I) or pseudophakic (Group-II) were included. Inclusion criteria were rhegmatogenous retinal detachment (RRD) with proliferative vitreoretinopathy (PVR) up to grade C-3. Eyes with RRD with PVR C-4 and above, corneal opacity and previous posterior segment surgery were excluded. Pars plana vitrectomy (PPV) or scleral buckling procedure (SBP) was performed as a primary re-attachment surgery. Patients were followed for at least 6 months. Anatomical (retinal reattachment) and functional outcome (best corrected visual acuity) was noted at each follow up.

Results: Anatomical outcome (retinal reattachment) was similar in Group-I (93.02%) and Group-II (92.86%) eyes ($p=0.88$). Best corrected visual acuity (functional outcome) of 6/6 – 6/18 was achieved in 46.5% in Group-I and 10.7% in Group-II. Raised intraocular pressure (IOP) was observed as most common complication.

Conclusion: Primary retinal re-attachment surgery either in phakic (group-I) or pseudophakic (group-II) eyes have similar anatomical outcome but functional outcome depends upon the status of macula at the time of surgery and level of proliferative vitreoretinopathy (PVR).

Keywords: Pars plana vitrectomy, Scleral buckling procedure, proliferative vitreoretinopathy

INTRODUCTION
Rhegmatogenous Retinal Detachment (RRD) is relatively unusual in general population; annual incidence is 1:10,000. However, variety of ocular conditions like high myopia, pseudophakia, aphakia, blunt and penetrating trauma increase chances of RRD. Incidence of pseudophakic RRD ranges from 0.4–1.3%. The features of RRD in pseudophakic eyes have been different from those in phakic ones. In pseudophakic eyes, the preoperative evaluation and surgical treatment is rendered more difficult by restricted view of the peripheral fundus and for this reason, the anatomical outcome of reattachment surgery in pseudophakic eyes is deemed to be poorer than in phakic ones. Also RRD in pseudophakic eyes is more extensive, macula has been observed to be detached more frequently, resulting in poor visual rehabilitation after reattachment surgery. The anatomical and functional outcome of RRD surgeries in developed world is well known, but less is known in developing countries.
aspirated with flute needle or with high extrusion needle. Two rows of double frequency Nd: Yag (Neodymium: yttrium aluminium garnet) 532 nm laser was applied around the break and at the retinotomy site after air-fluid exchange. Air was exchanged with silicone oil 5000 cs (centistokes). Ports were closed with 6/0 polyglactin (Vicryl) suture. 

In SBP peritomy was done in the region of break. Basic principle was followed, i.e., to seal the break and to decrease the vitreo-retinal traction with the help of either radial or segmental buckle. Then break was treated with cryotherapy and SRF was drained where indicated.

All patients undergoing retinal reattachment surgery were followed at 1 week, 2 weeks, 1 month, 3 months, and 6 months postoperatively. At each follow-up BCVA and status of the retina (attached or detached) were noted. Complication like raised IOP, macular pucker and cataract development were also noted. Success of the treatment was defined as complete retinal reattachment for at least 6 months after the primary RRD surgery. If more than one surgical intervention was performed on the posterior segment to stabilise or reattach the retina, the patient was excluded from the study. All the data were recorded in pre-designed proforma.

Data was analysed using SPSS-16. Frequencies and percentages were calculated for Gender, PVR grading, visual outcomes and complications. Mean±SD was computed for age and duration of visual loss. The cumulative probability of anatomical success after primary surgery during the 6 months follow-up period was calculated for each group according to the Kaplan-Meier curve.

RESULTS
A total 71 eyes of 69 patients with either phakic or pseudophakic RD were included in this study. Mean age of group-I (phakic) was 35.02±15.3 years and group-II (pseudophakic) was 50.4±10.4 years. In both groups there was male preponderance, i.e., 30 (69.8%) in group-I and 26 (92.9%) in group-II. Duration of visual loss was observed to be more in group-II (30.3±18.9 days) as compared to group-I (21.3±20.5 days). Retinal detachment characteristics like number of involved quadrants, PVR and detachment of macula is shown in Table-1.

Three ports pars plana vitrectomy (PPV) was performed in 26 (60.4%) eyes in group-I and 24 (85.7%) eyes in group-II. Scleral buckling procedure (SBP) was performed in 17 (39.5%) eyes in group-I and 4 (14.2%) eyes in group-II.

Anatomical success rate after surgery was similar in both groups, 93.02% group-I and 92.86% group-II ($p=0.88$). The cumulative probability of retinal re-attachment survival during 6 months follow-up is shown in Figure-1. Final visual acuity comparison is shown in Figure-2.

Table-1: Retinal detachment characteristics in Phakic and Pseudophakic eyes

<table>
<thead>
<tr>
<th>Variables</th>
<th>Phakic (Group-I) (n=43)</th>
<th>Pseudophakic (Group-II) (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.02±15.3 yrs</td>
<td>50.4±10.4 yrs</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (69.8%)</td>
<td>26 (92.9%)</td>
</tr>
<tr>
<td>Female</td>
<td>13 (30.2%)</td>
<td>2 (7.1%)</td>
</tr>
<tr>
<td>Duration of visual loss</td>
<td>21.3±20.5 days</td>
<td>30.3±18.9 days</td>
</tr>
<tr>
<td>Detachment of Macula</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>PVR* Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>10 (23.3%)</td>
<td>2 (7.1%)</td>
</tr>
<tr>
<td>B</td>
<td>21 (48.8%)</td>
<td>9 (32.1%)</td>
</tr>
<tr>
<td>C</td>
<td>12 (27.1%)</td>
<td>17 (60.7%)</td>
</tr>
<tr>
<td>QUD**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3 (7%)</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>18 (41.9%)</td>
<td>14 (50%)</td>
</tr>
<tr>
<td>3</td>
<td>12 (27.9%)</td>
<td>7 (25%)</td>
</tr>
<tr>
<td>4</td>
<td>10 (23.3%)</td>
<td>7 (25%)</td>
</tr>
</tbody>
</table>

*Proliferative Vitreoretinopathy **Quadrant

Figure-1: Cumulative probability of anatomical success after primary retinal reattachment surgery

Figure-2: Final visual acuity among phakic and pseudophakic eyes

Regarding complication, raised IOP was observed as most common complication 14 (32.5%) and 17 (60.7%) in group-I and group-II respectively. Other complications are shown in Table-2.
DISCUSSION

Main aim of RD surgery is to remove vitreoretinal traction and to seal the break, the best surgery is the one which needs minimum manipulation and requires less energy to seal the break.

In group-I, PPV was performed in 26 (60.4%) eyes and SBP in 17 (39.5%) eyes. In group-II, PPV was performed in 24 (85.7%) eyes and SBP in 4 (14.2%) eyes. In majority of cases we have performed PPV because of simple reason that patients report to us very late leading to development of complicated RRD. Halberstadt⁶ pointed out that vitrectomy is the logical treatment for pseudophakic RRD. But still there is disagreement on the ideal intervention for pseudophakic RRD.⁹ ¹⁰ Ratio of PPV vs SBP in group-I was 60/40 and in group-II 85/15. Brazitikos¹¹ reported PPV has potential advantage over SBP surgery in the treatment of pseudophakic RRD. Heimann¹² reported the benefits of SBP in phakic eyes and recommended PPV in pseudophakic patients.

In our study mean age of phakic RRD (group-I) was 35.0± 15.3 and pseudophakic RRD (group-II) was 50.4±10.4. Al-Khairi¹³ and Pastor¹⁴ reported similar mean age for phakic and pseudophakic RRD respectively. This difference of mean age between the 2 groups in our study was because of obvious reason that most of the patients in group-II were old and had to go for cataract extraction.

Regarding gender distribution there was male preponderance in both groups. This may be due to the fact that, the health problems of female members of the family are usually overlooked in developing countries. Hence their referral to tertiary eye care facilities is poor. This finding was also observed by Al-Khairi¹³ and Rosman.¹⁵

Duration of visual loss in group-I was 21.37±20.5 and in group-II was 30.3±18.9. There was marked difference in the duration of visual loss in our study if we compare it with other studies as reported by Halberstadt¹⁶ and Acar.¹⁷

In our study 36 (83.7%) eyes had macular detachment in group-I and 27 (96.4%) eyes in group-II. Halberstadt¹⁶ reported 50.9% eyes in phakic group and 48.1% in pseudophakic group presented with macular detachment and Pastor¹⁸ reported 65.0% macular detachment in his case series. The reason for longer duration of visual loss and increase number of eyes with macular involvement in our study can be due to the fact that most people in our country belong to poor socioeconomic group and they ignore any abnormality in peripheral field unless central vision is affected by macular involvement.

Status of RRD in group-II was more severe in terms of PVR as compared to group-I in this study, i.e., 60.7% of eyes had PVR grade C-³ in group-II and 27.1% eyes in group-I. This may due to the reason that most of these patients were old age with possible financial constraints leading to late presentation, thus leads to severe PVR formation, this was also reported by Nagasaki¹⁹ and Hooymans.²⁰

In our study, the anatomical outcomes in group-I and group-II eyes showed no marked difference, i.e., group-I, 40 (93.02%) eyes and in group-II, 26 (92.86%) eyes. This is quite near to the figure reported by Jun¹⁹, i.e., 95% in pseudophakic eyes. Pastor¹⁴ reported global anatomical success rate 94.7%. Contradictory to previous studies the better anatomical outcome in our study in group-II was better. This can be because the availability of instruments and improved techniques.

Functional success, i.e., improvement in VA of 0.33–1.0 (6/6–6/18) was achieved in 46.5% group-I, and 0.33–1.0 (6/6–6/18) was achieved in 10.5% of eyes in group-II, after at least 6 months of follow-up. This functional outcome in our study can correlate with Isernhagen⁷ who also reported poorer functional outcomes in pseudophakic eyes. Halberstadt¹⁶ reported BCVA of 20/50 or better in 59.6% pseudophakic eyes and 61.7% phakic eyes at 6 months. Pastor¹⁴ reported that 42.7% eyes reached VA 20/40 or better at 3 months after surgery.

The most common complication in our series was raised IOP, i.e., in 32.5% eyes in group-I and in 60.7% eyes in group-II, which was controlled medically with anti-glaucoma treatment. Pournaras²¹ and Tognetto²² reported ocular hypertony in 21% and 30.7% eyes respectively. In our study, this high percentage of raised IOP was probably due to use of heavy silicone oil. Out of 43 eyes, 23.2% developed a significant cataract or underwent cataract surgery during this study. Kapetanios²³ and Le Mer²⁴ reported cataract formation in 80.0% and 87.0% of their cases. Re-detachment developed in 6.9% in group-I and 7.1% in group-II, due to PVR formation. Halberstadt¹⁶ reported re-detachment, 11.5% in phakic group, and 13.7% in pseudophakic group. In our study macular pucker developed in 6.9% eyes in group-I and 14.2% eyes in group-II. Halberstadt¹⁶ reported that 15.2% eyes in phakic group and 7.7% eyes in pseudophakic group developed vision threatening macular pucker. Martinez-Castillo²⁵ reported 5.0% cases developed macular pucker.

Table-2: Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Phakic (Group-I) (n=43)</th>
<th>Pseudophakic (Group-II) (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raised IOP</td>
<td>14 (32.5%)</td>
<td>17 (60.7%)</td>
</tr>
<tr>
<td>Cataract</td>
<td>10 (23.2%)</td>
<td>---</td>
</tr>
<tr>
<td>Re-detachment</td>
<td>3 (6.9%)</td>
<td>2 (7.1%)</td>
</tr>
<tr>
<td>Macular pucker</td>
<td>3 (6.9%)</td>
<td>4 (14.2%)</td>
</tr>
<tr>
<td>Vitreous haemorrhage</td>
<td>---</td>
<td>1 (3.5%)</td>
</tr>
<tr>
<td>Choroidal detachment</td>
<td>---</td>
<td>1 (3.5%)</td>
</tr>
</tbody>
</table>

We found certain limitations in our study. Sample size of our study was small; hence a study with much larger sample size is needed to confirm our results and the duration of follow-up should also be longer.

CONCLUSION
Primary retinal reattachment surgery either in phakic (group-I) or pseudophakic (group-II) eyes have got similar anatomical outcome but functional outcome depends upon status of macula at the time of surgery and level of proliferative vitreoretinopathy (PVR).

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REFERENCES

Address for Correspondence:
Dr. Asfandyar Asghar, Assistant Professor, Isra Postgraduate Institute of Ophthalmology, Al-Ibrahim Eye Hospital, Old Thana, Gaddap Town, Malir, Karachi-75050. Cell: +92-333-3363553
Email: docasfandyar@gmail.com