ORIGINAL ARTICLE

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. Objective of this study was to compare the anatomical and functional outcome of primary retinal re-attachment surgery in phakic and pseudophakic eyes. **Methods:** A case series comparative study was carried out at Al-Ibrahim Eye Hospital, Karachi from July 2008 to June 2009. A total of 71 eyes of 69 patients either phakic (group-I) or pseudophakic (group-II) rhegmatogenous retinal detachment (RRD) with proliferative vitreoretinopathy (PVR) up to grade C-3 were included in the study. 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.[1] 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%.[2,3] The features of RRD in pseudophakic eyes have been different from those in phakic ones.[4] In pseudophakic eyes, the preoperative evaluation and surgical treatment is rendered more difficult by restricted view of the peripheral fundus[5] and for this reason, the anatomical outcome of reattachment surgery in pseudophakic eyes is deemed to be poorer than in phakic ones[6]. 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.[7] 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) eyes were included. Inclusion criteria were rhegmatogenous retinal detachment (RRD) with proliferative vitreoretinopathy (PVR) up to grade C-3.[8] Eyes with RRD with PVR C-4 and above, corneal opacity and previous posterior segment surgery were excluded.

Preoperative evaluation included detailed history, best corrected visual acuity (BCVA) by using Snellen acuity chart, slit lamp biomicroscopy and dilated fundus examination was carried out with 90D lens. Intra ocular pressure (IOP) was measured with Goldmann applanation tonometer. Peripheral retinal evaluation was performed with indirect ophthalmoscope and three mirror contact lens.

Four vitreo retinal surgeons performed the RRD surgery and all surgeons were allowed to choose their own procedure, i.e., either scleral buckling procedure (SBP) or pars plana vitrectomy (PPV). Patients were briefed in detail about the procedure and written consent was taken. Three ports pars plana vitrectomy (PPV) was performed using BIOM (Binocular indirect ophthalmomicroscope). In all eyes central and peripheral vitreous was removed, followed by removal of all vitreous over retinal tears. Endocautery was performed on the margin of break and drainage retinotomy was performed where indicated. Retina was flattened with air, subretinal fluid (SRF) was

aspirated with flute needle or with high extrusion needle. Two rows of double frequency Nd: Yag (Neodymium: yttrium aluminium garnet) 532 ηm 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 (21.37±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

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

*Proliferative Vitreoretinopathy **Quadrant

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

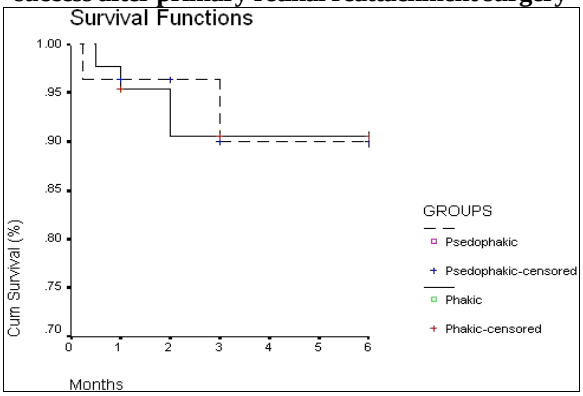
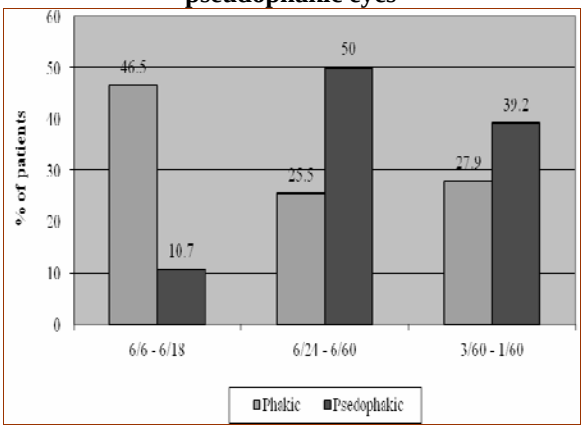


Figure-2: Final visual acuity among phakic and pseudophakic eyes



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.

Table-2: Complications

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

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. Halberstdt[4] 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. Brazitikos[11] reported PPV has potential advantage over SBP surgery in the treatment of pseudophakic RRD. Heimann[12] 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 35.02± 15.3 and pseudophakic RRD (group-II) was 50.4±10.4. Al-Khairi[13] and Pastor[14] 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-Khairi[13] 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 Halberstadt[16] and Acar.[17]

In our study 36 (83.7%) eyes had macular detachment in group-I and 27 (96.4%) eyes in group-II. Halberstdt[16] reported 50.9% eyes in phakic group and 48.1% in pseudophakic group presented with macular detachment and Pastor[14] 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[8] 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 Nagasaki[18] and Hooymans.[19]

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 Jun[20], i.e., 95% in pseudophakic eyes. Pastor[14] 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 Isernhagen[7] who also reported poorer functional outcomes in pseudophakic eyes. Halberstadt[16] reported BCVA of 20/50 or better in 59.6% pseudophakic eyes and 61.7% phakic eyes at 6 months. Pastor[14] 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. Pournaras[21] and Tognetto[22] 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. Kapetanios[23] and Le Mer[24] 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. Halberstadt[16] 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. Halberstadt[16] reported that 15.2% eyes in phakic group and 7.7% eyes in pseudophakic group developed vision threatening macular pucker. Martinez-Castillo[25] reported 5.0% cases developed macular pucker.

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

1. Haimann MH, Burton TC, Brown CK. Epidemiology of retinal detachment. Arch Ophthalmol 1982;100:289–92.
2. Javitt JC, Vitale S, Canner JK, Krakauer H, Mc Bean AM, Sommer A. National outcomes of cataract extraction. I. Retinal detachment after inpatient surgery. Ophthalmology 1991;98:895–902.
3. Kratz RP, Mazzocco TR, Davidson B, Colvard DM. A comparative analysis of anterior chamber, iris-supported, capsule-fixated, and posterior chamber intraocular lenses following cataract extraction by phacoemulsification. Ophthalmology 1981;88:56–8.
4. Halberstadt M, Brandenburg L, Sans N, Koerner-Stiefbold U, Koerner F, Garweg JG. Analysis of risk factors for the outcome of primary retinal reattachment surgery in phakic and pseudophakic eyes. Klin Monbl Augenheilkd 2003;220:116–21.
5. Bradford JD, Wilkinson CP, Fransen SR. Pseudophakic retinal detachments. The relationships between retinal tears and the time following cataract surgery at which they occur. Retina 1989;9:181–6.
6. Lois N, Wong D. Pseudophakic retinal detachment. Surv Ophthalmol 2003;48:467–87.
7. Isernhagen RD, Wilkinson CP. Visual acuity after the repair of pseudophakic retinal detachments involving the macula. Retina 1989;9:15–21.
8. The classification of retinal detachment with proliferative vitreoretinopathy. Ophthalmology 1983;90:121–5.
9. Campo RV, Sipperley JO, Sneed SR, Park DW, Dugel PU, Jacobsen J, *et al*. Pars plana vitrectomy without scleral buckle for pseudophakic retinal detachments. Ophthalmology 1999;106:1811–5.
10. Speicher MA, Fu AD, Martin JP, Fricken MA. Primary vitrectomy alone for repair of retinal detachments following cataract surgery. Retina 2000;20:459–64.
11. Brazitikos PD, Androudi S, Christen WG, Stangos NT. Primary pars plana vitrectomy versus scleral buckle surgery for the treatment of pseudophakic retinal detachment: a randomized clinical trial. Retina 2005;25:957–64.
12. Heimann H, Bartz-Schmidt KU, Bornfeld N, Weiss C, Hilgers RD, Foerster MH. Scleral Buckling versus Primary Vitrectomy in Rhegmatogenous Retinal Detachment Study Group. Scleral buckling versus primary vitrectomy in rhegmatogenous retinal detachment: a prospective randomized multicenter clinical study. Ophthalmology 2007;114:2142–54.
13. Al-Khairi AM, Al-Kahtani E, Kangave D, Abu El-Asrar AM. Prognostic factors associated with outcomes after giant retinal tear management using perfluorocarbon liquids. Eur J Ophthalmol 2008;18:270–7.
14. Pastor JC, Fernández I, Rodríguez de la Rúa E, Coco R, Sanabria-Ruiz Colmenares MR, Sánchez-Chicharro D, *et al*. Surgical outcomes for primary rhegmatogenous retinal detachments in phakic and pseudophakic patients: the Retina 1 Project–report 2. Br J Ophthalmol 2008;92:378–82.
15. Rosman M, Wong TY, Ong SG, Ang CL. Retinal detachment in Chinese, Malay and Indian residents in Singapore: a comparative study on risk factors, clinical presentation and surgical outcomes. Int Ophthalmol 2001;24:101–6.
16. Halberstadt M, Chatterjee-Sanz N, Brandenberg L, Koerner-Stiefbold U, Koerner F, Garweg JG. Primary retinal reattachment surgery: anatomical and functional outcome in phakic and pseudophakic eyes. Eye (Lond) 2005;19:891–8.
17. Acar N, Kapran Z, Altan T, Unver YB, Yurtsever S, Kucuksumer Y. Primary 25-gauge sutureless vitrectomy with oblique sclerotomies in pseudophakic retinal detachment. Retina 2008;28:1068–74.
18. Nagasaki H, Shinagawa K, Mochizuki M. Risk factors for proliferative vitreoretinopathy. Prog Retin Eye Res 1998;17:77–98.
19. Hooymans JM, De Lavalette VW, Oey AG. Formation of proliferative vitreo-retinopathy in primary rhegmatogenous retinal detachment. Doc Ophthalmol 2000;100:39–42.
20. Jun BY, Shin JP, Kim SY. Clinical characteristics and surgical outcomes of pseudophakic and aphakic retinal detachments. Korean J Ophthalmol 2004;18:58–64.
21. Pournaras CJ, Kapetanios AD. Primary vitrectomy for pseudophakic retinal detachment: a prospective non-randomized study. Eur J Ophthalmol 2003;13:298–306.
22. Tognetto D, Minutola D, Sanguinetti G, Ravalico G. Anatomical and functional outcomes after heavy silicone oil tamponade in vitreoretinal surgery for complicated retinal detachment: a pilot study. Ophthalmology 2005;112:1574.
23. Kapetanios AD, Donati G, Pournaras CJ. [Idiopathic giant retinal tears: treatment with vitrectomy and temporary silicone oil tamponade]. J Fr Ophtalmol 2000;23:1001–5.
24. Le Mer Y, Renard Y, Ameline B, Haut J. [Long-term results of successful surgical treatment of retinal detachment by vitrectomy and silicone oil injection. Effect of removal of the tamponade on further complications]. J Fr Ophtalmol 1992;15:331–6.
25. Martínez-Castillo V, Boixadera A, García-Arumí J. Pars plana vitrectomy alone with diffuse illumination and vitreous dissection to manage primary retinal detachment with unseen breaks. Arch Ophthalmol 2009;127:1297–304.

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