



Retinal Attachment Surgery in Pseudophakic Retinal Detachments

*A*uthor's Affiliation

Dr. M. Younis Tahir

Dr. Muhammad Arif

Dr. Qasim Lateef

Dr. Nadeem Ahmed

Dr. Tahseen Mahju

Dr. Raza Ali Shah

Dr. Najam Iqbal

Dr. Nasir Chaudhry

Prof. Asad Aslam khan

Correspondence:

Muhammad Younis Tahir
 Senior Registrar/VR Fellowship Trainee,
 COAVS
 KEMU/ Mayo Hospital Lahore

*A*bstract

Purpose: To compare two techniques of retinal attachment surgery in pseudophakic retinal detachments.

Methods: This non-randomized interventional study was conducted at vitreo-retina/eye unit III mayo hospital Lahore from January 2011 to August 2011. Forty eyes of different patients with Rhegmatogenous retinal detachment after pseudophakia who met inclusion criteria were included in study. They were equally divided in two groups. Group 1 was treated with scleral buckling alone while group 2 was treated with standard 20-gauge pars plana vitrectomy. Cases were followed for 6 months. On each visit complete ocular examination was carried out and results were compared at end of study.

Results: Dry anatomically attached retina after 6 months was endpoint of study. There was male preponderance in both groups. About 60% cases presented with macula-off. Myopia more than 6 diopters was found in 25% cases. YAG capsulotomy was noted in 35% cases while vitreous loss was noted in 62% cases. Causative breaks were not found in 5% to 22% cases while multiple retinal quadrants were detached in 17% to 47% cases. Group 1 showed 75% attached retina at 6 months and in second group 90% retina was attached. Raised IOP was frequent complication in both groups. Ten percent cases in group one showed raised IOP even after 6 months and were managed surgically. Overall visual results were not good due to multiple factors involved but improvement in BCVA was little bit better in PPV group.

Conclusion: Modern technique of pars plana vitrectomy is better than conventional scleral buckling for repair of RRD of pseudophakic eyes.



INTRODUCTION

Retinal detachment (RD) is rare but potentially blinding condition after cataract surgery. In old times of intracapsular cataract surgery RD was about 4% of operated cases which has dropped to 0.5% with extra capsular cataract surgery^{1,2} and even less with phacoemulsification. More than half of pseudophakic RD's occurs in first year after cataract surgery with additional 10% to 20% occurs in 2 years². Pseudophakic RD constitute approximately 30% of rhegmatogenous retinal detachments² so this is much more common than bacterial endophthalmitis and is a potentially blinding pathology after complicated cataract surgery⁴.

Vitreous loss during cataract surgery is much blamed as a causative factor in RD and especially if managed inappropriately leads to vitreous traction and ends up in opening of potentially weak areas of peripheral retina⁵.

Cataract surgery in young patients even if it is uneventful, increases the risk of rhegmatogenous retinal detachment⁶. In absence of vitreous loss, the forward movement of the vitreous pulls on the vitreous base and in doing so opens little tears which commonly lie just behind ora serrata. Frequently these are multiple in numbers, peripheral and take on the color of the choroid deep to them. These tears are so small that clue to their presence lies in the little tags of retina seen floating on the horizon. It has been observed that RD is more extensive⁷ with frequent macular involvement in pseudophakia^{8,9}.

Posterior capsular opacification (PCO) and big YAG capsulotomy especially in presence of liquefied vitreous increases the risk of RD. Usually these RD's occur in the first three months after YAG capsulotomy^{3,4}.

Myopic eyes in the presence of liquefied, partially detached vitreous and peripheral fundus degenerations add to the severity of condition¹⁰. Status of fellow eye and especially presence of retinal detachment in fellow eye after cataract surgery is another risk for pseudophakic retinal detachment. Surgery of RD in presence of pseudophakia is a difficult task. The macula is detached usually in 77% to 81% of these cases¹¹ with peripherally present tears. Retinal breaks cannot be found in 9 to 20% of pseudophakic RD's⁴. These breaks are difficult to locate and treat due to lens reflections, anterior and posterior lens opacification and multiple iris pathologies due to primary complicated cataract surgery, cortical remnants, shorter and smaller capsulorrhexis all add to this and may be risk factors for surgical failure¹.

Different techniques are used to repair RD in pseudophakic eyes. Conventionally used procedures are pneumatic retinopexy, sclera buckling and modern techniques of primary pars plana vitrectomy with or without

added scleral buckling¹² and endotamponade.

Results are not easy to express after pseudophakic RAS due to multiple factors determining outcome of primary cataract and secondary RD surgery¹³. With macula on RD's results are usually good but even with non-detached macula decreased final visual acuity may be due to cystoid macular edema, photoreceptor dysfunction or macular pucker etc¹¹.

The main objective of this study was to compare two techniques of retinal attachment surgery in pseudophakic RD's and their outcome at our center.

Material and methods:

This quasi-experimental (non-randomized interventional) study was carried out at Vitreo-retina unit of eye ward Mayo Hospital between Jan 2011 to August 2011. Forty pseudophakic eyes with RRD of forty different patients, who were between 40 to 70 years of age, were selected from outpatient department of Mayo Hospital. Without any sex discrimination, selected eyes were not having known ophthalmic pathology other than cataract before surgery.

All cases were having cataract surgery with posterior chamber intraocular lenses after phacoemulsification that later on developed rhegmatogenous retinal detachment (RRD) with PVR up to grade B were selected. Moreover cases where RRD developed after YAG capsulotomy were included in study.

Cases having aphakia, any corneal pathology, vitreous loss with wound incarceration, anterior chamber lens placement and other retinal pathology like advanced diabetic retinopathy, uveitis, PVR grade C, giant retinal tears, dialysis and trauma were excluded from study.

Selected cases were divided in two groups. Group no 1 treated with only scleral buckling procedure (SBP) or external tamponade as mode of treatment for RAS while in Group no 2 treated with 20 gauge primary pars plana vitrectomy with gas tamponade of 12-15% C3F8.

Patients were operated under general and local anesthesia.

Preoperative evaluation was complete ocular examination including visual acuity, intraocular pressure, slit lamp biomicroscopy, indirect ophthalmoscopy with scleral depression; Goldman triple mirror examination of peripheral retina was done. All record was maintained on prescribed proforma. Informed consent was taken from patients after approval of hospital ethical committee.

All cases were done by two main surgeons in same settings. In group 1, standard SBP was done with the help of radial or circumferential explants of silicone (tyre, band or



sponge). After creating required conjunctival peritomy silicone explant was attached to sclera with polyethylene (Ethibond) suture. Once tear was localized, cryoablation done and trans-scleral drainage of subretinal fluid carried out to approximate neurosensory retina to retinal pigment epithelium. Scleral band was approximated and conjunctiva was closed with Vicryl suture.

In group 2, cases were done with primary standard 20-gauge vitrectomy and internal tamponade of non-expanding concentration of gas (12-15% C3F8). All cases were done with BIOM (binocular indirect ophthalmoscopy).

After making three ports, vitreous from retro lenticular area was cleared. Diluted triamcinolone (20mg/ml) was used to visualize vitreous and PVD was done. After clearing all vitreous remnants from break area and periphery under low aspiration rates, endocautery done around breaks and retina was flattened with air-fluid exchange. Laser photocoagulation done around breaks and peripheral weak areas of retina, then air was exchanged with non expansile concentration of gas (12-15 % C3F8). Ports were closed with vicryl suture. Post-operative posture was advised according to location of break.

All patients were examined daily during hospital stay and after discharge re- evaluated on Week 1, Month1, Month3 and 6 Months postoperatively. On each visit complete examination was carried out including visual acuity, intraocular pressure, slit lamp examination with 90 D and indirect ophthalmoscopy with 20 D. Data were recorded on prescribed proforma. Success was defined as completely attached retina after six months of first surgery.

Results were summarized and prepared using SPSS versions 10.0 for statistical analysis

Results:

Results are difficult to interpret in case of pseudophakic retinal detachment as patients have had multiple surgeries and many factors are involved.

Total 40 eyes with pseudophakic RRD were included in study; twenty in each group. Group 1 treated with SB while group 2 treated with PPV. Regarding sex distribution there was male preponderance in both groups as 70% and 60% males respectively while 30% and 40 % females in both groups respectively.

All of our cases were having posterior chamber intraocular lens after phacoemulsification. In about 62% cases there was vitreous loss during the cataract surgery

while primary YAG capsulotomy was noted in 35% of cases.

We have found high myopia more than 6 diopters in about 25% of cases. We found macula off in about 60% of cases. No causative hole was found in 15% cases during out door evaluation and 10 cases during on table evaluation due to poor view of retina. Multiple holes were found in about 30% of cases. In about 47% of cases two quadrants of retina was detached.

Postoperatively raised intraocular pressure was most common complication in our study where 10 percent patients were having raised IOP at the end of study in group 1. Initially these patients were treated with anti-glaucoma medication while non-responding two cases were treated with loosening of scleral band and trabeculectomy. This may be due to over-tight scleral band or explant with forward movement of lens iris diaphragm. In group 2 twenty percent patients showed increased IOP in first week. All of them were managed medically and after two weeks when gas was partially absorbed, IOP was normalized.

Although visual acuity was not included in our study but we recorded best corrected visual acuity on each visit. Improvement of BCVA was little bit better in group 2, but overall visual results of pseudophakic retinal attachment surgery in our study were not encouraging.

Regarding retinal attachment, in both groups 100 percent cases were having attached retina on day 1 when discharged from hospital. In one month time two cases (10%) detached in group 1 while all cases remain attached in group 2. In three month time total 5 cases (25%) detached in group 1 and 1 case detached in group 2. At the end of surgery attached retina was 75 percent in group 1 and 90 percent in group 2. Most of detachments were due to missed breaks and PVR. All re-detached cases done with PPV endolaser and silicone oil and retina was flat postoperatively.

Table 1: Sex distribution

	Group 1	Group 2
Male	14 (70%)	12 (60%)
Female	6 (30%)	8 (40%)

Table 2: Characteristics of 40 pseudo phakic eyes with retinal detachment

Characteristics	No of eyes
Intraocular lens	40 (100%)
Anterior	0
Posterior	40
YAG capsulotomy	14 (35%)
Myopia more than 6 diopters	10 (25%)
Vitreous loss during cataract surgery(PC rent)	25 (62%)
Macula on	16 (40%)
Macula off	24 (60%)
Extent of RD	
One quadrant involved	8 (20%)
Two quadrants involved	19 (47%)
Three quadrants involved	7 (17%)
>3 quadrants involved	6 (15%)
Detection of holes	
1 hole	9 (22%)
2 holes	7 (17%)
3 holes	10 (25%)
More than 3 holes	8 (20%)
No hole found in out patient	6 (15%)
No hole intraoperatively	4 (10%)
Additional hole intraoperatively	12(30%)

Table 3: Complications

Complication	Group 1	Group 2	Comments
PVR more than Grade B	5(25%)	1(5%)	Missed breaks in group 1
Re -detachment or second surgery	5(25%)	2(10%)	Same
Macular pucker	4(20%)	2(10%)	
Sub retinal haemorrhage	1	None	

Table 4: Post-operative Intra ocular pressure (IOP) more than 22 mm Hg

	1 Week	Month 1	Month 3	Month 6
Group 1	10(50%)	6(30%)	3(15%)	2(10%)
Group 2	4(20%)	1(5%)	None	none

Table 5: Best corrected visual acuity after 6 months Group 1 Scleral buckling alone

BCVA	Postoperativen (%)	Postoperativen (%)
6/6 to 6/12	1(5%)	1(5%)
6/18 to 6/24	1(5%)	3(15%)
6/24 to 6/60	3(15%)	7(35%)
CF	4(20%)	6(30%)
HM	6(30%)	3(15%)
PL +	5(25%)	0

Group 2 Parsplana vitrectomy with GAS

BCVA	Preoperative n (%)	Postoperative n (%)
6/6 to 6/12	1(5%)	2(10%)
6/18 to 6/24	3(15%)	4(20%)
6/24 to 6/60	4(20%)	7(35%)
CF	2(10%)	5(25%)
HM	4(20%)	2(10%)
PL +	6(30%)	0

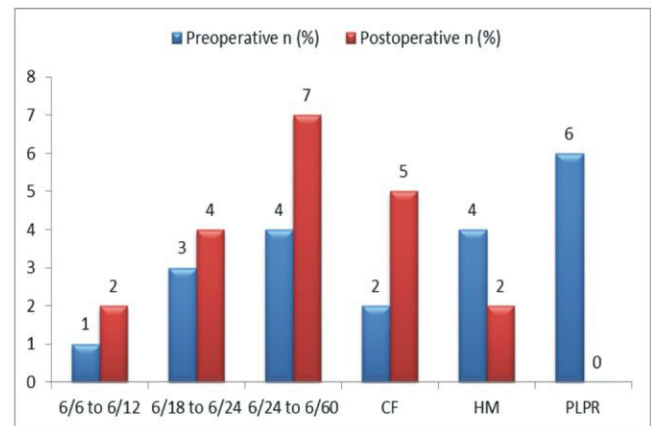
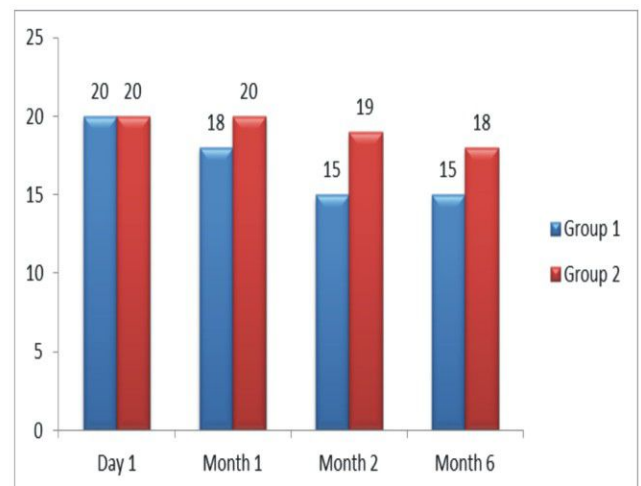


Table 6: Retinal attachment

	Day 1	Month 1	Month 2	Month 6
Group 1	20 (100%)	18 (90%)	15 (75%)	15 (75%)
Group 2	20 (100%)	20 (100%)	19 (95%)	18 (90%)



Discussion:

Pseudo-phakic retinal detachment is difficult to treat as there are multiple breaks anterior to equator with poor visibility¹⁴, syneritic and liquefied vitreous due to old age of these patients¹³.

In our study male were predominant 60% to 70% in



each group of pseudophakic RRD. This is in accordance with Walid et al and Alexandros^{15,16} who found 66% and 70% males in their study. This may be due to easy access to medical facilities by males and neglected female population in our villages and small cities.

Vitreous loss and YAG capsulotomy were found in 62% and 35% of our study. Some authors consider it controversial while others correlate it with RRD. Javitt and associates have found four-fold increase in risk of RRD after primary YAG capsulotomy or vitreous loss¹⁷.

Myopia with liquefied vitreous and peripheral retinal degenerations is risk for RRD after cataract surgery. We found 25% of our cases were myopic by more than 6 diopters. Similarly Wilkinson et al found 20% myopic patients in their series¹⁸. Clayman postulated increased risk of RRD after cataract surgery if axial length was more than 25mm¹⁹.

We also found 60% cases presented with macula-off RRD. They were involving multiple retinal quadrants in 17% to 47% of cases. Halberstadt²⁰ found 50.9% cases with macula off RRD. Paster found macula off in 65% of cases²¹. Walid¹⁵ found extensive RD involving multiple quadrants in 63% cases and Alexandros¹⁶ found multiple holes in 55% cases. We could not find holes in 5% to 22% of cases due to poor view. Walid et al found 12% cases with undiagnosed breaks. Raised IOP was commonly observed during our study; 10% to 35%. SB group 1 showed raised IOP for prolonged period of time while PPV gas group 2 showed raised IOP in first week. Raised IOP may be due to tight scleral band or forward movement of lens iris diaphragm. Most of cases were managed by medical treatment while two cases in group 1 were managed surgically. Different authors found raised IOP in their studies. Alexandros¹⁶ found 11.26% while Asfandyar¹ found it 32 to 60% and Pournaras²¹ found 21% cases with raised IOP in their study.

Improvement of visual acuity was very limited in our study. Only 10% to 20% cases were 6/6 to 6/24. Soomro²² had 34% cases with improved BCVA. Isernhagen²³ found poor visual outcome in pseudophakic RRD upto 7% only. Halber²⁴ found 59% cases with improved visual outcome. This may be due to multiple factors in anterior and posterior segment despite attached retina at 6 months. Multiple surgeries related anatomical and functional problems in cornea, lens, and macula effect the final visual outcome.

Group 1 showed 75% cases with attached retina at end of 6 months. All detached cases were re-done with PPV oil procedure and excluded from study. Re detachment in all cases is due to missed breaks per-operatively and PVR postoperatively. Wilkinson²⁵ had 87% success in SB group.

Soomro²² had 89% success. Campo documented 88% success in scleral buckling group²⁶. We think this is due to poor view of pseudophakic eyes and missed breaks.

In Group 2 success rate at end of 6 months was 90%. This was statistically significant ($p < 0.05$). All detached cases were done by PPV silicone oil and excluded from study. Alexandros found 97% success¹⁶ while Bartz found 94% success rate²⁷. Better results in PPV group were due to removal of media opacities, finding new breaks and focused treatment of cause.

Finally we have found certain limitations in correlation of results between different studies due to different sample size, duration of study and treatment modalities.

Conclusion:

Closure of break is utmost necessary in retinal attachment surgery. Pseudo phakic retinal detachment can be better dealt with intraocular approach as compared to Scleral buckling alone where we can find better view of break and remove the vitreous traction causing it, search for additional breaks in periphery under high magnification, apply focused laser photocoagulation around the breaks.

References:

1. Asghar A, Rehman A, Jafri WH Zaman Y, Bhatti N, Hassan M. Anatomical and functional outcome following primary retinal re-attachment surgery in phakic and pseudophakic rhegmatogenesis (sic) retinal detachment. *Ayub Med Coll* 2010;22(3):120-3
2. Javitt JC, Vitale S, Canner JK. National outcomes of cataract extraction. Retinal detachment after in patient surgery. *Ophthalmology*. 1991;98:895-905.
3. Powell SK, Olson RJ. Incidence of retinal detachment after cataract surgery and neodymium: YAG laser capsulotomy. *J Cataract surg*. 1995;21:132-5.
4. Williams GA, Aaberg TM. Technique of scleral buckling, In Ryan ST, editor. *Retina*. Vol.3. 3rd ed. St: Louis: Mosby. 1994: 2013-4.
5. Chawla HB. The pathology of retinal detachment: The essentials of management. 3rd edition. London: Butterworth Heinemann; 1998:14.
6. Russell M, Gaskin B, Russell D, Polkinghorne PJ. Pseudophakic retinal detachment after phacoemulsification cataract surgery: Ten-year retrospective review. *J Cataract Refract Surg*. 2006;32(3):442-5.
7. 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 Monatsbl Augenheilkd* 2003;220:116-121.



8. Tornquist R, Bodin L, Tornquist P. Retinal detachment: a study of a population-based patient material in Sweden 1971–1981. IV. Prediction of surgical outcome. *Acta Ophthalmol* 1988;66:637–642.
9. Tornquist R, Tornquist P. Retinal detachment: a study of a population-based patient material in Sweden 1971–1981. III. Surgical results. *Acta Ophthalmol* 1988; 66: 630–636.
10. Lois N, Wong D. Pseudophakic retinal detachment. *Surv Ophthalmol* 2003;48:467–487
11. Greven CM, Sanders RJ, Brown GC, Annesely WH, Sarin LK, Tasman W et al. pseudophakic retinal detachment: anatomical and visual results. *Ophthalmology* 1992;99:257-262
12. Wilkinson CP. Pseudophakic Retinal detachments. *Retina* 1985;5:1-4.
13. Ryan SJ. Pseudophakic retinal detachment: In *Retina* 4thed, Philadelphia. Mosby, 2006; 2066
14. Bradford JD, Wilkinson CP, Fransen SP. Pseudophakic retinal detachments. *Retina* 1989; 3: 181–186.
15. Walid M. Retinal detachment after phacoemulsification: A study of 114 cases. *Ophthalmol* 2002; 133:630–638.
16. Alexandros N. Pars-plana Vitrectomy Alone vs Vitrectomy with Scleral Buckling for Primary Rhegmatogenous Pseudophakic Retinal Detachment. *Ophthalmol* 2004;138:952–958.
17. Javitt JC, Vitale S, Canner JK, Krakauer H, McBean AM, Sommer A. National outcomes of cataract extraction I. Retinal detachment after inpatient surgery. *Ophthalmology* 1991; 98: 895–902.
18. Wilkinson CP. Pseudophakic retinal detachments. *Retina* 1985; 5:1-4.
19. Clayman HM, Jaffe NS, Light DS, Jaffe MS, Cassady JC. Intraocular lenses, axial length, and retinal detachment. *Am J Ophthalmol* 1981;92:778–80,
20. Halberstadt M, Chatterjee-Sanz N, Brandenburg 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.
21. Pournaras CJ, Kapetanios AD. Primary vitrectomy for pseudophakic retinal detachment: a prospective non-randomized study. *Eur J Ophthalmol* 2003; 13:298-306.
22. Soomro AQ. Outcome of rhegmetogenous retinal detachment surgery in uncomplicated pseudophakic eyes. *Pak J Ophthalmol*. 2012; 1:28.
23. Isernhagen RD, Wilkinson CP. Visual acuity after the repair of pseudophakic retinal detachments involving the macula. *Retina* 1989; 9:15-21.
24. 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 Monatsbl Augenheilkd* 2003; 220: 116–121.
25. Wilkinson CP, Anderson LS, Little JH: Retinal detachment following phacoemulsification. *Ophthalmology* 85:151–6, 1978.
26. 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; 106:1811–1816.
27. Bartz-Schmidt KU, Kirchof B, Heimann K. Primary vitrectomy for pseudophakic retinal detachment. *Br J Ophthalmol* 1996;80:346–9,
28. Ryan SJ. Pseudophakic retinal detachment: In *Retina* 4thed, Philadelphia. Mosby, 2006; 2067
29. The classification of retinal detachment with proliferative vitreoretinopathy. *Ophthalmology* 1983;90:121-5.
30. Williams MA, McGimpsey S, AbugreenS, Chan W, Sharkey JA, Best RM et al. The incidence and rate of rhegmatogenous retinal detachment seven years after cataract surgery in patients with high myopia. *Ulster Med J* 2009;78(2):99-104
31. Kratz RP, Mazzocco TR, Davidson BD. A comparative analysis of anterior chamber, iris supported, capsule-fixated and posterior chamber intraocular lenses following cataract extraction by phacoemulsification. *Ophthalmology* 1981;88:56–58.