MEDWIN PUBLISHERS
Committed to create value for Researchers

Open Access Journal of Ophthalmology

Non Drainage Scleral Buckling Surgery

Sanaullah J[1]*, Tariq S[2], Abid N[3], Nasir S[4] and Muhammad ZK[2]

[1]Associate Professor in Vitreoretinal Ophthalmology Khyber Girls Medical College, Pakistan

[2] Resident FCPS (Vitreoretinal ophthalmology), Pakistan

[3]Professor, Kabir Medical College, Naseer teaching Hospital, Peshawar, Pakistan

[4]Professor and Head of department of ophthalmology, Khyber Girls Medical College, Pakistan

***Corresponding author:** Sanaullah Jan, Associate Professor in Vitreoretinal Ophthalmology Khyber Girls Medical College, House 101, Street 10, Sector J-2, Phase 2, Hayatabad, Peshawar, Pakistan, Tel: 0092 3109777332; E-mail: sanaullah.jan@hotmail.com

Research Article

Volume 2 Issue 2

Received Date: August 31, 2017

Published Date: September 19, 2017

Abstract

Purpose: To determine safety and efficacy of non-drainage scleral buckling in selected cases of retinal detachment.

Study design: Descriptive interventional case series.

Place and duration of study: This study was performed at eye unit, Khyber Girls Medical College, Hayatabad medical complex, Peshawar from 1st Feb 2016 till 31st Jan 2017 (1 year).

Methods: Total of 23 eyes of 23 patients of both gender having RD, were selected. Cases of RD with single break (preferably) or dialysis (≤ 3 clock hours) with PVR ≤ Grade B. Patients were included irrespective of macula status. We excluded cases with giant retinal tear, choroidal detachment, pseudophakic or aphakic eyes with rented posterior capsule and vitreous face disruption. Eyes with media opacities dense enough to obstruct satisfactory examination of posterior segment and eyes which had previous surgical interventions to reattach retina were also excluded. Retinal detachments of more than six clock hours (extent) were excluded. Cases which had accidental suture needle penetration, eyes with inferior bulbous RD, eyes in which tears could not be localized pre operatively and patients above 50 years of age were also not included. All cases underwent SB (non-drainages) surgery as primary intervention by a single surgeon. Silicone buckles were used as per patient's requirement and retinal cryopexy was done in all cases. A/C paracentesis were performed in 22 (96%) cases. All patients were followed daily till resolution of SRF or for maximum of 7 days (postoperatively) & at final follow up (120th day) postoperatively.

Results: A total of 23 eyes of 23 patients were included. Mean age was 25.35 years (SD 9.49). In 11 cases (48%), macula was on at the time of presentation while in 12 cases (52%), macula was off. PVR was grade A in 20(87%) cases and in remainder it was grade B. Primary surgical success rate in our procedure was 21(91%) and final re-attachment rate after secondary interventions was 100%. Mean pre-operative BCVA was 0.97 logMAR which is equivalent to 6/60.

Postoperatively mean BCVA improved to a mean of 0.35 logMAR (6/12 Snellen's acuity). Repeat surgery was done in 2 (8.6%) cases.

Conclusion: Non-drainage SB surgery is effective and safe approach in treatment of selected cases of RD.

Keywords: Scleral Buckling; Non-Drainage Scleral Buckling; Sub-Retinal Fluid Drainage; Retinal Detachment; No Sub-Retinal Fluid Drainage

Abbreviations: RD: Retinal Detachment; SB: Sclera Buckling; SRF: Sub Retinal Fluid; PVR: Proliferative Vitreo-Retinopathy; IOP: Intra-Ocular Pressure; AC: Anterior Chamber; SD: Standard Deviation; BCVA: Best Corrected Visual Acuity; logMAR: Logarithm of Minimal Angle of Resolution; mg: Milligram; mm: Millimeter; PPV: Pars Plana Vitrectomy

Introduction

Even after introduction of modern microsurgical internal approach to treat Retinal Detachment (RD), Scleral Buckling (SB) still maintains its validity as treatment option for RD without significant internal traction [1]. Most of the complications associated with SB are related to buckle and Sub Retinal Fluid (SRF) drainage. It is reasonable compromise to accept buckle related complications as integral part of SB surgery however complications related to SRF drainage can be safely avoided without affecting surgical outcome in most of the cases selected for SB surgery.

Complications related to SRF drainage like choroidal bleed, sub retinal bleed, vitreous bleed, iatrogenic breaks, hypotony, hyphema, vitreous and retinal incarceration can have serious implications in relation to surgical outcome [2]. Further, SRF drainage converts SB from extra ocular to intra ocular procedure with inherited risk of endophthalmitis. Frequency of these complications can be reduced by careful selection of drainage site, placement of preplaced sutures, technique of sclera-choroidotomy, (use of cautery, point cautery, laser), avoiding undue pressure on the globe at the time of choroidotomy or by adopting other suggested techniques like needle drainage etc. However all SRF drainage related complications can be surely avoided by adopting "no drainage option".

Although initially SRF drainage was considered as an integral part of the SB surgery but sooner it was realized that successful outcome is possible without SRF drainage [3]. At present, there is no consensus and controversies exist regarding SRF drainage. Decision regarding SRF drainage is multi factorial and better to be individualized for every patient. Although factors like age of the patient, severity of proliferative vitreoretinopathy (PVR), chronicity of RD, viscosity of SRF, number, type and location of breaks all can influence the decision "to drain or not to drain" [4,5]. However careful case selection, careful selection of size, type & placement of buckle can all play the key role in achieving better surgical outcome in non drainage SB surgery. Breaks which can be treated by radial buckle are usually considered better option for non drainage SB surgery. Cases having RD due to dialysis are also good candidates and yield good surgical outcome after non-drainage SB surgery by using segmental buckles. Some surgeons advocates SRF drainage to reduce Intra-Ocular Pressure (IOP) after buckle placement while others advocate SRF drainage before buckle placement to have ease of indentation and to attain better buckle height.

However, the above mentioned advantages can be achieved by performing paracentesis which is associated with less serious complications compared to SRF drainage. The feeling of the satisfaction which surgeon feels by seeing retina flat on the table may cause temptation of the surgeon to perform SRF drainage. However such decisions may not be related to surgical outcome and patient's benefit. Therefore such temptations to drain SRF should be resisted, as most of the time successful surgery can be attained by adopting much safer option of non-drainage. In general, if the surgeon can appreciate intra-operatively after placement of buckle that the contours of retina follows the contours of the buckle, then it is most likely to have successful outcome with flat retina post operatively. SRF usually absorbs quickly but may be delayed. Surgeon patience is tested in such cases and ultimately "no intervention" is usually more fruitful then re-interventions. This descriptive (interventional) case series was designed to determine the surgical outcome in selected cases of scleral buckling (non-drainage) for treatment of RD.

Methods

Total of 23 eyes of 23 patients of both gender having RD, were selected to be included in our study as per surgeon decision after availing informed written consent. Study was carried out after approval from ethical committee of our department. All cases had single break (tear) or dialysis (≤ 3 clock hours). All patients had PVR ≤ Grade B. Patients were included irrespective of macula status. Cases with localized retinal elevation around break or dialysis were preferably included. We excluded cases with giant retinal tear, choroidal detachment, pseudophakic or aphakic eyes with rented posterior capsule and vitreous face disruption, eyes with media opacities dense enough to obstruct satisfactory examination of posterior segment and eyes which had previous surgical interventions to reattach retina. Retinal detachments of more than six clock hours (extent) were excluded. Cases which had accidental suture needle penetration, eyes with inferior bulbous RD, eyes in which tears could not be localized pre operatively and patients above 50 years of age were also excluded. All cases underwent SB (non-drainages) surgery as primary intervention by a single surgeon with more than 15 years of experience of SB surgery.

In all cases silicone plombs (Micro Vision, Inc. USA) of different sizes (7 mm, 5mm) were used radially or circumferentially as per surgeon's decision & patient's requirement using spatulated double needle 5/0 polyester (Ethibond Excel, Ethicon). Retinal cryopexy was done in all cases, A/C paracentesis were performed in 22 (96%) cases to achieve lower IOP, ease of indentation and better buckle height. Conjunctival suturing was done using absorbable, double needle 7/0 poly glycolic acid sutures (Polycryl, Aurolab, India). All patients had acetazolamide (250 mg) 4 times daily for 7 days or till resolution of SRF. All patients were followed daily for 7 days initially (postoperatively) or till resolution of SRF & then at 15th, 45th and then at final follow up (120th day) postoperatively. Re interventions were only done if SRF didn't resolve at 7th day (postoperatively).

Results

A total of 23 eyes of 23 patients were included in our study which were found to have retinal detachment due to dialysis or tear and they all underwent non-drainage scleral buckling. Among them 17 (74%) were male and 6 (26%) were female. In 12 (52%) cases right eye was involved and in 11 (48%) cases left eye was involved. Mean age of our subjects was 25.35 years (SD 9.5, range 14-46 years). Age distribution of our patients is shown in Table 1. The frequency of tear and dialysis in our study cases was 13 (56.5%) and 10 (43.4%) respectively. Distribution of breaks in temporal quadrants outnumbered those in nasal quadrants. Involvement of superotemporal and inferotemporal quadrant was 11 (48%) cases each and only in 1 (4%) case, break was found in inferonasal quadrant. Macula involvement by detachment was nearly equal to macula sparing detachment. In 11 cases (48%), macula was on at the time of presentation while in 12 cases (52%), macula was off. In 22 (95.6%) cases, 5 mm sized plomb was used, while 7mm plomb was placed in only one eye (4%).

These plombs were placed radially in 11 (48%) cases which were having detachments due to tears, whereas segmental plombs were placed in 12 (52%) cases for dialysis. PVR was grade A in 20 (87%) cases and in remainder it was grade B. Primary surgical success rate in our procedure was 21 (91%) and final re-attachment rate after secondary interventions was 100%. Mean pre-operative BCVA was 0.96 log MAR which is equivalent to 6/60 Snellen's vision. Postoperatively mean BCVA improved to a mean of 0.35 log MAR (6/12 Snellen's acuity). Visual acuity was better in the "macula on" cases preoperatively. All 11 (48%) patients in this group had pre-operative BCVA of ≥6/12. Postoperatively 6 patients (54.5%) among macula-on cases had BCVA of 6/6. In "macula off" cases, none of the patient had BCVA better than 2/60 preoperatively, but after successful surgery their vision improved. Six cases (50% of macula-off cases) had BCVA 6/18 or better and 6 (50%) achieved BCVA in range of 6/60 to less than 6/18. Table 2 show the details of Snellen's BCVA in our study. Mean IOP postoperatively in our study was 16.6 mm Hg, only 1 patient (4%) had IOP 26 mm of Hg on final follow up. SRF was not drained in any case primarily and no air, gas or fluid injection was given in primary setting. Repeat surgery was done in 2 (8.6%) cases. One of them required drainage of sub-retinal fluid with C3F8 gas injection and positioning while the second case needed pars plana vitrectomy (PPV) with silicone oil tamponade. Patients were followed till 120th day postoperatively, and retina was found attached in all the cases.

	Pre-Operative	Post-Operative	P-value
Macula-On			
Log MAR	0.16	0.1	0.351
Macula-Off			
Log MAR	1.7	0.58	0
Total log MAR	0.97	0.35	0

BCVA: Best Corrected Visual Acuity; n: Number; log MAR: Logarithm of Minimal Angle of Resolution
n=23.

Table 1: BCVA (Mean).

BCVA (Snellen's)	Pre-Operatively (n)	Post-Operatively (n)
≥6/12	11	14
≥6/60 <6/12	0	9
≥3/60 <6/60	0	0
<3/60	12	0

BCVA: Best Corrected Visual Acuity; n: number; >: more than or equal to; <: less than
(n = 23).

Table 2: BCVA.

Discussion

Scleral buckling surgeries for retinal detachment has been a successful treatment option and retained its validity in the field for nearly a century [1]. Vitrectomy has gained huge popularity over last few decades to the extent that most of the young vitreoretinal surgeons prefer more to be trained in vitrectomy and pars plana vitrectomy is performed in 70-80% of retinal detachment cases in UK [6]. But this increased popularity hasn't been translated in terms of superior results over external RD surgery in any large studies [1-7]. In our study, results with external approach without drainage were very encouraging as we achieved retinal attachment in 91 % of our cases at final follow up. We consider external approach to be superior option to treat RD without significant internal traction. Further SB without drainage of SRF surely eliminates many of the serious vision threatening complications. Complications related to SRF drainage like choroidal bleed, sub retinal bleed, vitreous bleed, iatrogenic breaks, endophthalmitis, hyphema, vitreous and retinal incarceration can compromise visual and surgical outcome.

To conclude, non-drainage SB surgery may be much superior and safer option for treating RD. The primary procedure success rate in our study was 91 % however after secondary intervention; anatomic success rate was 100%. This is comparable to study carried out by Wilkinson and Rice who reported 75 to 91% single operation success rate and 88-97% multiple procedures success rate [8]. Salicone, et al. demonstrated single operation success rate upto 81% in their study [9]. Ross and Kozy reported 96% success [10]. Scottish retinal detachment study published in 2011 reported primary success rate to be approximately 81% [11]. Rishi, et al. performed non-drainage surgery in 306 eyes of 298 patients and reported primary anatomical success of 91% [12]. Proliferative vitreoretinopathy is one of the factor which can modify our approach to treat RD. PVR develops in upto 10% of cases of rhegmatogenous detachment [13]. But this is data from developed countries where cases usually present earlier.

PVR grade is quite high at presentation in our practice as reported by an earlier study (7% had Grade A PVR, 57% had Grade B PVR and 36% had Grade C PVR). Grade A PVR cases are therefore less commonly encountered and may be the main reason for relatively small sample size of our study [14]. In our study, cases of less PVR were selected preferably. In our study, Grade A PVR was encountered in 87% of cases, while remaining cases had grade B PVR. Mean age group of our study population was 25.3 years ± 9.5. Our study group was relatively young as compared to the study by Ross and Kozy in which median age of patient was approaching 60years. Age has strong correlation with functioning of Retinal Pigment Epithelium (RPE) and subsequent absorption of SRF [10].

In young patients, SRF absorbs rapidly even if not drained. Old age is an independent risk factor for anatomical failure in external RD surgery [15,16]. This might be one of the reasons for higher anatomic success in our study as we selected patients of 50 years or less. Scleral buckling results in terms of anatomic success are more or less the same when SRF is drained or not [3,4-17]. However, the surgical complications are more in the SRF drainage group like sub-retinal hemorrhage, choroidal detachment, infections, vitreous and retinal incarcerations [2]. These complications were not encountered in our study due to "non-drainage" protocol. SRF was not drained in our cases in primary setting, however in one case, where there was persistent SRF, drainage was performed with no added complications. In 52% cases solitary tear was found except in one case (4%) in which 2 small tears were present adjacent to each other (adequately treated by single radial buckle). In 44% cases, dialysis was the cause for RD.

Dialysis was mainly in the temporal quadrants (90%). In 48% cases break were present in superotemporal quadrant and inferotemporal quadrant each. In 4% cases break was observed in inferonasal quadrant. Superotemporal quadrant is the most common location for break in rhegmatogeous retinal detachment [18]. In our study, 47.8% cases macula was attached pre-operatively, while in the remainder 52.2% macula was off. Macula status is directly related to the final visual outcome [19]. Tani, et al. reported that post-operative visual acuity better than 20/50 was achieved in "macula on" cases as compared to 20-37% in "macula off" cases [20]. Overall mean pre-operative BCVA in our cases was 0.96 log MAR while overall mean post-operative BCVA was 0.35 log MAR. In the macula on cases, mean pre-

operative BCVA was 0.16 log MAR which improved to 0.1 log MAR. Although anatomical results were excellent in our cases, however functional outcome was better in the macula-on cases than in macula-off cases.

In our study, 54.5% of the cases with pre-operative "macula on" had BCVA of 6/6 post-operatively while the remaining had vision better than 6/12. In the "macula off" group, mean pre-op vision was 1.7 log MAR which improved to 0.58 log MAR. BCVA of 6/12 or better was observed post-operatively in 25% of "macula off" cases. Silicone, et al. reported BCVA better than 6/12 in 78% cases when macula was not involved and 28% when macula was involved [9]. Loss of central vision in "macula off" cases is due to photoreceptor dysfunction [21]. In these cases, visual recovery is slow as suggested by Liem, et al. and longer follow up may be required over years to document final acuity [22]. Follow up of our cases was 120th post –operative day, which may be regarded as a limiting factor in terms of visual restoration in "macula off" cases.

Primary anatomical failure was seen in two cases and both of them were "macula off" cases. So the anatomic success in "macula on" cases was 100% as compared to 83% in "macula off" cases. Success rate in male was 88% and in female 100%. Campo, et al yielded reattachment rate of 86% with primary vitrectomy in "macula off" retinal detachment cases [23]. Major complications with this approach were clinical or angiographic evidence of cystoid macular oedema (17%) and macular pucker (16%) [23]. Our results are also better to those achieved by Falkner-Radler and Snedd who reported a success rate of 85% [24]. Thelen, et al. reported (4325 cases), primary anatomical success of 80.4% in "macula off" cases and 88.2% in "macula on" cases [25]. Secondary intervention was done in 2 (8.6%) cases. In one case, SRF was drained and C3F8 gas was injected. In the other case, pars plana vitrectomy was performed with endolaser and silicone oil. Retina was attached in these cases on final follow up.

Silicone sponges have proven its safety over the years and whether placed radially or circumferentially, yield better results [26,27]. In our study, mostly 5mm plomb was used (96%). Hilton, et al reported that higher complication rate in drainage group, however no difference in the final visual acuity in both the drainage and non-drainage groups was observed [3]. Secondary glaucoma, cataract, intraocular hemorrhage, intraocular infection, incarceration of retina or vitreous or iatrogenic tears didn't occur in our cases. Hyphema was noted in 1 case (4%) which resolved spontaneously on 5th post-operative day while RPE atrophic spots were seen in 21.7% cases at final follow up. The purpose of our study was to determine safety and efficacy of SB (no SRF drainage) in treatment of selected cases of RD. By adopting non-drainage scleral buckling, complications related to SRF drainage can be safely avoided without any compromise of surgical reattachment (success) rate in selected cases. However, our study had relatively small sample size due to strict selection and inclusion criteria. At the same time, our follow up was only for 120 days. Therefore we recommend studies with large sample size and longer follow ups to further strengthen the evidence related to safety and efficacy of non-drainage SB surgery in treating RD.

Conclusion

Non-drainage SB surgery is effective and safe approach in treatment of selected cases of RD.

References

1. Adelman RA, Parnes AJ, Ducournau D (2013) Strategy for the management of uncomplicated retinal detachments: the European vitreo-retinal society retinal detachment study report 1. Ophthalmology 120(9): 1804-1808.

2. Azad R, Kumar A, Sharma YR, Rajpal (2004) Modified needle drainage. A safe and efficient technique of subretinal fluid drainage in scleral buckling procedure. Indian J Ophthalmol 52(3): 211-214.

3. Hilton GF, Grizzard WS, Avins LR, Heilbron DC (1981) The drainage of subretinal fluid: a randomized controlled clinical trial. Retina 1(4): 271-280.

4. O'Connor PR (1973) Absorption of subretinal fluid after external scleral buckling without drainage. Am J Ophthalmol 76(1): 30-34.

5. Robertson DM (1978) Delayed absorption of subretinal fluid after scleral buckling procedures: the significance of subretinal precipitates. Trans Am Ophthalmol Soc 76: 557-583.

6. Wickham L, Bunce C, Wong D (2007) Randomized controlled trial of combined 5-Fluorouracil and low-molecular-weight heparin in the management of unselected rhematogenous retinal detachments undergoing primary vitrectomy. Ophthalmology 114(4): 698-704.

7. Ahmadieh H, Moradian S, Faghigi H et al. (2005) Anatomic and visual outcomes of scleral buckling versus primary vitrectomy in pseudophakic and

aphakic retinal detachment. Ophthalmology. 112(8): 1421-1429.

8. Wilkinson CP, Rice TA (1997) Michele's Retinal Detachment. 2nd (Edn.). St. Louis: Mosby, pp. 935-978.

9. Salicone A, Smiddy WE, Vankatraman A, Feuer W (2006) Visual recovery after scleral buckling procedure for retinal detachment. Ophthalmology 113(10): 1734-1742.

10. Ross WH, Kozy DW (1998) Visual recovery in macula off rhegmatogenous retinal detachments. Ophthalmology 105(11): 2149-2153.

11. Mitry D, Awan MA, Borooah S, Siddiqui MA, Brogan K, et al. (2012) Surgical outcome and risk stratification for primary retinal detachment repair: results from the Scottish Retinal Detachment study. Br J Ophthalmol 96(5): 730-34.

12. Rishi P, Rishi E, Gupta A (2014) Non-drainage scleral buckling with solid silicone elements. Oman J Ophthalmol 7(2): 55-60

13. Girard P, Mimoun G, Karpouzas I, Montefioure G (1994) Clinical risk factors for proliferative vitreoretinopathy after retinal detachment surgery. Retina 14(5): 417-424.

14. Hussain J, Rehman M, Khan B (2016) Frequency of different grades of proliferative vitreo-retinopathy in patients admitted for rhegmatogenous retinal detachment. J Postgrad Med Inst 30(3) 222-225.

15. Wong CW, Wong WL, Yeo IY, Loh BK, Wong EY, et al. (2014) Trends and factors related to outcomes for primary rhegmatogenous retinal detachment surgery in a large Asian tertiary eye center. Retina 34(4): 684-692.

16. Park SW, Kwon HJ, Byon IS, Lee JE, Oum BS (2017) Impact of Age on Scleral Buckling Surgery for Rhegmatogenous Retinal Detachment. Korean J Ophthalmol 31(4): 328-335.

17. Chignell AH (1974) Retinal detachment surgery without drainage of subretinal fluid. Am J Ophthalmol 77(1): 1-5.

18. Shunmugam M, Shah AN, Hysi PG, Williamson TH (2014) The pattern and distribution of retinal breaks in eyes with rhegmatogenous retinal detachment. Am J ophthalmol 157(1): 221-226.

19. Wilkinson CP (1981) Visual results following scleral buckling for retinal detachments sparing the macula. Retina (Philadelphia, Pa.) 1(2): 113-116.

20. Tani P, Robertson DM, Langworthy A (1980) Rhegmatogenous retinal detachment without macular involvement treated with scleral buckling. Am J ophthalmol 90(4): 503-508.

21. Cleary PE, Leaver PK (1978) Macular abnormalities in the reattached retina. Br J Ophthalmol 62(9): 595-603.

22. Liem AT, Keunen JE, van Meel GJ, van Norren D (1994) Serial foveal densitometry and visual function after retinal detachment surgery with macular involvement. Ophthalmology 101(12):1945-1952.

23. Campo RV, Sipperley JO, Snedd SR (1999) Pars plana vitrectomy without scleral buckle for pseudophakic retinal detachments. Ophthalmology 106(9): 1811-1816.

24. Falkner-Radler CI, Binder S (2008) Long-term results of scleral buckling using a microsurgical approach. Klin Monatsbl Augenheilkd 225: 1055-1061.

25. Thelen U, Amler S, Osada N, Gerding H (2012) Outcome of surgery after macula-off retinal detachment – results from MUSTARD, one of the largest databases on buckling surgery in Europe. Acta Ophthalmologica 90(5): 481-486.

26. Kreissig I, Rose D, Jost B (1992) Minimized surgery for retinal detachments with segmental buckling and nondrainage. An 11-year follow-up. Retina 12(3): 224-231.

27. Banaee T, Hosseini SM, Ghooshkhanei H, Moosavi M, Khayyatzadeh-Kakhki S (2009) Anatomical and visual outcomes of three different scleral buckling techniques. J Ophthalmic & Vis Res 4(2): 90.