DRAINAGE VERSUS NON DRAINAGE IN SCLERAL BUCKLING PROCEDURE

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ABSTRACT

Purpose: To compare the anatomical retinal reattachment with Scleral Buckling (SB) technique with and without sub retinal fluid drainage (SRFD) in uncomplicated Rhegmatogenous Retinal Detachment (RRD).

Methods: This study was performed in the department of Vitreoretinal Ophthalmology, Hayatabad Medical Complex, Peshawar. Thirty Nine eyes of 39 subjects were studied from 1st October 2010 to 31st July 2012. All the cases were randomly allotted in two groups equally, drainage group contain scleral buckling with SRF drainage and non drainage group contain scleral buckling only. All operations were performed by a single surgeon and only segmental silicon plumb 3mm and 5mm were used in both the groups. All patients were followed up postoperatively on day one, day 15, Day 30 and day 60. The major endpoint for comparison was the anatomic cure rate with secondary consideration of intraoperative complications.

Results: Post operatively at 60 days of follow up drainage group had retinal reattachment mean 89.47% and non drainage group had 90% which was not statistically significant (p-value=). Visual outcome was achieved at 60 days follow up 3/60 and above in 15/20 (78.94%) cases in drainage group while 14/20 (70 %) in non drainage group. Intraoperative complications were encountered more commonly 10 out of 19 eyes in drainage group and 4 out of 20 eyes in non drainage group (p-value=).

Conclusion: In conclusion, SRFD do not seem to influence the anatomical retinal reattachment and visual outcomes of scleral buckling in un complicated rhegmatogenous retinal detachment. Although intraoperative complications were noted more in SRFD group. Routine drainage of SRF is not essential for successful retinal re-attachment.

Key Words: Scleral Buckling, Rhegmatogenous Retinal Detachment, sub retinal fluid drainage (SRFD).

INTRODUCTION

There are three main types of retinal detachments, rhegmatogenous retinal detachment (RRD), tractional and exudative. RRD is the most commonly seen retinal detachment. It is a serious ophthalmic condition that can lead to significant visual loss or blindness without timely and appropriate management.[1] According to population-based studies in Iowa and in Minnesota the annual incidence of RRD is 12 cases per 100,000.[2] Scandinavian studies reveal an annual incidence of RRD of 7-10 cases per 100,000.[3] Rhegmatogenous retinal detachment has been managed by several methods, from pneumatic retinopexy to pars plana vitrectomy (PPV). Scleral buckling, however, remains the surgical procedure of choice for RRD without Proliferative Vitreo Retinopathy (PVR).[4] Scleral explant procedure was initially described by Custodis 4 which Lincoff later modified 8 while the implant method was popularised by Schepens.[5-7] Although there is a new trend of other interventions such as pneumatic retinopexy and vitrectomy but scleral buckling still seems to surpass vitrectomy in the treatment of phakic RRDs.[8,9] Scleral buckling includes a variety of techniques including encircling buckles and segmental buckles which can be placed radially, circumferentially or even obliquely. The procedure of scleral buckling has been traditionally combined with SRFD and cryotherapy but none of these routine practices guarantees of a successful outcome.[10,11] There is no significant difference in the primary success rate between the drainage group and non-drainage group, final flattening rate (97% in both groups) or visual acuity outcome between the two groups.[12] Drainage of subretinal fluid is probably the most dangerous step in scleral buckling surgery for uncomplicated retinal detachment. Subretinal haemorrhage, retinal perforation, and vitreoretinal incarceration were the most common complications.[13,14] Indications for drainage of subretinal fluid during scleral buckling remain controversial. Some authors believe that most cases can be managed without drainage of subretinal fluid, whereas others believe that drainage is a crucial aspect of the procedure.[15,16] Drainage of subretinal fluid is one of the debatable issues in scleral buckling. As this step is almost a blind procedure it is not free from potential complications. To drain or not to drain is one of the important controversy in retinal detachment surgery. Many papers have been written on the subject but the controversy is still persisted. We conducted a randomized controlled clinical trial the drainage versus

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non-drainage in scleral buckling for uncomplicated RRD.

MATERIAL AND METHODS

This study was performed in the department of Vitreoretinal Ophthalmology, Khyber Institute of Ophthalmic, Medical Sciences, Hayatabad Medical Complex, Peshawar. It is a tertiary care teaching hospital and centre of excellence for vitreoretinal surgery, catchment area of the hospital is the whole Khyber Pakhtunkhwa including Afghanistan. Thirty-nine eyes of 39 subjects were studied from 1st October 2010 to 31st January 2012. The study protocol was approved by the local institutional review board. All those patients who presented with first time rhegmatogenous retinal detachment with macular detachment, proliferative vitreoretinopathy (PVR) Grade B or less, single break which can cover with segmental plumb and had not received any prior surgical treatment were invited to participate in the study. The age of the patients were confined to those who were 45 years or younger to exclude the effect of ageing.

Table 1: Demographic and Clinical data

Variables	Drainage Group n=19	Non Drainage Group n=20	P-Value
	Mean±SD	Mean±SD	
Age (years)	29 ±12.50	28±12	0.9092
Male (%)	62.96%	59.25%	0.5000
Female(%)	37.04%	40.75%	
Previous History			
Trauma%	5(26.3%)	6(30%)	0.953
Myopia%	5(26.3%)	4(20%)	
Pseudophakia%	4(21.1%)	5(25%)	
Aphakia%	3(15.8%)	2(10%)	
Miscellanous%	2(10.5%)	3(15%)	
Extent of retinal detachment			
Inferior%	5(26.3%)	6(30%)	0.956
Temporal%	4(21.05%)	5(25%)	
Superior%	3(15.78%)	2(10%)	
Superotemporal%	4(21.05%)	3(15%)	
Inferotemporal%	3(15.78%)	4(20%)	
IOP (mm Hg)	15±5	16±5	
PVR			
Grad-A	5(26.31%)	6(30%)	0.798
Grad-B	14(73.68%)	14(70%)	
Retinal Breaks			
Retinal tears	12(63.2%)	11(55%)	0.601
Holes	6(31.6%)	6(30%)	
Dialysis	1(5.3%)	3(15%)	

SD= Standard deviation, RD=Retinal Detachment, IOP=Intraocular pressure, PVR=Proliferative vitreoretinopathy

Table 2: Anatomical Outcome of the buckling procedure with and without SRFD

	Drainage Group n=19	Non Drainage Group n=20
Day 1st (Flat Retina)	17/19(89.47%)	2/20(10%)
Day 15 (Flat Retina)	18/19(94.73%)	13/20(65%)
Day 30 (Flat Retina)	19/19(100%)	16/20(80%)
Day 60 (Flat Retina)	17/19(89.47%)	18/20(90%)

Table 3: Visual Outcome of the buckling procedure with and without SRFD

	Uncorrected visual acuity (UCVA)	Drainage Group n=19	Non Drainage Group n=20	P-Value
Preoperative	PL-HM	10(%)	13(65%)	0.733
	HM-CF	5(%)	4(20%)	
	CF-3/60	4(%)	3(15%)	
	3/60 and above	0(%)	0(0%)	
day 1st	PL-HM	9(47.4%)	13(65%)	0.309
	HM-CF	5(26.3%)	6(30%)	
	CF-3/60	4(21.1%)	1(5%)	
	3/60 and above	1(5.3%)	0(0%)	
Day 15	PL-HM	2(10.5%)	8(40%)	0.005
	HM-CF	4(21.1%)	9(45%)	
	CF-3/60	8(42.8%)	2(10%)	
	3/60 and above	5(26.3%)	1(5%)	
Day 30	PL-HM	1(5.3%)	6(30%)	0.006
	HM-CF	2(10.5%)	7(35%)	
	CF-3/60	5(26.3%)	5(25%)	
	3/60 and above	11(57.9%)	2(10%)	
Day 60	PL-HM	0(0%)	1(5%)	0.751
	HM-CF	2(10.5%)	2(25%)	
	CF-3/60	2(10.5%)	3(15%)	
	3/60 and above	15(78.9%)	14(70%)	

PI=Perception of light, HM=Hand movement, CF=Counting finger,

Table 4: Per operative complications

S. No	Complications	Drainage Group n=19	Non Drainage Group n=20
1.	Subretinal hemorrhage	4/19 (21.05%)	0/20 (0%)
2.	Vitreous hemorrhage	1/19 (5.26%)	0/20 (0%)
3.	Retinal perforation with suture needle	4/19 (21.05%)	3/20 (15%)
4.	Retinal break at drainage site	1/19 (5.26%)	0/20 (0%)
5.	IOP	0/19 (0%)	1/20 (5%)

IOP= Intra Ocular Pressure

All those patients who have high grade PVR, with macular or more posterior breaks, giant retinal tears, and those with previously failed scleral buckling procedures were excluded. Uncontrolled hypertension, known coagulation abnormalities or current use of anticoagulative medication other than aspirin, or any condition affecting documentation or follow-up were also excluded.

They were randomly allotted through lottery method in two groups, Drainage group and Non drainage group. A detailed history and examination of all the patients including determination of Snellen visual acuity, swinging flash light test, slitlamp biomicroscopy, Goldmann applanation tonometry, and dilated fundus examination with 78D lens and indirect ophthalmoscope. Extent of detachment, macular status, PVR grading, position and type of break(s) were noted. All operations were performed by single surgeon in both the groups and surgical technique was initial anterior chamber paracenthesis with 27 gage needle, segmental silicone sponge 3mm or 5mm were used according to the retinal break. Ethibond 5/0 was used for sponge suturing. Half strength normal saline injected to the posterior chamber with 27 gage needle through parsplana, cryotherapy was used sparingly. In

non drainage group SRF drainage was performed over bullous area away from retinal break. Vertical incision (2-4mm) given to the sclera with 150 knife. when the choroid become visible then punctured with 23 gage needle and the eye become pressed to drain the SRF and the wound stitched with 5/0 ethibond. All the patients monitored for intraoperative complications and followed up postoperatively on day one, day 15, Day 30 and day 60. Details like visual acuity, anatomical status of the retina, intra-ocular pressure, buckle status, any operative complication, and any additional procedure advised or done are routinely recorded at each follow-up visit. The primary outcome measures was anatomical retinal reattachment. Different variables of the study were analyzed by means of SPSS version 12 software.

RESULTS

The 39 eyes of 39 patients were randomly allotted through lottery method in two groups and completed the 60 days follow up. Both the groups were statistically not significant in demographic and ocular characteristics as shown in Table 1. Out of 39 cases 19 cases had SRF drainage, on 1st post-operative day retina was found flat in 17/19 (89.47%) at day 30 retina was flat in 19/19 (100%) cases. Two cases had redetachment at day 60 of follow up and treated with PPV and silicone oil and achieved flat retina in both cases. While in non drainage group, only two cases (10%) had flat retina on 1st postoperative day and achieved 19/20 cases (90%) of flat retina on day 60. Only one case reoperated with PPV plus silicone oil, retinotomy and retinectomy done and achieved flat retina. All other detail are shown in Table 2.

BCVA were improved more quickly in drainage group as compared to non drainage group as shown in Table 3. Preoperative VA in both the groups were statistically not significant. On follow-up visits initially in non drainage group the VA was worse but gradually improved in day 15 onward and almost equal to drainage group at day 60. There were very less intraoperative complications in non drainage group as compared to drainage group because in non drainage group there were very less manipulation and less intraocular interventions. Intraoperative complications were encountered in 10 out of 19 eyes where SRF was drained and 4 out 20 eyes where SRF was not drained shown in Table 4. The most common complications were subretinal haemorrhage and retinal perforation. They were more commonly observed in drainage group.

DISCUSSION

This study intended to identify the anatomical reattachment of the retina after conventional scleral buckling surgery after uncomplicated rhegmatogenous retinal detachment in 39 eyes of 39 patients randomly allotted in two groups. One group had drainage of SRF while in another group no drainage of SRF. In our study mean age of drainage group was 29±12.50 and in non drainage group was 28±12. Other studies reported nearly same mean age for RRD.[17,18] Most of the common cause in our study for RRD is trauma and myopia which are consistent with the other studies and they reported high myopia, retinal tears, trauma, family history, as well as complications from cataract surgery.[19,20] Al-Khairi[21] and Rosman[22] observed that male patients had more common RRD as compared to female patients due to the fact that, the health problems of female members of the family are usually overlooked in developing countries and their referral to tertiary eye care facilities is poor. In our study there was male preponderance in both groups. This finding is again consistent with the other local studies.[23,24] In scleral buckling procedure the globe wall is compressed so that the RPE opposition occurs to the neurosensory retina thereby interfering with passage of liquefied vitreous into the Subretinal space. The RPE pump actively absorbs subretinal fluid if the break is properly closed, and the retina will spontaneously flatten with no need for SRF drainage.[25,26] In our study, final anatomical re-attachment rate at day 60 in drainage group was 17/19 (89.47%) and in group-II 18/20(90%) showed no difference statistically. This is quite near to the Pastor[27] reported global anatomical success rate 94.7%. Jun[28] reported 95% in pseudophakic eyes. Thompson et al. reported 77.1% anatomical re-attachment in primary RRD with scleral buckling procedure.[29] Banaee et al. reported final anatomical re-attachment rate of 89.3% in primary RRD with three different scleral buckling surgery at 6 months of follow-up.[30] Schwartz et al. reported a long follow up of scleral buckling surgery with a final results of 82% after one procedure.[31] The results of our study are comparable to the local studies and as well as the above mentioned studies.[32,33] In our study SRF drainage had no effect on final retinal reattachment these results are consistent with other study[34], they found no significant effect on retinal reattachment rate from SRF drainage.

In conventional scleral buckling the trend is to perform minimal segmental buckling with out drainage as it has been shown to be associated with optimal outcome and minimal complications.[35] Final BCVA of 3/60 or better achieved in 78% of patients in group I, whereas 70% in group II. Both the groups had achieved almost same visual acuity which are statistically not significant. These results are comparable with other studies which shows nearly the same results.[36,37] In our study the most common per-operative complications were Subretinal hemorrhage and retinal perforation with suture needle in group I and while in group II as there is no SRF drainage and there were no complication of Subretinal hemorrhage which is highly statistically significant, retinal perforation with suture needle are nearly same in both groups and statistically not significant. Hilton,[38] Tewari et al[39] and Thompson et al.[40] reported the rate of retinal perforation with suture needle while passing the buckle sutures were comparable to our

study, but the rates of intra-ocular haemorrhage (retinal, choroidal, vitreous) were much higher in drainage group. This could be the cause of SRF drainage. It is desirable to spare SRF drainage whenever possible to minimize associated complications such as Subretinal hemorrhage, and vitreous or retinal incarceration into the site of drainage.[41] Serious complications are more frequently associated with drainage of subretinal fluid than any other step in the operation. Chignell[42] in his study had encountered 7.5% complication rate during SRF drainage, of which 4.5% had bleeding while 3% had vitreous loss. Wilkinson and Bradford 43 reported 5.6% complication rate of which bleeding contributed for 3% while retinal incarceration occurred in 2.2% of cases along with retinal holes in 0.54%. Hilton[44] reported that around 4.3% of cases had bleeding.

CONCLUSION

In conclusion, SRFD do not seem to influence the anatomical retinal reattachment and visual outcomes of scleral buckling in un complicated rhegmatogenous retinal detachment. Although intraoperative complications were noted more in SRFD group. Routine drainage of SRF is not essential for successful retinal re-attachment.

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