

Early Removal of Scleral Buckle

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ABSTRACT

Purpose: To study the outcomes of early removal of segmental buckle on visual acuity, retinal status, and astigmatism.

Study Design: Interventional case series

Place and Duration of Study: Mayo hospital, from February 2018 to July 2018.

Methods: Ten patients fulfilling the inclusion criteria were recruited. All the patients underwent segmental radial sponge with cryoretinopexy, with or without drain and intraocular gas tamponade as per need. Post-operative follow ups were at 1st week, 4th week and 6th week. Sponge was removed at 6th week after making sure that the retina was attached. Follow ups after buckle removal were planned at 1st week, 1st month and 3rd month. Improvement in VA, retinal status and astigmatism were noted. The commonest reason for the explant removal was infection followed by pain. Normality was checked through Shapiro-Wilk's W-test and the normality criteria was met so paired sample t-test was used to assess the significance of astigmatism pre and post-surgery.

Results: The average age was 32.30 ± 16.75 years (range, 03 – 61 years). Anatomical success was achieved in 100%. Visual acuity improved in all patients. Moreover, early removal of buckle reduced astigmatism and further improvement in vision was also noted. Pre and post-surgical vision improvement was statistically significant with p-value of 0.000. After removal of buckle, improvement of astigmatism was also statistically significant p-value 0.004.

Conclusion: The early removal of scleral explant not only provides symptomatic relief to the patients, but is also associated with marked improvement in visual acuity was noted.

Key Words: Visual Acuity, Astigmatism, Retinal Detachment, Segmental Scleral Buckle.

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INTRODUCTION

Scleral buckling (SB) has always been an important procedure for the management of retinal detachment and provides comparable results with primary pars plana vitrectomy.^{1,2} Pars plana vitrectomy is increasingly used for repair of Rhegmatogenous retinal detachment (RRD) and is the most popular method of management nowadays. The importance of conventional method with cryotherapy and scleral

implant cannot be put aside.³ Buckling not only provides very good vision but also gives anatomical stability to the retina.⁴ Scleral buckle is removed at 6 months after surgery or in some cases not removed at all.⁵

Segmental scleral buckle is an extremely effective technique for the repair of retinal detachments, especially in young and phakic eyes with fresh RRD.⁶ Its initial success rates are higher than pneumatic retinopexy and are comparable with vitrectomy and combined approach in selected cases.⁷ Segmental buckle is a fast, simple and cost effective procedure. It eliminates the restriction of positioning and decreases risk of cataract formation with minimal astigmatism. It also reduces the risk of IOP rise and there is faster visual rehabilitation with no risk of travelling. On the

other hand because of more chances of infection, extrusion, and astigmatism, with more implication of time and effort and more difficult training, its usage has become limited with the passage of time.⁸

This study was conducted to evaluate anatomical and functional outcomes of early removal of segmental scleral buckle, chances of re-detachments and changes in the refractive status of the eye.

METHODS

Ten patients fulfilling the inclusion criteria were taken from the outdoor of Mayo Hospital. Phakic patients with fresh Rhegmatogenous retinal detachment, single break or multiple breaks involving 1 clock hour and PVR A or B were included. Pseudophakic patients with old RRD, multiple breaks or breaks involving 2 or more clock hours and PVR C were excluded. The data was collected from February 2018 to July 2018. Initial evaluation included: Visual Acuity (VA), Auto Refraction (AR), Intra ocular Pressure (IOP) and detailed anterior and posterior segment evaluation. All the patients underwent segmental radial sponge (507 or 509) with cryo, with or without sub-retinal fluid drainage and intraocular gas tamponade (C3F8) when needed. Post-operative visits were planned at 1st week, 4th week (laser augmentation if needed) and 6th week. Removal of sponge was done at 6th week after making sure the stability of retina. Follow up after buckle removal was planned at 1st week, 1st month and 3rd month. Improvement in VA, retinal status and astigmatism were noted.

Data was collected and analyzed using SPSS version 25. The Shapiro-Wilk’s W-test was applied for checking normality assumptions. Paired Sample T-test was used to check the significance of results, the *p*-value of ≤0.05 was considered as statistically significant.

RESULTS

Average age of the patients was 32.30 ± 16.75 years (range, 03–61 years). Functional success was 100% as visual acuity was improved in all the patients. Further improvement in visual acuity was observed after the removal of buckle. Anatomical success rate was also 100%. Mean duration of explant was 06 weeks and mean follow-up was 06 months. In all the 10 patients, radial silicone explants was applied. The commonest reason for the explant removal was infection.

Followed by pain. Symptomatic relief was achieved in 100% of patients. No patient suffered from retinal re-detachment after removal of explant till the last followup.

Normality was checked through Shapiro-Wilk’s W-test and the normality criteria was met so paired sample t-test was used to assess the significance of astigmatism pre and post-surgery and Friedman Test was applied to check the significance of visual improvement. Results showed that the pre and post-surgical vision improved significantly with *p*-values < 0.05. After removal of buckle, improvement in astigmatism was also significant *p*-value 0.004.

Table 1: Pre and Post-Surgical Visual Improvement.

	Visual Acuity		
	Log Units	No. of Patients	Percentage
Pre Surgery	1.00	2	20.0
	1.50	1	10.0
	1.60	7	70.0
Total		10	100.0
Post Buckle (2nd Week)	0.30	2	20.0
	0.50	3	30.0
	0.60	4	40.0
	1.00	1	10
Total		10	100
Post Buckle Removal (6th week)	0.10	2	20.0
	0.30	2	20.0
	0.40	2	20.0
	0.50	1	10.0
	0.60	2	20.0
	0.70	1	10.0
Total		10	100.0

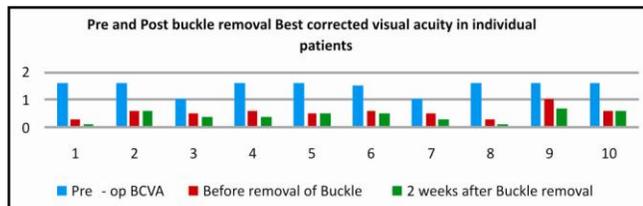
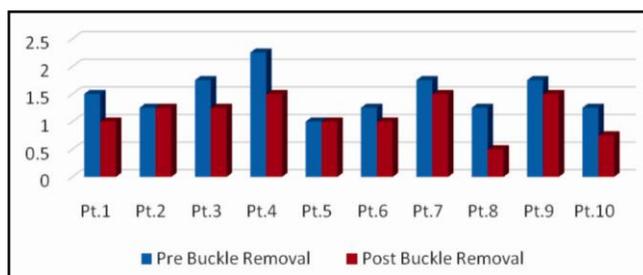
Table 2: Pre and Post-Surgical Astigmatism.

	Astigmatism		
	Dioptres (D)	No. of Patients	Percentage
Before Buckle Removal	0.90	1	10.0
	1.20	4	40.0
	1.40	1	10.0
	1.70	3	30.0
	2.20	1	10.0
Total		10	100
After Buckle Removal	0.40	1	10.0
	0.70	1	10.0
	0.90	3	30.0
	1.20	2	20.0
	1.40	2	20.0
	1.70	1	10.0
Total		10	100.0

Table 3: Early Removal of Scleral Buckle Impacts.

		Total No. of Patients	Minimum	Maximum	Mean	Std. Deviation	P-Value
Visual Acuity	VA Pre Surgery	10	1.00	1.60	1.4700	.24967	
	VA Post Surgery	10	.30	1.00	.5500	.19579	0.000*
	Pre-Buckle Removal	10	.30	1.00	.5500	.19579	
Astigmatism	VA Post Buckle removal	10	.10	.70	.4000	.20548	
	Astigmatism Pre Surgery	10	.90	2.20	1.4400	.38064	
	Astigmatism Post Surgery	10	.40	1.70	1.0700	.38312	0.004*

*shows significant p-value, VA = Friedman Test was applied, Astigmatism = Paired Sample T-Test

**Figure 1:** Functional Success.**Figure 2:** Post buckle improvement of astigmatism in individual patients.

DISCUSSION

The aim of our study was to find out the functional and anatomical success in case of early removal of scleral buckle, which was carried out at 6th week. We had a close eye on patients on the 1st week and kept on checking until 4th week to see if the patient needed any laser augmentation, laser was applied to three patients who needed augmentation at the site of the break and after complete satisfaction we went for the removal of buckle at 6th week post operative. Only two of our patients showed slight infection of the sponge in late 5th week and their buckle was also removed at 6th week. All of our patients showed 100% success as not only the vision of our patients improved but when these patients were followed up later at 6th months and one year interval none of them showed any re-detachment. Not only did we measure betterment in the VA due to retinal attachment but we also calculated the degree of astigmatism induced due to

buckle and when the buckle was removed astigmatism improved as well as the VA in most of our cases making it significant finding that early removal of buckle helps reduce astigmatism as well.

Deokule investigated in his study that the commonest reason for explant removal was extrusion followed by pain, scleritis, infection and foreign body sensation but we only faced minor explant infection at the end of 5th week for which we removed the implant at 6th week. Retina was attached in 88.8% of his patients but we achieved the 100% success. He did not calculate the improvement in astigmatism after the removal of buckle but we calculated and showed significant improvement in astigmatism.⁹

There are other studies which showed some of the major complications following scleral buckling.¹⁰⁻¹³ These included extrusion,¹⁰ fistula formation,¹¹ rejection¹² and intrusion of the sponge.¹³ However, in our study only two patients got minor infection in the 5th week which came better as soon as we removed the sponge by the end of 6th week. By early removal of buckle we can avoid all of these complications and relieve our patients from the complications of buckle.¹⁴

In previous studies, the usual time of removal of scleral buckle ranged from 03 – 80 months.^{15,16,17} Moisseiev et al, studied the effects and indications of implant removal.¹⁶ He experienced explant extrusion as the commonest reason for buckle removal. However, in our study infection was the commonest reason and we did not have extrusion in any case. In his study the improvement in VA was not significant but our patients showed marked improvement in VA. It might be because of the different patient selection criteria as we included only fresh detachments in our study. Different types of explants were studied by different authors but we used only radial silicone sponge.^{18,19}

Singh S has shown a rare case of buckle infection with *Curvularia* species.¹⁹ Park SW et al. described

that patient selection was a very important criteria in case of scleral buckling in the management of rhegmatogenous retinal detachment and its outcomes.²⁰

Limitations of our study was that it was a case series with only limited follow up. Large number of patients with longer follow ups and multi-center data are required to further prove the results of this particular study.

CONCLUSION

Early removal of scleral buckle at 6 weeks not just gives anatomical but functional success as well with minimal chances of post-operative infections. The discomfort that patients experience in case of buckle (sponge) is also reduced.

Ethical Approval

The study was approved by the Institutional review board/ Ethical review board (COAVS/817/2020).

Conflict of Interest

Authors declared no conflict of interest.

Disclaimer

This research study was conducted at KEMU and all authors were present in the said place during the conduct of the study.

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Authors' Designation and Contribution

Nida Usman; Consultant Ophthalmologist: *Concepts, Design, Literature search, Data acquisition, Manuscript Preparation.*

Muhammad Ali Haider; Assistant Professor: *Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review.*

