MACULAR PERFUSION CHANGES ASSESSED WITH OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY AFTER SCLERAL BUCKLING SURGERY FOR RHEGMATOGENOUS RETINAL DETACHMENT

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INTRODUCTION

Rhegmatogenous retinal detachment (RRD) is caused by the movement of liquefied vitreous gel into the subretinal space through a retinal break. RRD is commonly treated with scleral buckling (SB) or pars plana vitrectomy (PPV). Blood flow at the macula, in contrast to the other areas of the retinal vascular system, does not change following scleral buckling. This study aims to explore the macular perfusion changes in the RRD-treated eyes and to evaluate the influence of these changes on the final visual outcome using Optical Coherence Tomography Angiography (OCTA).

AIM OF THE WORK

The aim of this work was to assess the macular perfusion changes in patients with Macular-off RRD after successful buckling surgery using OCTA.

PATIENT AND METHODS

It's an observational case-control study. The study involved 60 eyes from 30 participants. The study group included 30 eyes with a history of successful scleral buckling surgery for macula-off rhegmatogenous retinal detachment (RRD) that were repaired at the Main University Hospital (Alexandria University) by cryotherapy of the retinal breaks with the application of a circumferential buckle (band 240 with segmental tire 276). The control group included 30 eyes (contralateral eyes of the study group). 18 of the included patients were men (60%) and 12 were women (40%). Patients that were included in the study had ages spanning from 15 to 80, with a mean age of 46.37±16.45 years.

Regarding the study group (30 eyes), were right-sided in 13 eyes (43.3%) and left-sided in 17 eyes (56.7%). The duration from retinal detachment to buckling surgery ranged from 1 to 60 days, with a mean of 8.77±11.54 8days. The OCTA was done one to 36 months after cryobuckling surgery.

RESULTS

Table 1: Correlation between vessel density and different parameters in study group (n=30)

	Vessel density (VD) mm/mm² in the study group (n=30)							
	Central (C)		Inner (I)		Outer (O)		Full (F)	
	r	p	r	p	r	p	r	p
Age (years)	-0.278	0.137	-0.400*	0.028*	-0.373*	0.042*	-0.385*	0.036*
Preoperative BCVA	-0.241	0.200	-0.152	0.422	-0.029	0.880	-0.064	0.738
Postoperative BCVA	-0.291	0.119	-0.270	0.149	-0.125	0.512	-0.165	0.385
Refraction	0.203	0.283	0.210	0.265	0.188	0.321	0.196	0.300
Preoperative IOP	0.031	0.869	-0.067	0.726	-0.049	0.799	-0.051	0.789
Postoperative IOP	-0.229	0.223	-0.222	0.238	-0.156	0.410	-0.175	0.354
Duration of RRD in days	-0.341	0.065	-0.126	0.509	-0.027	0.889	-0.055	0.771
Period after surgery (months)	0.074	0.698	0.047	0.805	0.017	0.931	0.026	0.891
Axial length (AL)	-0.642*	<0.001*	-0.541*	0.002*	-0.560*	0.001*	-0.563*	0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table 2: Correlation between perfusion % and different parameters in the study group (n=30)

	Perfusion % (P)							
	Central (C)		Inner (I)		Outer (O)		Full (F)	
	r	p	r	p	r	p	r	p
Age (years)	-0.307	0.099	-0.392*	0.032*	-0.374*	0.042*	-0.381*	0.038*
Preoperative BCVA	-0.257	0.170	-0.147	0.438	-0.009	0.963	-0.047	0.805
Postoperative BCVA	-0.285	0.127	-0.263	0.160	-0.106	0.578	-0.148	0.435
Refraction	0.229	0.223	0.213	0.258	0.179	0.343	0.191	0.313
Preoperative IOP	0.042	0.826	-0.076	0.689	-0.048	0.801	-0.055	0.774
Postoperative IOP	-0.203	0.282	-0.224	0.234	-0.157	0.407	-0.175	0.354
Duration of RRD in days	-0.297	0.111	-0.129	0.497	-0.025	0.895	-0.055	0.772
Period after surgery (months)	0.051	0.788	0.053	0.781	0.008	0.966	0.020	0.916
Axial length	-0.584*	0.001*	-0.544*	0.002*	-0.566*	0.001*	-0.569*	0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table 3: Correlation between FAZ and different parameters in the study group (n=30)

	Foveal avascular Zone (FAZ)					
	Size mm² (S)		Circumference (perimeter in mm)		Circularity Index	
	r	p	r	p	r	p
Age (years)	-0.319	0.086	-0.144	0.448	-0.296	0.112
Preoperative BCVA	0.104	0.585	0.173	0.362	-0.064	0.737
Postoperative BCVA	-0.004	0.982	0.061	0.748	-0.184	0.330
Refraction	-0.016	0.932	0.096	0.615	-0.014	0.943
Preoperative IOP	0.078	0.681	0.018	0.925	0.096	0.613
Postoperative IOP	-0.123	0.517	-0.143	0.452	0.087	0.647
Duration of RRD in days	0.126	0.507	0.309	0.097	-0.216	0.251
Period after surgery (months)	0.044	0.817	0.085	0.655	-0.091	0.632
Axial length	-0.344	0.063	-0.426*	0.019*	0.123	0.518

r: Pearson coefficient

r: Spearman coefficient

*: Statistically significant at $p \leq 0.05$

CONCLUSION

The vessel density and perfusion density did not vary significantly when OCTA data from the study and control groups were compared. On the other hand, FAZ features revealed a statistically significant difference (size, perimeter, and circularity index). VD, P (in both groups), and FAZ (in the study group only) exhibited a statistically significant negative association with AL. Furthermore, a statistically significant negative association between age and the research group's VD and P was observed. Finally, P was shown to be inversely associated with pre-operative BCVA also in the control group.