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Swept Source OCT Angiography after scleral buckling

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No financial interest to disclose

Summary



Purpose

To evaluate macular **microvasculature** with special regard to fovea avascular zone and vessel density in eyes with rhegmatogenous retinal detachment (RRD) treated with **scleral buckling**.

Methods

It is a retrospective, interventional study. Inclusion criteria were as follows: signed informed consent, scleral buckling as the only retinal surgery in the evaluated eye, swept source OCT Angiography (SS-OCT A) performed at least twice during regular follow-up controls for at least 24 months after surgery, anatomic success achieved after primary surgery. In all eyes a complete ophthalmic examination, swept source OCT and SS-OCTA were performed. We measured visual acuity, central retinal thickness, central choroidal thickness, intraretinal changes in the fovea, vessel density at the level of superficial and deep retinal plexus, area of fovea avascular zone (mm²) at the level of superficial and deep retinal plexus.

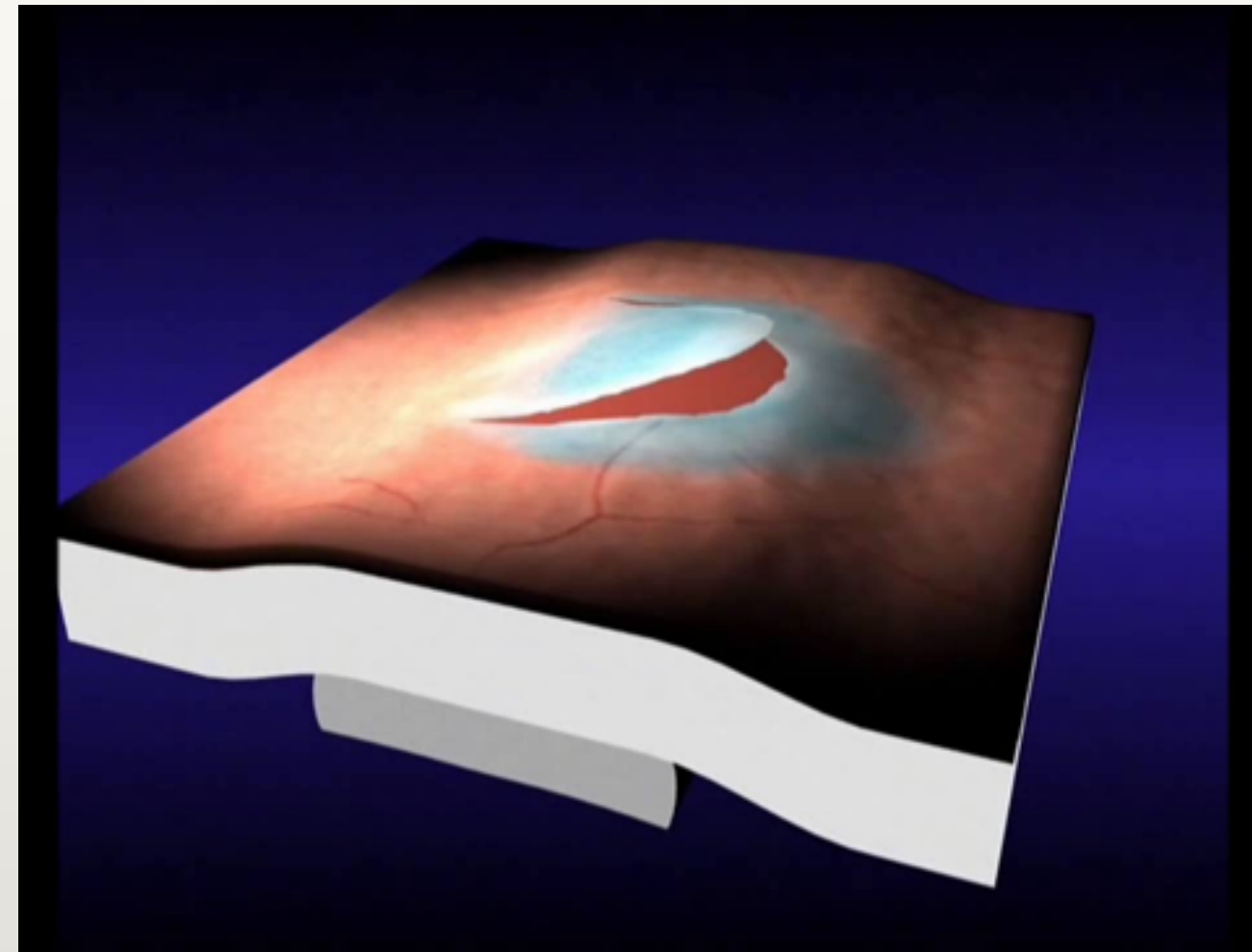
Results

74 eyes of 72 patients (40 males, 32 female) were in the mean age of 48 years were included into the analysis. 24 eyes had a macula on RRD and were classified into group one and 50 eyes had macula off RRD and were classified into group two. Mean visual acuity was significantly better in group one ($p < 0.05$). Mean central retinal thickness did not change significantly in any subgroup ($p = 0.06$; $p = 0.2$) and did not differ between them ($p = 0.32$). There was statistically significant decrease in central choroidal thickness six months after surgery in group one (median 247 μ m to 216 μ m, $p = 0.047$). sFAZ and dFAZ did not differ significantly at any time point for any group ($p = 1.0$, $p = 0.78$). One month after surgery vessel density at the level of deep retinal capillary plexus was statistically significant lower in group two- both, when compared to group one ($p = 0.01$) or to fellow eyes ($p < 0.001$).

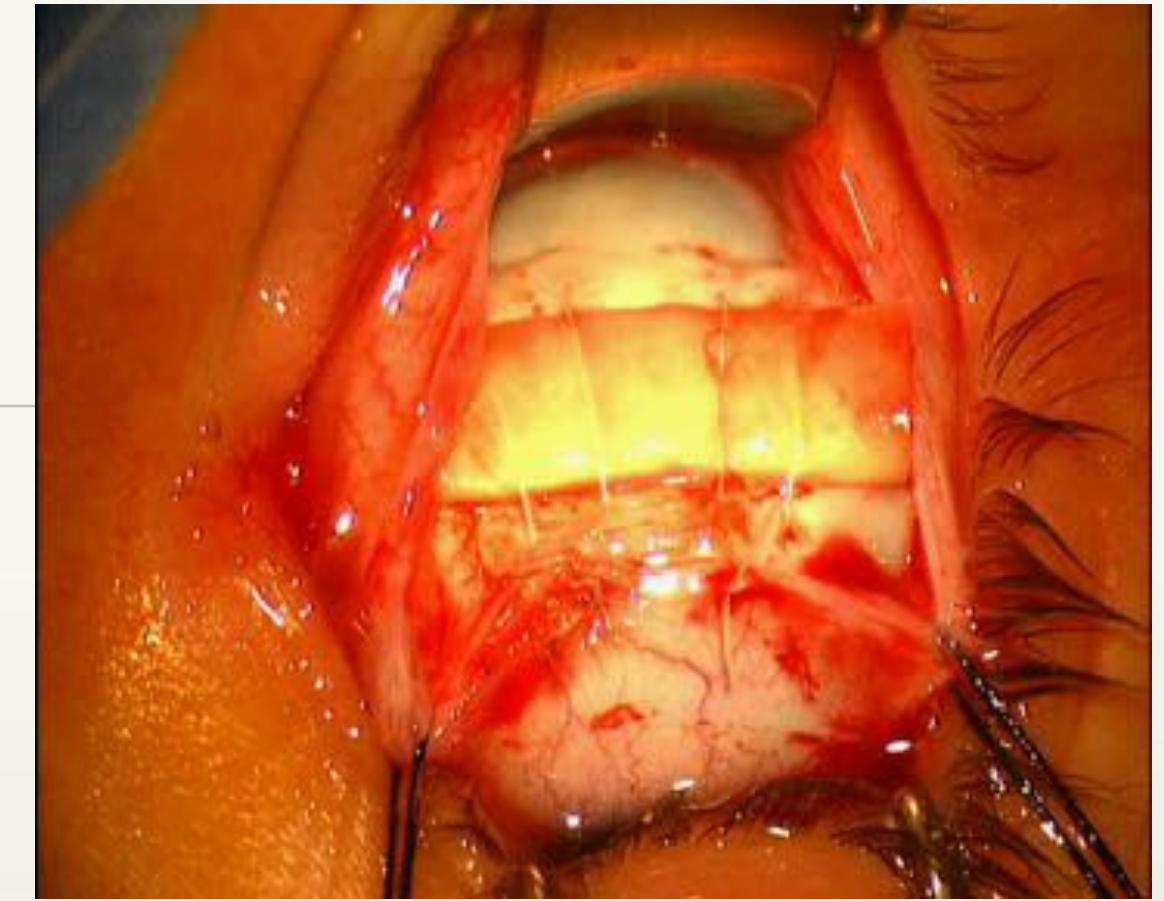
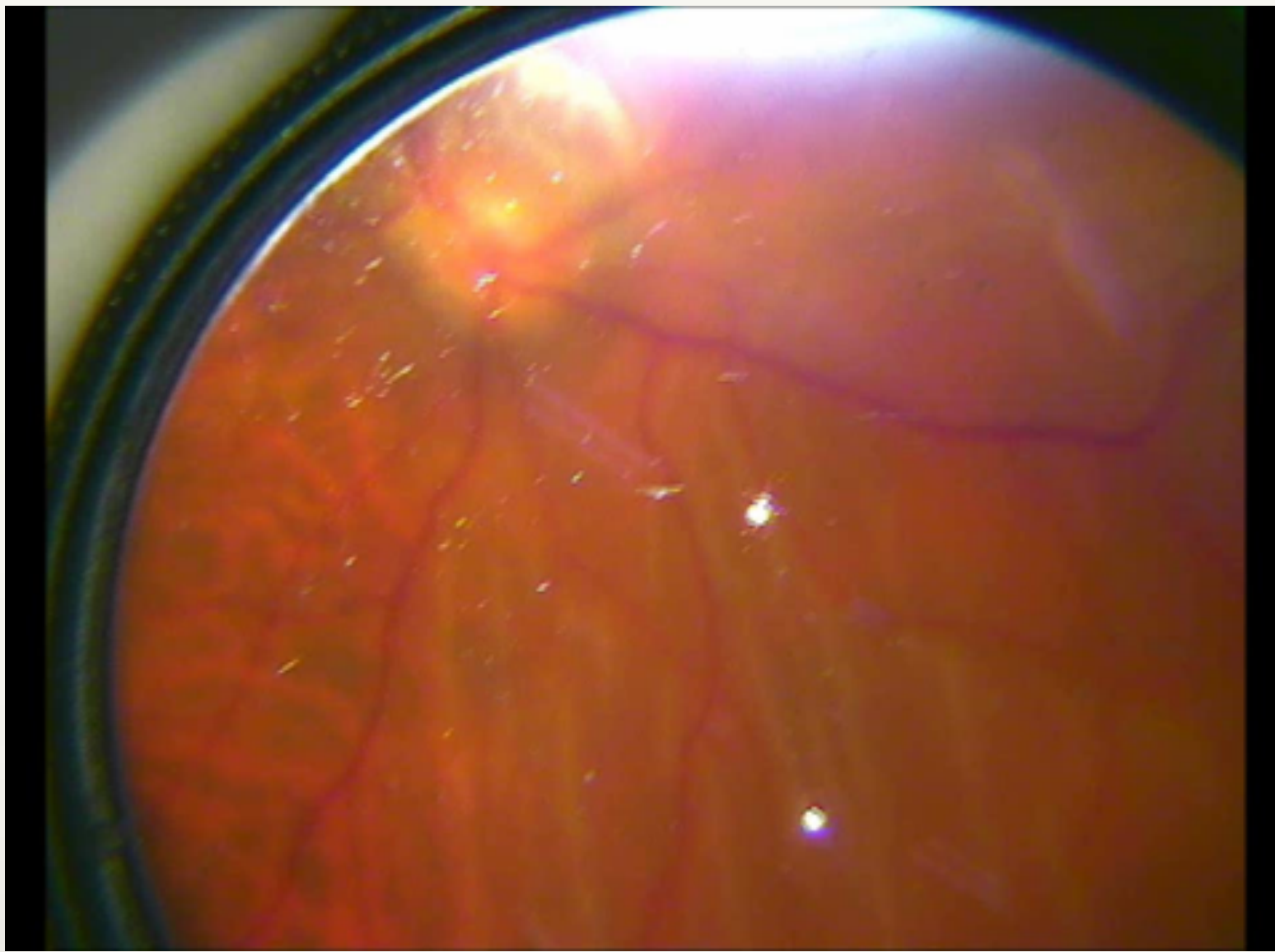
Conclusions

Patients with a **macula-off retinal detachment had decreased vessel density one month after surgery**, which normalized at later timepoints. This study confirms that in regard to vessels visualized with SS-OCT A scleral buckling does not seem to influence foveal choroidal vasculature in the long term. Vasculature in patients treated with a cerclage, even after a macula-off retinal detachment tend to normalize in the long-term.

CCT, sFAZ, dFAZ and vessel density measured with OCTA were reported to be deferred after ppV for RD. No data on SB

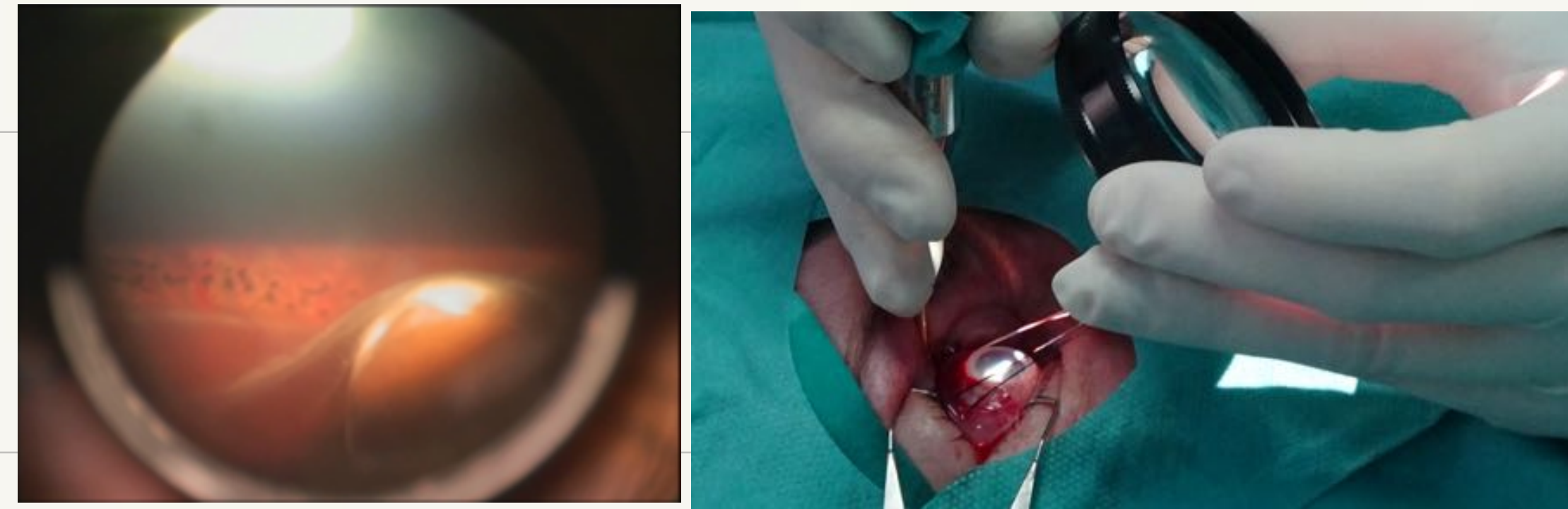


Material and Methods



- ❖ Retrospective observational study
- ❖ Inclusion criteria: signed informed consent, scleral buckling as the only retinal surgery in the evaluated eye, swept source OCT Angiography (SS-OCT A) performed at least twice during regular follow-up controls for at least 24 months after surgery, anatomic success achieved after primary surgery
- ❖ Following parameters were measured: visual acuity, central retinal thickness, central choroidal thickness, intraretinal changes in the fovea, vessel density at the level of superficial and deep retinal plexus, area of fovea avascular zone (mm.) at the level of superficial and deep retinal plexus.

Results



- ❖ 74 eyes of 72 patients (40 males, 32 female) , mean age 48 years

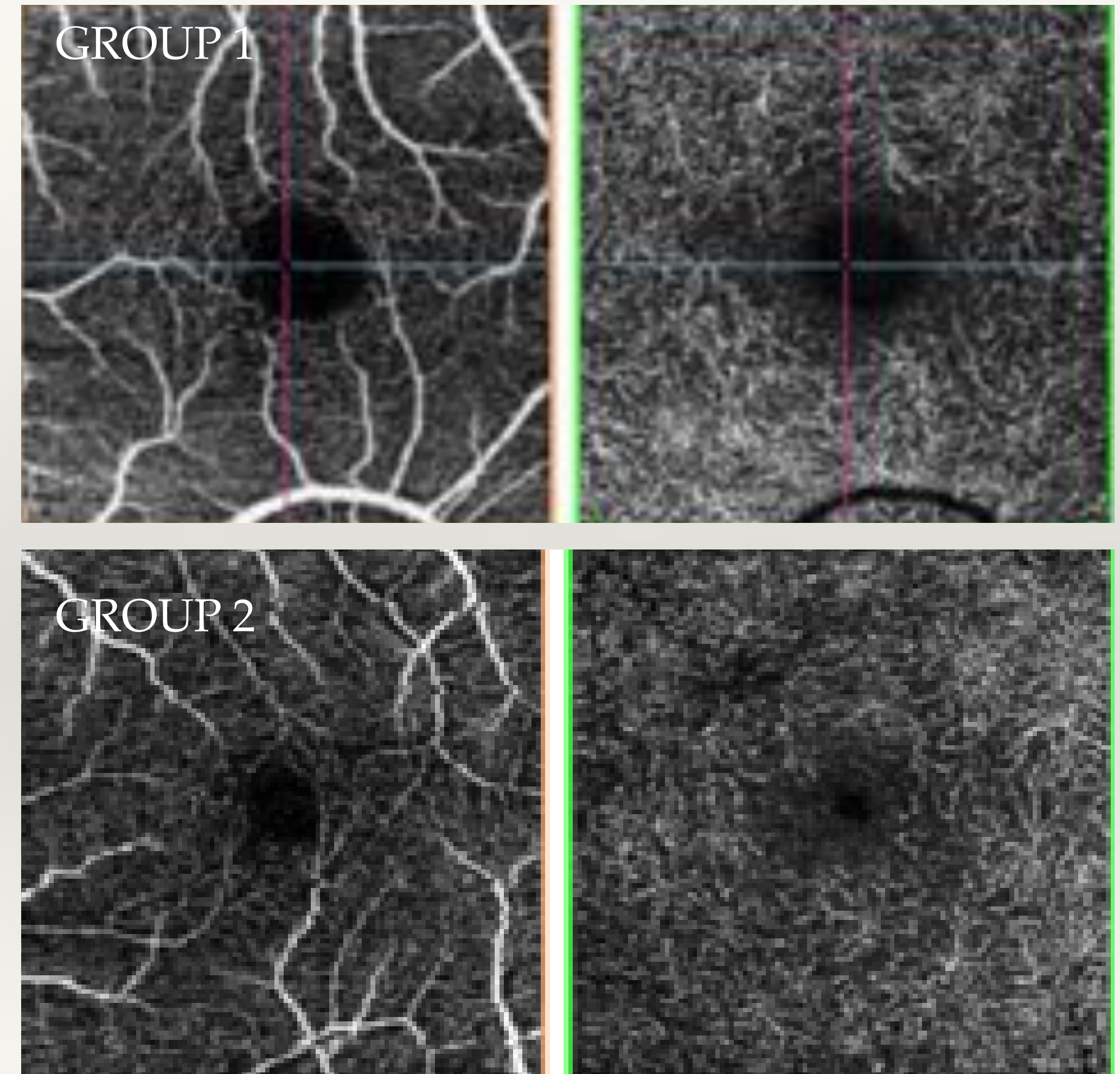
	Group 1 Macula on	Group 2 Macula off	P
No	24	50	
V	0.78	0.32	0.01
Age	45	50.4	0.1
Pseudophakia	3 / 24 (12.5%)	7 / 50 (14%)	0.6

CRT did not change in any subgroup (p=0.06, p=0.2)
CCT significantly decreased one week after surgery in group 2 (p=0.044).

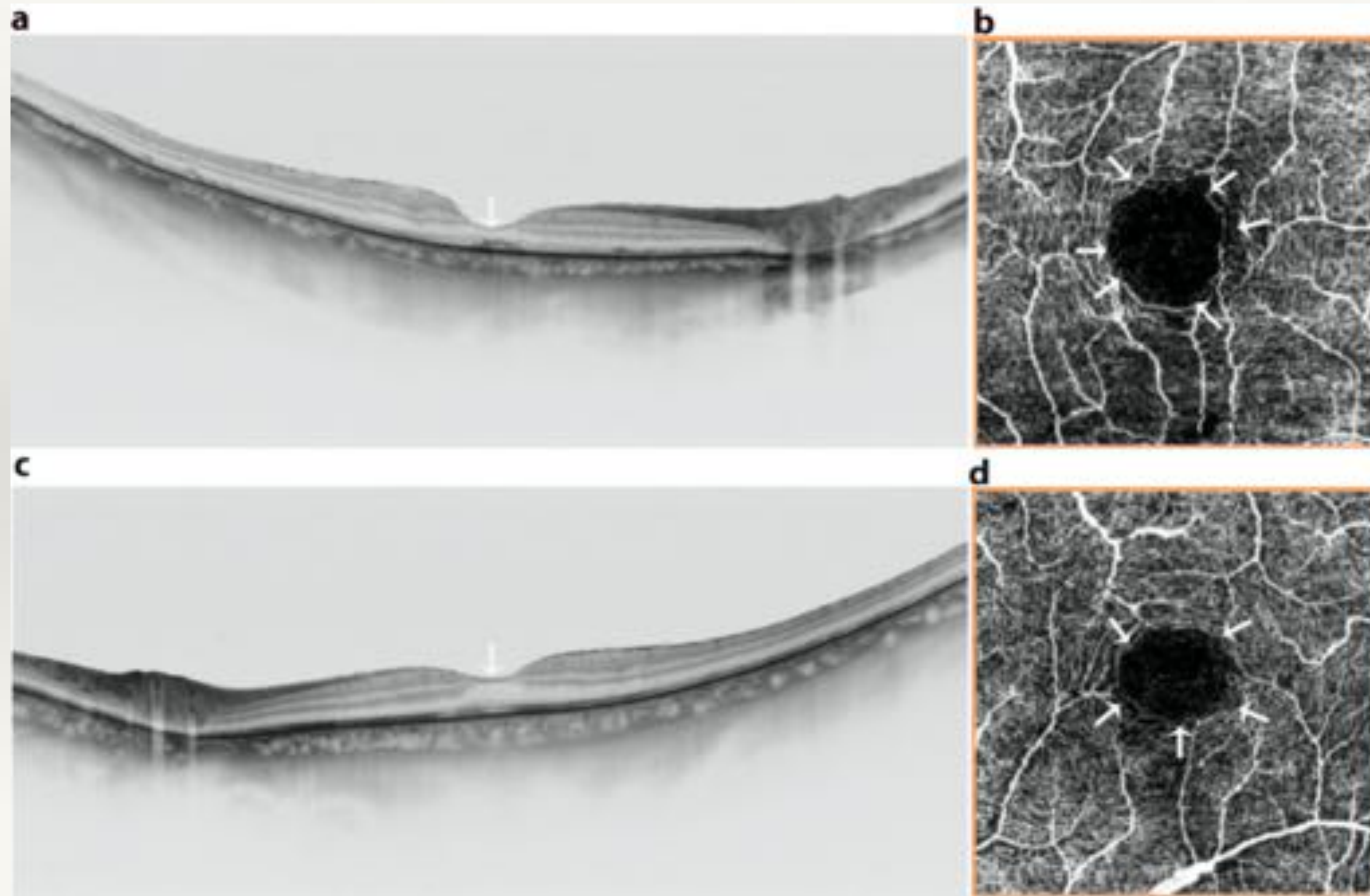
	Group 1 Macula on	Group 2 Macula off	P
Final CRT	248μm	274μm	0.32
Initial CCT	289μm	248μm	0.35
CCT one month after surgery	260.8μm	200.47μm	
Final CCT	227.9μm	236.2μm	0.58

Vessel density

- ❖ One month after surgery vessel density at the level of deep capillary plexus was significantly lower in group two- both when compared to group one ($p=0.01$) and to fellow eyes ($p<0.01$).
- ❖ It normalized until month six.



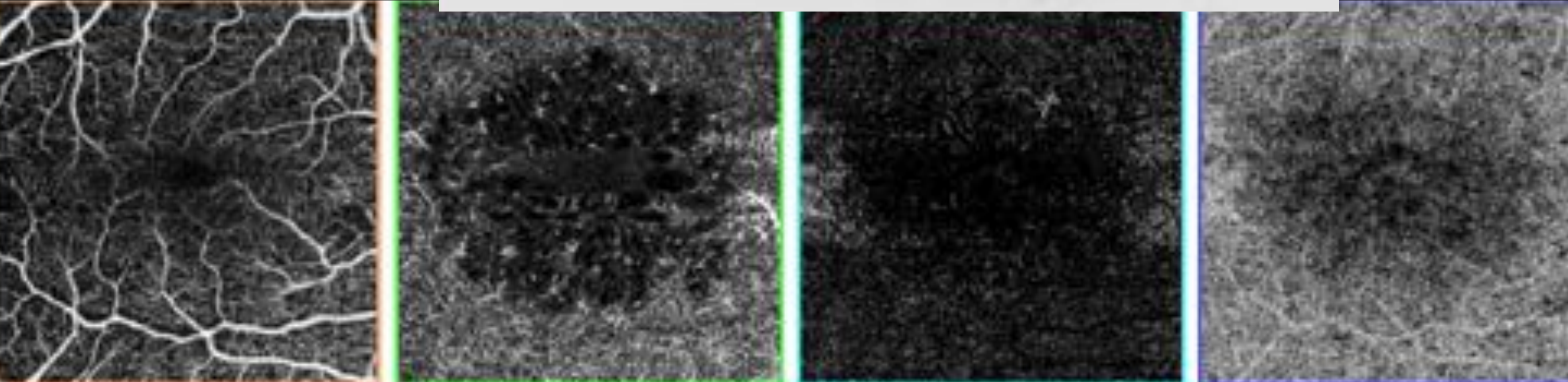
- ❖ One month after surgery CRT correlated with dFAZ in group one ($r=-0.2$, $p=0.008$) and two ($r=-0.4$, $p=0.0001$)
- ❖ This correlation persisted ($p<0.05$)



Postoperative complications

	Group 1 Macula on	Group 2 Macula off	P
Macular edema	1 / 24 (4%)	5 / 50 (10%)	0.3
Increased intraocular pressure	4 / 24 (16%)	6 / 50 (12%)	0.7
Cataract	2 / 24 (8.3%)	6 / 50 (12%)	0.8

Macular edema



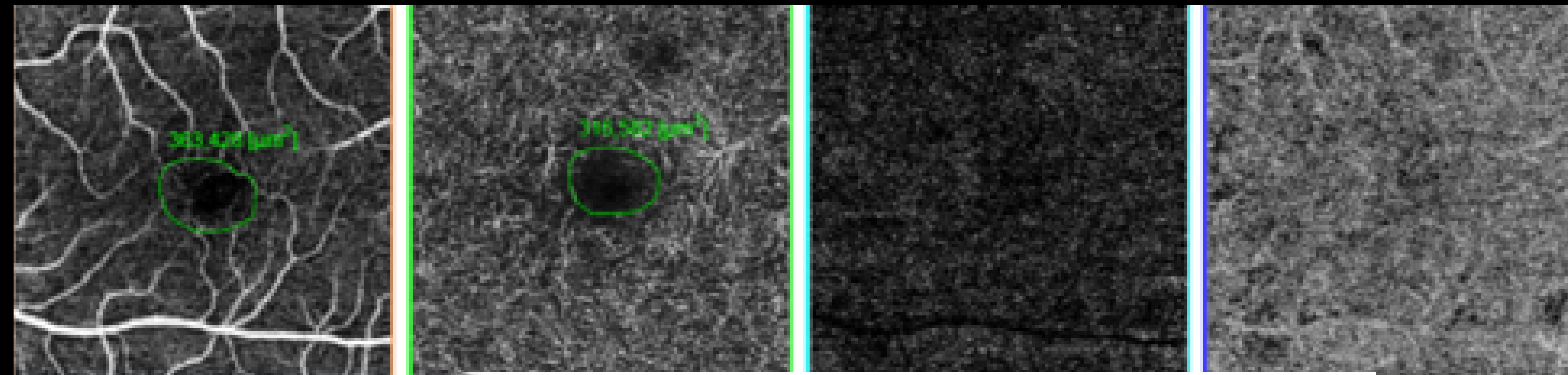
Etiopathogenesis:

- pressure on vessels induced by the buckle) Bonfiglio 2015
- Inflammation (Increased levels of cytokines and PG lead to defects in the blood/ retina barrier and in turn to accumulation of intraretinal fluid)

Treatment:

Mean 4.5 Injections/ 8 months of:

- Aflibercept
- Bevacizumab
- Dexamethasone implant



Macular edema

- ❖ Lower prevalence than in earlier studies (10% vs. 25-30%: Lobes 1980, Tunc 2007) probably due to lack of aphakia and lower age
- ❖ Multiple linear regression analysis revealed that the only analyzed factor associated with the occurrence with macular edema was the age of patients (median 57 vs. median 49 years; $p=0.0018$). However, macular edema was also observed in one patients age 24.
- ❖ Mean vessel density in patients, who later developed macular edema was 58%
- ❖ Mean vessel density in other eyes was 49%

Vessel density at the level of deep retinal plexus

- ❖ One month after surgery lower in group two- both, when compared to group one ($p=0.01$) or to fellow eyes ($p<0.001$)
- ❖ It normalized already during the month 3 control

Conclusions

- ❖ Vessel density one month after surgery was lower in eyes with macula off RD
- ❖ It normalized at later timepoints
- ❖ In regard to vessels visualized in SS-OCT A placement of a scleral buckle does not seem to influence foveal choroidal vasculature in the long term
- ❖ Vasculature in patients after macula- off RD and cerclage normalizes in the long- term