Introduction: We aim to evaluate quantitative changes in the vascular network of eyes with polypoidal choroidal vasculopathy (PCV), regarding differences between normal, intermediate AMD, fellow PCV and PCV affected eyes (objective A), but also prospective changes in treated PCV eyes (objective B), using optical coherence tomography angiography (OCTA).

Materials and Methods: In objective A, we performed a cross-sectional study with 4 study groups: controls (44 eyes), early/intermediate AMD (30 eyes), PCV fellow eyes (7 eyes) and PCV (10 eyes). In objective B we prospectively followed a treatment naïve cohort of PCV eyes, treated with aflibercept 2mg/0.05mL at week 0,4,8 and evaluated with OCTA at week 0 and 16. We used the Cirrus 5000 AngioPlex (Zeiss, Dublin, California, USA) to obtain 3x3 mm OCTA images to quantitatively evaluate the vascular perfusion of the superficial retinal plexus, deep retinal plexus, and choriocapillaris. To test for statistically significant differences between groups, we used One-way ANOVA followed by the non-parametric Games-Howell post-hoc test (objective A) and the Wilcoxon matched-pairs signed-ranks test (objective B).

Results: Regarding objective A, we have found that superficial plexus perfusion density was lower in both affected and fellow PCV eyes when compared to the other groups (all p<0.001), while perfusion density did not differ between them or between controls and early/intermediate AMD. On the other hand, perfusion density at the deep retinal plexus level did not differ between groups. At the choriocapillaris level, while no differences were seen between control and early/intermediate AMD eyes, an ordered and significant decrease in perfusion density was seen for all the other groups (early/intermediate AMD > PCV fellow eyes > PCV eyes, all p<0.001 in paired between groups comparisons). In objective B, we found that following loading dose treatment, at week 16, vessel density was significantly decreased at the superficial plexus and choriocapillaris level (p=0.031 and p=0.038, respectively), with no significant changes at the deep plexus level (p=0.515).

Conclusions: To the best of our knowledge this is the first study to look at PCV and the fellow eye of PCV using quantitative OCT angiography. We have found evidence of a distinct and more ischemic vascular phenotype in the fellow-eye of PCV, with reduced perfusion densities, when compared to intermediate AMD eyes. Finally, OCTA may be able to quantitively track and measure vascular changes following anti-VEGF injection in PCV.