Abstract

Purpose.
• Prospective, observational pilot study
• Image retinal vasculature associated with geographic atrophy (GA) to understand the metabolic support of remaining retinal tissue

Methods.
• Five eyes of five patients with GA
• Mean age 60.8 ± 7.1 years
• Used a spectral domain OCT with prototype angiography software (OCT-A, 10 x 10 degree field, Spectralis, Heidelberg Engineering)
• Areas of atrophy varied
  • Mean horizontal size 2410 ± 1314 um
  • Mean vertical size 2029 ± 559 um
• BCVA requirements: 20/50 or better
• Retinal layers were hand segmented

Results.
• Course and caliber of medium to large superficial vessels appears unchanged over areas of atrophy
• Both superficial and deep plexuses exhibit areas of reduced signal apparently respecting the larger areas of atrophy
• Foveal avascular zone was identifiable despite being within an area of atrophy

Conclusion.
• Area of decreased signal may indicate that fine vessels are not needed in areas of tissue loss

Introduction

• Research about tissue atrophy and its relation to blood supply in GA has been primarily aimed at understanding the choroid
  • Multiple studies show decreased flow of the choroid in and around an area of GA
  • The order of tissue atrophy vs vascular atrophy occurring first depends on the stage of atrophy being studied
• Research about outer retinal tubules (ORT) in areas of retinal atrophy raised questions about retinal vasculature
• We aimed to investigate retinal vasculature in areas of retinal atrophy by answering questions such as:
  • Is the vasculature still present?
  • Is it present to the same degree as non-atrophied tissue?

Discussion

• Expected result
  • Medium to large superficial vessels did not change course and caliber over areas of atrophy
  • Superficial and deep retinal vasculature provide metabolic support to inner retina, not affected by geographic atrophy

• Unexpected results
  • Reduced signal which apparently respects the borders of large areas of atrophy
  • Hypotheses for this reduced signal:
    • Change of tissue position in areas of atrophy
    • Accounted for via hand segmentation
    • Atrophy has progressed enough to affect retinal tissue carrying vasculature, therefore diminished blood flow
  • Artifact of OCTA image
    • Area of reduced signal present in all figures
    • Figures 2 and 3 do not have geographic atrophy at this location
    • Figures 4 – 6 may be coincident that this area roughly aligns with borders of atrophy
  • Reduced signal inferior to the FAZ in figure 3
  • Present in both superficial and deep plexuses
  • Hypotheses for this reduced signal:
    • Segmentation error is not the cause
    • Media opacities and other OCTA artifacts
    • unlikely because small blood vessels cross over this area of reduced signal in the deep plexus
    • True absence of blood flow
    • Absence of detectable blood flow
• Our results lead us to wonder if we might slow the progression of geographic atrophy by increasing retinal vascular perfusion without inducing CNVM

Acknowledgement

Special thanks to Brittany Walker for her help acquiring these OCTA images.

References