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A novel technique for visualizing blood supply of the posterior eye and retina

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Diabetes mellitus (DM) is a metabolic disease that in addition to be characterized by elevated blood glucose is a leading cause of blindness in adults. In addition, previous studies have suggested that DM is one of many risk factors associated with retinal artery occlusion (RAO). Current literature further suggests that the prevalence of diabetes is 21% higher in untreated patients with RAO in comparison to general population in the US. The blood supply of the posterior eye and retina is mainly provided by the branches of ophthalmic artery (OA). One of its primary retinal branches, the central retinal artery (CRA) is well researched but the secondary suppliers, the short posterior ciliary arteries (SPCA) and cilioretinal arteries (CRNA) are not. These arteries may provide alternative perfusion to the retina when branches of the central retinal artery are occluded in a diseased state. The initial purpose of this study was to establish a method to visualize and describe the identified arteries through macroscopic and histological methods. Eyes were harvested from cadavers from both the US and Netherlands population. Initially, the hemisected eyes were injected with India ink and viewed with a dissecting microscope and was deemed unsuccessful in visualizing SPCA and CRA consistently. Consequently, additional eye specimens were embedded into a 50/50 xylene/paraffin wax mixture and optic nerve sections were obtained using a microtome. Structures of the posterior eye such as optic nerve/artery, CRA and SPCA were identified, while CRNA has yet to be visualized, under light microscope after being sectioned and stained with hematoxylin and eosinophil. Future studies are focused on applying this visualization method towards investigating prevalence of SPCA, CRNA and other retinal branches amongst Dutch and American populations and their effects on ocular diabetic complications, specifically retinal artery occlusion and related sequela.

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