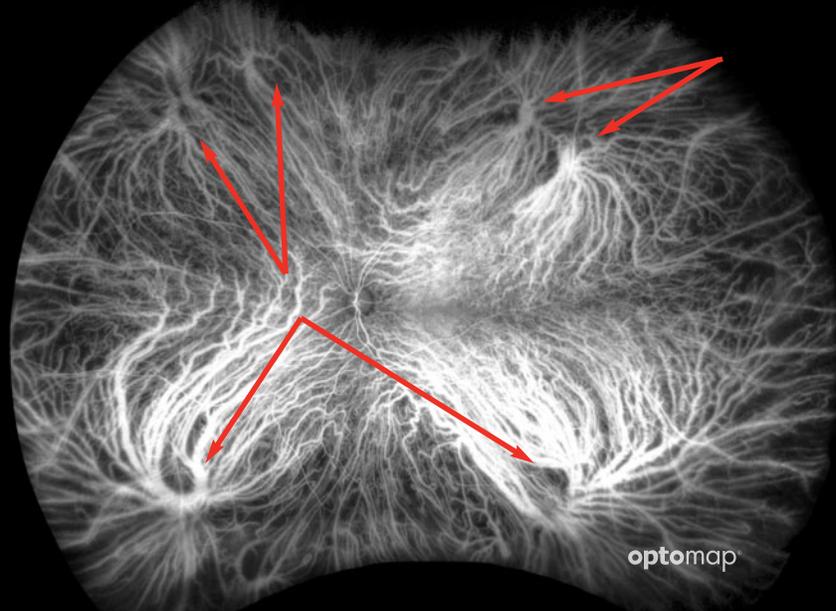


optomap®

SHOWS MORE VORTEX VEIN AMPULLAE THAN PREVIOUSLY REPORTED



Results from a recent publication found that the mean number of vortex vein ampullae is much larger than previously reported.

A recent study of normal subjects using indocyanine green angiography (ICG) to visualize the choroid, found that the number of vortex veins can vary greatly per subject. Researchers found that the mean number of vortex veins was 8 with as many as thirteen observed. The frequency of ampullae was higher in the superior and inferior quadrants than in the nasal and temporal quadrants. Ampullae were never observed in the 3- and 9-o'clock meridians. The mean distance (mm) of a vortex vein ampulla from the optic nerve was observed as 14.2. Another recent study found that the normal peripheral extent of choroidal circulation was estimated to be 893.22mm.²

Understanding the function of the choroid has become more compelling with the advent of anti-VEGF treatments. Recognizing that the mean number of vortex vein ampullae is much higher than previously reported is important because they function as the venous drainage of the choroid into the superior and inferior ophthalmic veins. More vortex veins may impact the drainage of the eye and have an impact on the success of treatment. Therefore, being able to visualize these anatomical structures and their location, has become more important in understanding ocular health. A recent study also found them to be important boundary landmarks for understanding the field of view being visualized by ultra-widefield imaging technologies and that they may be missed by widefield images.³

“In this study of the choroidal drainage pathways using UWF ICGA in healthy eyes, we observed a higher frequency vortex vein ampullae than previously described, with a relatively uniform distribution in the various quadrants.”¹

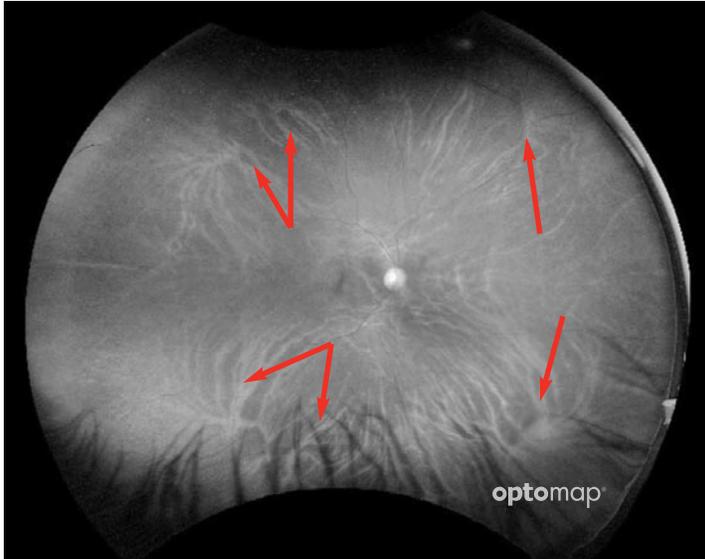
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CLINICAL SUMMARY

Distribution and Location of Vortex Vein Ampullae in Normal Human Eyes as Assessed by Ultra-widefield Indocyanine Green Angiography

Verma, Maram, Alagorie, Gupta, van Hemert, Keane, Carnevale, Bell, Singer, Sadda
Ophthalmology Retina | 2019



Vortex vein ampullae are also visible in **optomap** red channel images.

This study of 36 eyes of 36 healthy subjects looking at the choroid using indocyanine green angiography (ICG) found that there was a significantly larger number of vortex vein ampullae than previously reported.¹ The study was performed using the Optos California device as it has been reported as the only technology that could consistently image out past the vortex veins.²

- The mean number of ampullae observed by UWF ICGA was 8.0 ± 2.1 (range 5-13).¹
- The mean distance (mm) of a vortex vein ampulla from the optic nerve was 14.2 ± 1.1 (10.3 - 17.7).¹
- The frequency of ampullae was higher in the superior and inferior quadrants than in the nasal and temporal quadrants. Ampullae were never observed in the 3- and 9-o'clock meridians.¹
- Multiple regression analysis showed no relationship with age, gender, axial length or ethnicity.¹
- Understanding the number and location of vortex veins is considered critical to prevent inadvertent injury during extraocular surgery.¹
- One current hypothesis is that the presence of these multiple ampullae may function as more potential drainage sites for drugs post-injection, therefore understanding the number and presence of these ampullae may prove important.¹
- The mean area of the peripheral extent was estimated to be 893.2 mm^2 (844.2 to 942.3 mm^2). "The mean distance (range) of this boundary from optic nerve center was 18.22 mm (14.0 to 23.14 mm)"²
- Recently, the International Widefield Imaging Study Group has used the vortex veins as a boundary marker for delineating widefield and ultra-widefield imaging, describing "ultra-widefield as images showing retinal anatomy anterior to the vortex vein ampullae in all 4 quadrants."³

References:

1. Distribution and Location of Vortex Vein Ampullae in Healthy Human Eyes as Assessed by Ultra-Widefield Indocyanine Green Angiography. Ophthalmology Retina. 2019
2. Peripheral extent of the choroidal circulation by ultra-widefield indocyanine green angiography in healthy eyes. BJO. 2020.
- 3 Classification & Guidelines for Widefield Imaging Recommendations from the International Widefield Imaging Study Group. Ophthalmology Retina. 2019.



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