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Abstract

In eyes with pathologic myopia, an alteration of retinal and choroidal vascular system is seen in a wide area of the fundus. Representative changes include peripheral retinal avascular zone and macular vortex veins. Wide-field fundus angiograms are powerful tools to examine the pathologies of retinal and choroidal vasculature in a wide area.

Keywords

Peripheral avascular zone · Macular vortex vein · Fluorescein angiogram · Indocyanine green angiogram

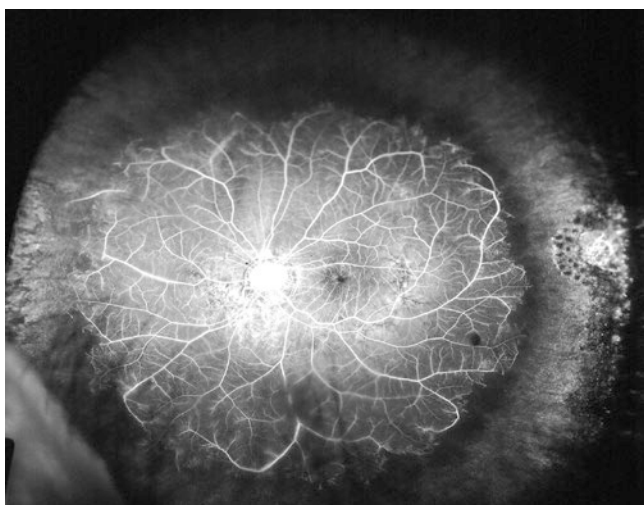


Fig. 15.1 Wide-field fluorescein angiogram showing the peripheral avascular zone in the left fundus of a 59-year-old man with an axial length of 33.0 mm. Reproduced with permission from [1]. Retinal non-perfused area is seen in 360 degree in the peripheral fundus. Retinal capillaries, retinal arterioles, and venules all end abruptly in the periphery. This patient has a history of laser photocoagulation for retinal hole in the temporal fundus

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15.1 Peripheral Avascular Zone

Wide-field fluorescein angiography showed the areas of non-perfusion in the far periphery in 83% of the eyes with pathologic myopia [1] (Figs. 15.1 and 15.2). In addition to a closure of retinal capillaries, retinal arterioles and venules are all occluded as observed by an abrupt ending. In some patients, peripheral avascular zone reaches near the border of posterior staphyloma. The pathogenesis of peripheral avascular zone is not fully clear; however, one possibility is that the vessel-free zone that normally exists in the far periphery becomes wider in axially elongated eyes.

Also, retinal capillary telangiectasia and microaneurysms are commonly seen in the periphery of eyes with pathologic myopia.

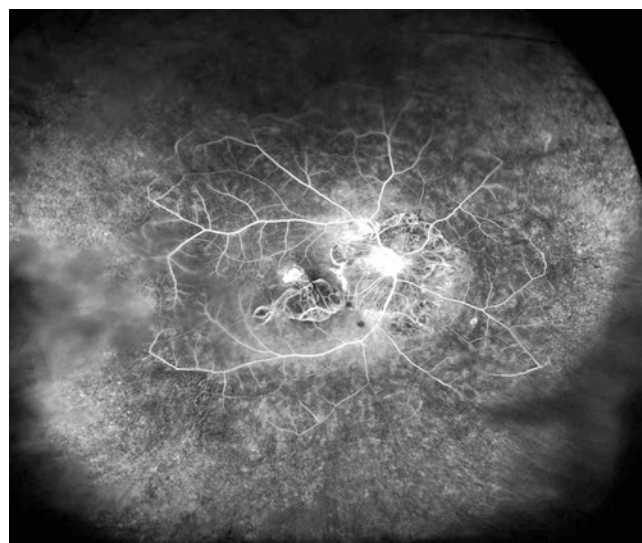


Fig. 15.2 Wide-field fluorescein angiogram showing a very large peripheral avascular zone in the right fundus of a 78-year-old woman with an axial length of 29.0 mm. Reproduced with permission from [1]. All of the retinal arterioles, venules, and capillaries end in the mid-periphery. A wide area of granular hyperfluorescence suggesting the changes of the retinal pigmented epithelium is present in the non-perfused area

15.2 Macular vortex vein (posterior vortex vein)

Choroidal venous blood is usually drained through vortex veins situated in the equator of the eye. However, about 25% of eyes with pathologic myopia have additional vortex veins in the macula (macular vortex vein), and they work as a main venous drainage route in the posterior fundus [2] (Fig. 15.3). The prevalence of posterior staphyloma is significantly higher in eyes with macular vortex veins than those without macular vortex veins [3]. In eyes with macular vortex veins, the orientation of choroidal venous flow is opposite at around mid-peripheral fundus; choroidal venous flow in the posterior segment flows to macular vortex veins, and venous flow outside the posterior segment flows to peripheral vortex veins. In extreme cases, macular vortex veins collect most of the choroidal venous blood, and only scanty vortex veins remain in the periphery (Fig. 15.4) [3]. Branches of macular vortex veins are often dilated. Such stagnation of venous flow may affect the development of myopic maculopathy [4]. In addition to a drainage around the macula, the drainage around the optic disc is also common (Fig. 15.5).



Fig. 15.3 Macular vortex vein in the left fundus of a 62-year-old woman with axial length of 32.3 mm. Macular vortex vein appears to exit the eye at around the fovea. Branches of macular vortex vein are dilated

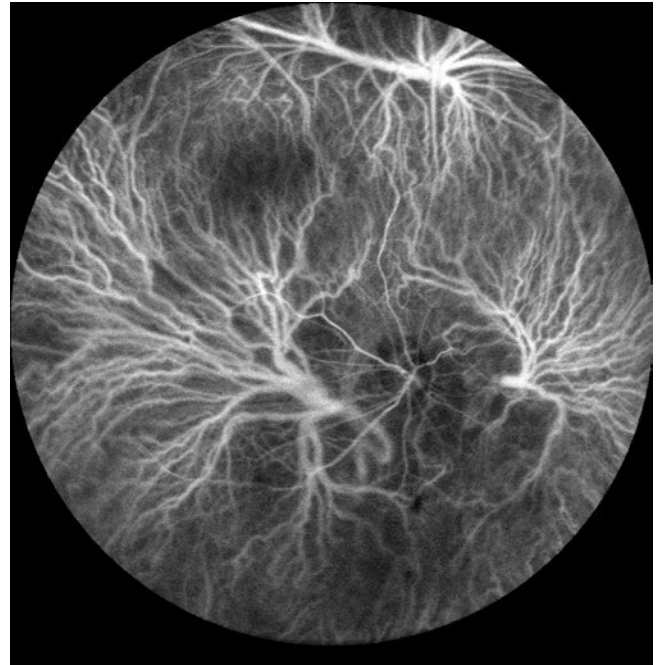


Fig. 15.4 (Reproduced with permission from [3]). Wide-field ICG angiogram showing two posterior vortex veins which cover a very wide area of the fundus. A large posterior vortex vein forms a wide trunk of the ampulla and exits the eye in the macula. This vortex vein covers a wide area up to the periphery. There is another posterior vortex vein draining to nasal to the optic disc. One very small vortex vein remains in the upper periphery

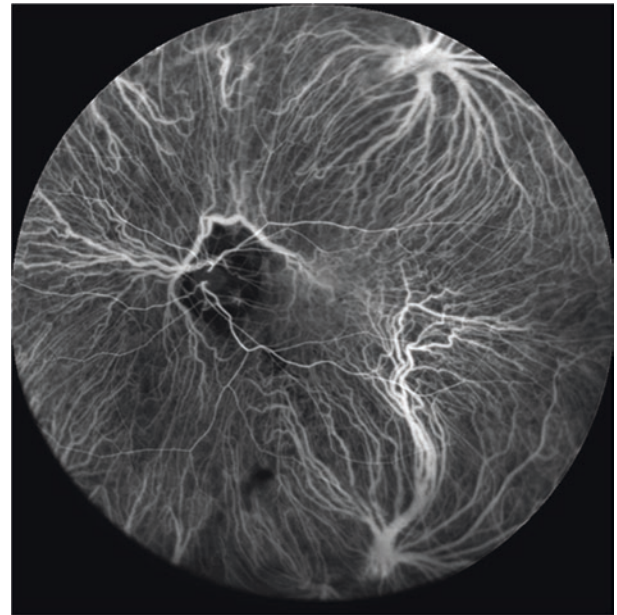


Fig. 15.5 Wide-field ICG angiogram showing posterior vortex vein draining to nasal to the optic disc. This posterior vortex vein seems to collect the venous blood of nasal fundus

References

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