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Morphologic Changes of the Macula in a Patient with Purtscher's Retinopathy

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Key Words

Retinal vessels
Purtscher's retinopathy
Retina
Scanning laser ophthalmoscope

Abstract

Purtscher's retinopathy is a rare complication after trauma to the chest or bone fractures. We report about a patient, which we examined 6 months after a serious car accident. Visual acuity was 20/20 in both eyes. Examination with the Amsler grid revealed a paracentral scotoma in the left eye. In the fluorescein angiography of the left eye performed with a scanning laser ophthalmoscope we found capillary dropout, which corresponded well to the scotoma. Measured by digital image analysis, the area of the foveal avascular zone was eccentrically enlarged by a factor of 4. The mean perifoveal intercapillary area was also enlarged in the corresponding quadrant. This reflects that focal capillary dropout may result in scotoma rather than in a decrease in visual acuity as reported in other diseases.

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Fluorescein angiography using the scanning laser technique enables precise morphologic analysis of the retinal capillary status [1]. Previous studies in patients with diabetic retinopathy [2] showed a global reduction of capillary density in the perifoveal capillary network. This capillary dropout may result in an increase in diffusion length and decreased oxygen support. Furthermore it is associated with a loss of visual acuity [2]. In this report, we present the case of a patient with Purtscher's retinopathy with a focal rarefaction of the perifoveal capillary vasculature which did not affect visual acuity but resulted in a parafoveal scotoma.

Case Report

A 28-year-old man was referred to the Augenlinik Aachen. He complained of blurred vision in his left eye. The medical history was significant for a serious car accident 6 months previously, which resulted in a fracture of the femur. After surgery, the patient was admitted to the intensive care unit for 2 weeks for management of an adult respiratory distress syndrome. At that time, Purtscher's disease was diagnosed by a consultant ophthalmologist based on fundoscopic evidence of cotton wool spots and dilated veins. The left eye was more affected than the right.

At our examination, the patient's best corrected visual acuity was 20/20 in both eyes, and the anterior segment appeared normal. Fundus-scopic biomicroscopy revealed a normal macular

structure in the right eye and altered macular reflexes in the left eye. Examination with the Amsler grid revealed a paracentral scotoma superior to the fixation point in the left eye (fig. 1). Fluorescein angiography with the scanning laser ophthalmoscope was performed followed by an off-line image analysis for the assessment of the perifoveal capillary network. The left eye showed an enlargement of the foveal avascular zone (FAZ) by almost 4 times (0.914 mm^2) as compared to reference values ($\text{FAZ: } 0.231 \pm 0.06 \text{ mm}^2$ [1]). The fixation point assessed by a cross projected onto the retina was not in the middle of the FAZ but appeared more in its upper nasal quadrant. Measurements of the perifoveal intercapillary area (PIA) characterizing capillary density showed slightly enlarged values in the unaffected quadrants ($\text{PIA } 4,674 \mu\text{m}^2$) compared to reference values ($3,900 \pm 381 \mu\text{m}^2$ [1]), whereas in the temporal inferior quadrant the size of the PIA was more than doubled ($8,539 \mu\text{m}^2$; fig. 2). The late phase in the right eye showed a slight enlargement of the FAZ, as well, though much less pronounced. Quantification of these changes was not possible due to the lower contrast in the late phase.

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Fig. 1. Results of the examination with the Amsler grid of the left eye: scotoma drawn by the patient.

Fig. 2. Early transit fluorescein angiogram of the macular network of the left eye. Note the eccentric enlargement of the FAZ temporally and inferiorly (arrowhead).

Blood samples including assessment of glucose and HbA_{1c} were normal. Follow-up fluorescein angiography after 6 months was unchanged. Perimetric examination of the right eye showed no abnormalities.

Comment

This patient's history and the posttraumatic funduscopic examination after the injury led us to the diagnosis of Purtscher's retinopathy. According to the patient and the records of the referring ophthalmologist, there was no head injury or direct eye trauma. Besides Purtscher's retinopathy, retinal arterial occlusions due to a closed head trauma may be discussed, but the bilateral event suggests a systemic cause for the reported changes.

Purtscher's disease is a rare but sometimes severe complication of traumatic injury to the chest and bone fractures.

The pathogenic concept includes capillary occlusions due to complement-activated leukocytes or fat embolism [3,4]. The visual outcome is extremely variable and dependent on the extent of optic nerve head and retinal involvement. Para-central scotomata are common sequelae [5]. In the presented case, capillary occlusions were detected in the PIA resulting in an increased size of PIA and FAZ. The enlargement of FAZ and PIA was eccentric and may be due not only to diffuse capillary loss but also to an obstruction of an arte-riolar tributary. The more focal rarefaction of the perifoveal capillary network in this patient resulted in a parafoveal scotoma. This illustrates that more focal capillary occlusion, alone, can result in a circumscribed scotoma without reduction in visual acuity. In contrast, more diffuse capillary dropout as found in diabetic retinopathy [2] or retinal vein occlusion [6] leads to decreased visual acuity.

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