

PRESERVED VISION DESPITE DISTINCT RETINAL EDEMA IN CENTRAL RETINAL ARTERY OCCLUSION

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Abstract

Background: In subtotal central retinal artery occlusion (CRAO), distinct retinal edema with acute onset irreversible visual loss is common.

Methods: Clinical observation, fluorescein angiogram

Patient: A 69-year-old patient presented with acute visual loss of his right eye. Risk factors for CRAO were arterial hypertension and diabetes mellitus. A further factor was a 60% stenosis of the right and a 90% stenosis of the left internal carotid arteries.

Result: Visual acuity at initial examination was 20/32 despite pronounced central retinal edema with characteristic cherry red spot of the macula. Fluorescein angiography demonstrated early filling of retinal vessels, only perfusion of the inferior macular vessels was delayed. Two months later retinal edema resolved and central visual acuity was 20/25.

Conclusion: In this patient, retinal edema most likely resulted from a transient retinal ischemia. Spontaneous reperfusion occurred early enough to allow functional recovery in the ischemic retina.

Key words: Central retinal artery occlusion; retinal edema; visual acuity; stenosis of the carotid artery; vascular risk factors; arteriosclerosis.

with slight macular edema. Both eyes had been already successfully treated by cataract surgery some years ago.

Funduscopy of the right eye revealed a pronounced central retinal edema with the characteristic cherry red spot in the macula (Fig. 1). Fluorescein angiography demonstrated early filling of retinal vessels, only perfusion of the inferior macular vessels was delayed (Fig. 2). No embolus was detected. The visual field (Goldmann perimeter) of the right eye showed a small relative central scotoma together with a constriction of the peripheral field. After several control examinations, every one to two weeks, the visual field slowly improved.

OPTICAL COHERENCE TOMOGRAPHY (OCT)

The OCT investigation of the central retina (Fig. 3) showed in the right eye a distinct edema (foveolar area: $222 \pm 47 \mu$; central: 302μ , temporal: 359μ , nasal: 417μ ; superior: 405μ , inferior: 377μ).

INTRODUCTION

In subtotal central retinal artery occlusion (CRAO), early retinal edema with acute onset irreversible visual loss close to blindness is common [1, 2].

In the following, we describe a case with good visual acuity despite distinct central retinal edema.

METHODS

A 69-year-old patient had a 20-year history of arterial hypertension and a four-year history of diabetes mellitus with a 60% stenosis of the right and a 90% stenosis of the left internal carotid arteries. He noticed a decrease in visual acuity of his right eye on waking in the morning. The day after this event he presented in our institution.

RESULTS

Visual acuity of the right eye was 20/32 (tested with Landolt rings). The visual acuity of his left eye was only 20/100 due to diabetic background retinopathy

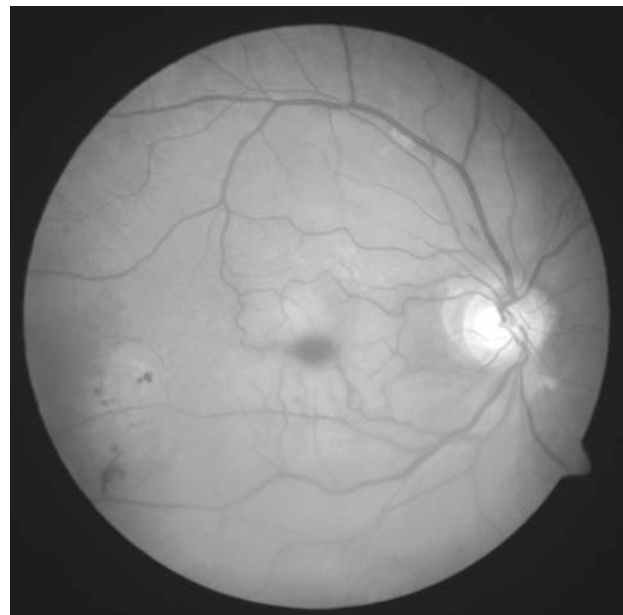


Fig. 1. RE: Central retinal edema with a cherry red spot of the macula. Circumscribed old chorioretinal scar temporal to the macular area.

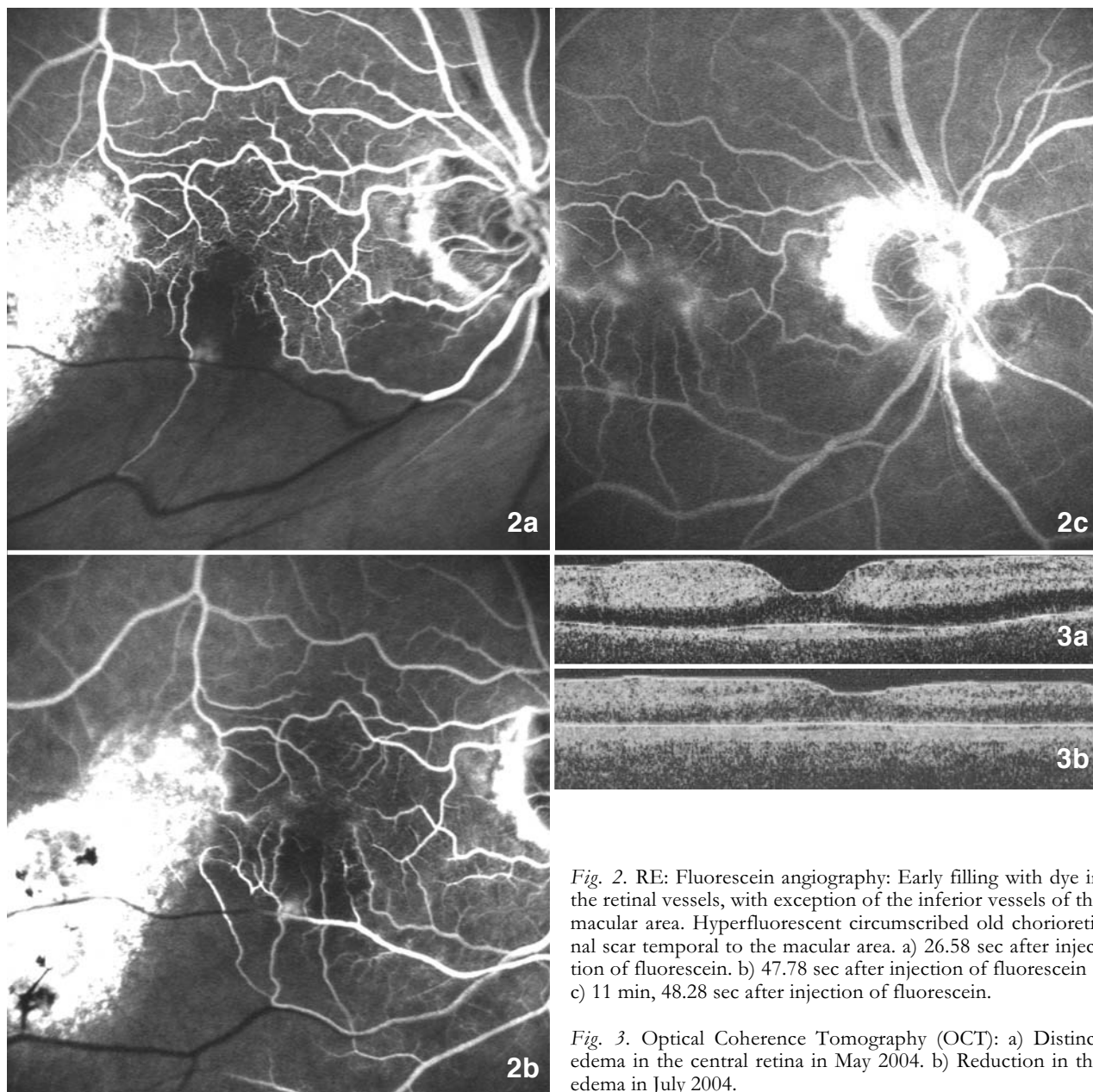


Fig. 2. RE: Fluorescein angiography: Early filling with dye in the retinal vessels, with exception of the inferior vessels of the macular area. Hyperfluorescent circumscribed old chorioretinal scar temporal to the macular area. a) 26.58 sec after injection of fluorescein. b) 47.78 sec after injection of fluorescein c) 11 min, 48.28 sec after injection of fluorescein.

Fig. 3. Optical Coherence Tomography (OCT): a) Distinct edema in the central retina in May 2004. b) Reduction in the edema in July 2004.

Two months later the edema had disappeared (foveal area: $195 \pm 51 \mu$; central: 210μ ; temporal: 184μ ; nasal: 241μ ; superior: 216μ ; inferior: 256μ).

ULTRASONOGRAPHY OF THE CAROTID ARTERIES

Doppler sonography of the extracranial arteries demonstrated a 60% stenosis of the right and a 90% stenosis of the left internal carotid arteries.

FOLLOW-UP

During the observation of four months with several control intervals, the retinal edema gradually diminished and a slight increase of visual acuity to 20/25 with a better reading ability was documented. The visual field improved slightly. The edema, shown in the OCT was clearly reduced after only two months.

DISCUSSION

In our patient relatively good visual acuity was observed in the presence of a pronounced central retinal edema. This good visual acuity in combination with signs of severe retinal ischemia is unusual and has to the best of our knowledge not yet been described. Brown and Magargal [3] found in 73 eyes with acute or subacute CRAO visual acuities of counting fingers in 51%, recognition of hand movements in 23%, light perception in 16% and no light perception in 4%. Visual acuity in only two eyes was 6/30 (20/100) and in additional two eyes 6/60 (20/200).

In a series of 178 patients with CRAO [4], a distinct edema in the central retina with a massive decrease in visual acuity ("subtotal CRAO") or a slight edema in the central retina with a partial reduction in visual acuity ("incomplete CRAO") were found.

CRAO is usually due to an embolic process originating from the carotid artery or the heart [5, 6, 7]. On the other hand, retinal arterial occlusions may also arise in arterial hypertension [8] or it may be due to an arterial spasm [9].

We assume that in our patient, the unusual discrepancy between retinal edema and relatively good visual function was caused by a transient obstruction of the central retinal artery. In our patient a pronounced visual loss of vision could have occurred in the beginning of the episode. Presumably, the occlusion most likely resolved spontaneously and the central retinal artery and its tributaries were then reperfused. Ischemia lasted long enough to induce a marked edema but reperfusion occurred early enough to allow functional recovery.

This corresponds to the findings by Hayreh [8] who pointed out that in patients with CRAO the presence of normal retinal circulation by no means exclude the previous occurrence of a retinal arterial occlusion. Hayreh and Jonas [10] found in monkeys a significant correlation between duration of CRAO and decreased visibility of retinal nerve fiber layers.

The earliest change in CRAO is a loss of retinal transparency with gray or white coloration of the affected area [5]. The term "retinal edema" is used in the literature because it is an accepted description of the retinal changes occurring in CRAO. It is known, however, that edema, swelling of the ganglion cells [11], and an accumulation of axoplasmic flow are present in the retina in CRAO [12].

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