Visual System Involvement in CADASIL

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Background and objective: Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is a hereditary arteriolar small-vessel disease caused by *Notch3* mutations. A detailed definition of the neuro-ophthalmologic spectrum of CADASIL might provide new insights in the pathophysiology of small-vessel diseases. Therefore, this study aims to precisely delineate the features and the prevalence of the visual system impairment in CADASIL. *Methods:* A cohort of 34 genetically confirmed CADASIL patients was enrolled in an observational cross-sectional study. Subjects underwent a complete neuro-ophthalmological evaluation. Clinical features and common cardiovascular risk factors were also considered. Data were compared with those already reported in previous studies. *Results:* Both afferent and efferent visual structures were commonly impaired in CADASIL patients. Retinal microvascular changes such as arteriolar narrowing and arteriovenous nicking, described in most patients and detected also in asymptomatic carriers, reflect the typical hemodynamic changes of CADASIL. However, less frequent findings, like early macular and lens changes, would indicate a possible further role played by susceptibility to premature aging and degeneration. Cotton wool spots and vessel occlusions were not common. Finally, eye movement abnormalities suggest that the brainstem is particularly vulnerable to damage in CADASIL. *Conclusions:* Although no specific or prominent neuro-ophthalmologic finding can be considered as hallmark of the disease, afferent and efferent visual system abnormalities could be accounted as complementary markers to study cerebral small-vessel diseases. **Key Words:** CADASIL—neuro-ophthalmology—small-vessel disease—retinal vessels.

Introduction

Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is an inherited adult-onset microangiopathy, caused by mutations in *Notch3* gene and clinically characterized by migraine with aura, mood disturbances, recurrent transient ischemic attacks (TIAs), and strokes leading to severe disability, dementia, and premature death.[1]

Although impairment of both the afferent and the efferent visual pathways has been described at all stages of the disease, reported findings are sometimes conflicting and the true extent of the involvement of the visual system in CADASIL has not been specifically established. However, investigating the neuro-ophthalmologic profile of CADASIL may usefully provide new insights in the pathophysiology of the disease and identify potential clinical markers. Moreover, because CADASIL is considered a model of pure small-vessels disease, the identification of pathological features by means of noninvasive and reproducible methods might help in defining some general mechanisms of microvascular damage. Increasing evidences, actually, indicate the examination of retinal

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