

Myelinated Retinal Nerve Fibers, a Complicating Factor in Amblyopia Rehabilitation?

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ABSTRACT

Myelinated retinal nerve fibers (MRNFs) have the appearance of white striated patches with poorly defined borders and are considered like a benign congenital anomaly. In this clinical case, a 25-year-old patient presented for an optical correction renewal. During the examination an amblyopia in the right eye was found associated with extensive MRNFs in the superotemporal region of the retina. In his childhood an amblyopia rehabilitation therapy was performed with partial recovery. The persistence of amblyopia despite appropriate treatment could be due to the presence of extended MRNFs.

In the literature the most common association of MRNFs are with amblyopia, ametropia and/or strabismus. In those cases the rehabilitation seems to be less effective, a treatment more aggressive is recommended with refraction under cycloplegia and total occlusion adapted to the patient's age. The presence of extended MRNFs would not be the cause of amblyopia but it seems to be a complicating factor in the visual prognosis. The main prognostic elements, as in the case of isolated amblyopia, are the initial visual acuity and the magnitude of anisometropia.

Keywords: Myelinated Retinal Nerve Fibers, Amblyopia, Occlusion Therapy

INTRODUCTION

Myelinated Retinal Nerve Fibers (MRNFs) can be observed on fundus photography. This has the appearance of white striated patches with poorly defined borders caused by a developmental error leading to myelination of retinal ganglion cell fibers by ectopic oligodendrocytes. The prevalence of MRNFs is low, ranging from 0.34% [1] to 0.98% [2], and there is no variation according to the origin or sex of the patients. Apart from associated pathologies, this type of fiber remains stable over time [2]. It is considered as a rare and mostly benign congenital anomaly. The objective is to show that in young children, the presence of extensive myelin fibers should be monitored more regularly by ophthalmologists.

CASE REPORT

A 25-year-old patient presented for a sensation of decreased vision and optical correction renewal. The glasses used by the patient had a correction of (-1.25×110) on the right eye and $+0.5 (-0.25 \times 15)$ on the left eye. On the automatic refractometer, the refractive error was $+0.5 (-1.75 \times 105)$ for the right eye and $+1 (-0.5 \times 180)$ for the left eye. During the examination the patient mentions wearing glasses since childhood and had undergone a long occlusion therapy for unilateral amblyopia. The best-corrected visual acuity (BVCA)

was 20/50 in the right eye with a correction of $+0.5 (-1.75 \times 105)$ and 20/20 in the left eye with a correction of $+0.5 (-0.5 \times 180)$.

Extensive MRNFs in the superotemporal region of the retina in the right eye were found on fundus photography (Figure 1). No macular abnormality was detected; however few small subretinal deposits were noted without any impact on vision. In this patient, the amblyopia persisted despite the occlusion therapy, we can think that the extensive MRNFs may be the cause.

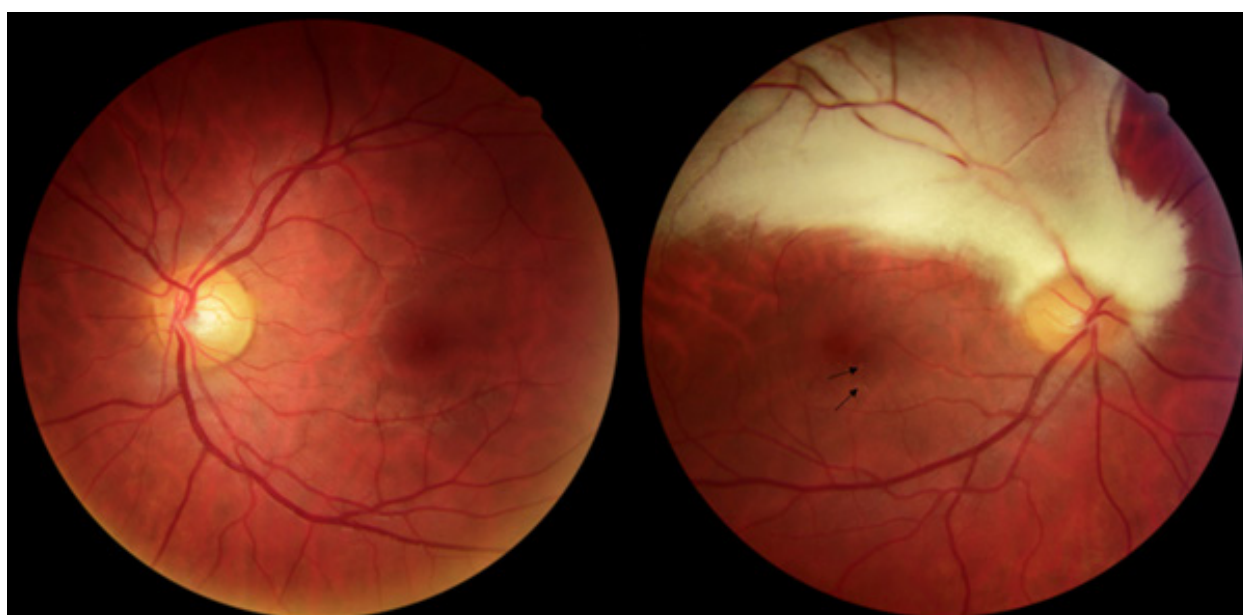


Figure 1: Fundus photo of the patient. No abnormalities were observed in the left eye (left image), whereas extensive myelinated retinal nerve fibers were observed in the superotemporal region of the right eye (right image). The arrows show the subretinal deposits.

DISCUSSION

MRNFs are not considered to have an effect on vision. Studies have shown a possible enlargement of the blind spot on visual field examination when the fibers are located around the optic nerve [3]. This enlargement is lower than what could be expected due to the partial passage of light information through the myelin [2]. The most common association of MRNFs is the presence of amblyopia, ametropia and/or strabismus [2,4].

In cases combining strabismus, amblyopia and unilateral myopia, an improvement in visual acuity is observed in only 16 to 55% of patients during amblyopia rehabilitation by

occlusion therapy [5]. The standard treatment for amblyopia is the occlusion of the dominant (non-amblyopic) eye with an adhesive patch to stimulate the visual development of the amblyopic eye. Aggressive treatment can be successful: refraction under cycloplegia and total occlusion adapted to the patient's age are recommended in these cases [5,6]. The treatment is started with an attack phase that varies according to the age of the child; one week per year of life (e.g. 3 weeks for a 3 year old child). During this phase, the occlusion of the eye is permanent (total occlusion day and night). Then, we progressively decrease the wearing of the patch while monitoring the vision of both eyes and the preservation of the isoacuity.

Rehabilitation appears to be beneficial for the patient's visual acuity, with at least partial recovery [6]. This is a significant result considering the initial visual prognosis. Amblyopia associated with myelinated retinal nerve fibers and anisometropia appears more severe than amblyopia due to isolated anisometropia. In cases with lower anisometropia, patient recovery appears to be better [7,8]. The location and extent of the fibers are highlighted by some authors as having a correlation with expected recovery. MRNFs located in the peripapillary area are more associated with the presence of strabismus and/or amblyopia [8]. Myelination of the macula is possible but extremely rare [9]. Furthermore, the presence of extensive fibers seems to be more associated with the presence of anisometric myopic amblyopia [10].

CONCLUSION

The presence of extended MRNFs would not be the cause of amblyopia because it is found in isolated cases in many patients. However, it seems to be a complicating factor in the visual prognosis of amblyopic children when it is present. The main prognostic elements, as in the case of isolated amblyopia, are the initial visual acuity of the affected eye and the magnitude of anisometropia.

DECLARATION OF COMPETING INTEREST:

The author has no conflict of interest to declare.

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