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Assessing the effect of idebenone in LHON by silent-MT 7T-MRI of the optic nerve requires appropriate study designs

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1 LETTER TO THE EDITOR

With interest we read the article by Grochowski et al. about an investigation of the optic nerves in 6 patients with Leber's hereditary optic neuropathy (LHON) receiving idebenone and 9 LHON patients not receiving idebenone by means of a Zero Echo Time (ZET) 7T MRI sequence with an Adiabatic Spectral Inversion Recovery (ASPIR) fat suppression pulse (silent-MT 7T-MRI) [1]. It was concluded that the technique confirms known pathology of the optic nerve in LHON [1]. We have the following comments and concerns.

We disagree with the notion that 'LHON is a disorder of the optic nerve. LHON is pirmarely a disorder of the retinal ganglion cells (RGCs), which is why it can be diagnosed by the ophthalmologist. Secondarily, LHON affects dendrites and axons of RGCs resulting in asymmetric optic atrophy.

There are no striking conclusions from this study. The only results were that the silent-MT at 7T depicts the optic nerve with high quality and artefact-free, that quantitative measures of the optic nerve can be obtained, and that LHON optic nerves showed focal hyperintensities.

The authors do not differentiate b etween L HON and LHON plus [2]. LHON exclusively affects t he retina, whereas LHON plus is characterised by multiorgan involvement, affecting i n p articular t he e yes b ut a lso t he brain, endocrine organs, bone marrow, arteries, kidneys, peripheral nerves, and the heart [2]. We should know how many of the included patients had LHON and how many LHON plus. This is crucial as it may determine the outcome of these patients [3].

The main shortcoming of the study is that the authors suggest that the technique can document an idebenone effect but do not prove it. The design of the study is inappropriate to assess any treatment effect. It would be necessary to compare a LHON cohort before, during, and after idebenone therapy, preferentially in a cross-over design.

Differences in the left optic nerve diameter 3, surface area 3 and right optic nerve diameter 2 not necessarily are attributable to an idebenone effect. Height; body weight, heteroplasmy, mtDNA copy number, age, sex, age at onset, risk factors, adherence to therapy, onset of treatment after diagnosis, and duration of treatment have to be considered [4]. There are also several patients with spontaneous recovery or improvement [5].

Differences between left and right optic nerve are the rule in LHON and not the exception. Thus, the finding about side differences is a confirmation of what is known. Why are hyperintensities within the optic nerve not attributable to anterior ischemic optic neuropathy (AION) or posterior ischemic optic neuropathy (PION)? Were cardiovascular risk factors assessed in each of the included patients?

Silent-MT parameters should be correlated with measures of visual acuity, visually evoked-potentials, electroretinography, and retinal nerve fiber layer (RNFL) thickness as assessed by on optical coherence tomography (OCT).

Overall, this interesting study has a number of shortcomings, which need to be addressed before drawing conclusions. Correlations between quantitative silent MT measures and the genetic variables respectively the clinical and instrumental assessment of visual functions are warranted.

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REFERENCES

[1] Finsterer J, Zarrouk-Mahjoub S. Leber's hereditary optic neuropathy is multiorgan not mono-organ. Clin Ophthalmol. 2016;10:2187–2190.

[2] Pemp B, Kircher K, Reitner A. Visual function in chronic Leber's hereditary optic neuropathy during idebenone treatment initiated 5 to 50 years after onset. Graefe's Archive for Clinical and Experimental Ophthalmology. 2019;257(12):2751–2757. Available from: https://dx.doi.org/10.1007/s00417-019-04444-6.

[3] Leo-Kottler B, Jacobi F, Christ-Adler M. Lebersche Optikusneuropathie mit klinischer Besserung. Der Ophthalmologe. 2000;97(12):849–854. Available from: https://dx.doi.org/10.1007/s003470070007.

[4] Grochowski C, Symms M, Jonak K, Krukow P, Wood TC, Ljungberg E, et al. The Evaluation of Optic Nerves Using 7 Tesla "Silent" Zero Echo Time Imaging in Patients with Leber's Hereditary Optic Neuropathy with or without Idebenone Treatment. Journal of Clinical Medicine. 2020;9(4):1112–1112. Available from: https://dx.doi.org/10.3390/jcm9041112.

[5] Finsterer J, Stöllberger C, Michaela J. Familial left ventricular hypertrabeculation in two blind brothers. Cardiovascular Pathology. 2002;11(3):146–148. Available from: https://dx.doi.org/10.1016/s1054-8807(01)00087-4.

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