

Retinal nerve fiber layer thickness in refractory chronic migraine patients

V. Favoni, S. Cevoli, G. Pierangeli, G. Giannini, R. Terlizzi, C. La Morgia

Department of Biomedical and NeuroMotor Sciences (DIBINEM) Alma Mater Studiorum-University of Bologna, IRCCS Scienze Neurologiche, Bologna, Italy.

Background:

Thinning of the retinal nerve fiber layer (RNFL) thickness has been documented by optical coherence tomography (OCT) in a few studies in migraine patients¹⁻⁹. Some studies reporting reduction of the RNFL thickness put forward the hypothesis of retinal hypoperfusion. There is still a lack of studies evaluating RNFL thickness in chronic migraine patients⁹.

Aim:

To evaluate by OCT the RNFL thickness in chronic migraine patients compared to control subjects.

Methods:

In a prospective study, we evaluated RNFL thickness by OCT in a series of 28 patients with refractory chronic migraine. All subjects underwent average and single sectors (temporal, superior, nasal and inferior) RNFL thickness measurements by OCT (StratusOCT, software version 4.0.1; Carl Zeiss Meditec Inc, Dublin, CA, USA). Chronic migraine patients were compared with age and gender-matched controls. For both groups we used a randomly selected eye for further statistical analysis. The Student's t test has been used to compare OCT values between migraine and control groups (p value < 0.05).

Results:

• **28 patients** with refractory chronic migraine were enrolled (21 F, 7 M; mean age 50.1 ± 10.8 years; range 23–67 years) and compared to **43 sex and age matched controls** (32 F, 11M; mean age 49.6 ± 12.1 years; range 23–68 years).

• The RNFL average thickness did **not significantly differ** in both groups and did not significantly differ between patients and controls ($97.4 \pm 8.4 \mu\text{m}$ in migraine patients vs $99.5 \pm 13.0 \mu\text{m}$ in controls, $p=0.37$).

• Moreover, there was **no significant difference** in the RNFL thickness in any of the optic nerve quadrants analyzed.

	CDH		CTRL		T-TEST
	MEAN	STD.DEV	MEAN	STD.DEV	
AGE	50,14	10,85	49,65	12,07	0,8621
AVG	97,04	8,41	99,54	12,98	0,3716
T	69,75	10,07	69,63	12,36	0,9653
S	115,57	12,37	120,84	18,85	0,1959
N	75,96	12,76	81,56	18,67	0,1699
I	126,86	17,16	126,58	20,79	0,9536

Author	Migraine Patients (n)	Controls (n)	Diagnostic technique	Chronic Migraine	RNFLT reduction
Tan et al. 2005	39	25	SCP	no	None
Martinez et al. 2008	70	53	OCT	no	T
Martinez et al. 2009	57	44	SCP	no	AVG
Gipponi et al. 2013	24	16	OCT	no	S
Kirbas et al. 2013	50	40	OCT	no	S
Yukel et al. 2013	50	50	OCT	no	AVG
Sokhabi et al. 2013	60	30	OCT	no	N
Ekhinci et al. 2014	90	30	OCT	no	AVG+T+S+I
Demican et al. 2015	76	40	OCT	no	N
Reggio et al. 2015	27	42	OCT	yes	AVG
Present study	28	43	OCT	yes	None

Table 1: Evaluation of retinal nerve fiber layer thickness in literature.

RNFLT: retinal nerve fiber layer thickness; SCP: scanning laser polarimetry; OCT: optical coherence tomography; T: temporal quadrant; AVG: average; S: superior quadrant; N: nasal quadrant; I: inferior quadrant.

Conclusions:

➤ In our series of refractory chronic migraine patients, we failed to detect differences in the RNFL thickness between patients and controls.

➤ Our results are similar to those reported in a study using scanning laser polarimetry which failed to detect significant RNFL thinning in migraine patients¹⁰.

➤ A larger number of patients is needed to confirm these findings.

References

- Martinez A, Proupim N, Sanchez M. Retinal nerve fibre layer thickness measurements using optical coherence tomography in migraine patients. Br J Ophthalmol. 2008;92(8):1069-75.
- Martinez A, Proupim N, Sanchez M. Scanning laser polarimetry with variable corneal compensation in migraine patients. Acta Ophthalmol. 2009;87(7):746-53.
- Gipponi S, Scaroni N, Venturelli E, Forbice E, Rao R, Liberini P, Padovani A, Semeraro F. Reduction in retinal nerve fiber layer thickness in migraine patients. Neurol Sci. 2013;34(6):841-5.
- Kirbas S, Tufekci A, Turkyilmaz K, Kirbas A, Oner V, Durmus M. Evaluation of the retinal changes in patients with chronic migraine. Acta Neurol Belg. 2013;113(2):167-72.
- Yukel F, Dirik EB, Eren Y, Simavli H, Uğurlu N, Çağlı N, Şimşek Ş. Macula and retinal nerve fiber layer in migraine patients: analysis by spectral domain optical coherence tomography. Semin Ophthalmol. 2015;30(2):124-8.
- Sokhabi R, Mostafaei S, Ahoor M, Talebi M. Evaluation of retinal nerve fiber layer thickness in migraine. Iran J Neurol. 2013;12(2):51-5.
- Ekinci M, Ceylan E, Çağatay HH, Keleş S, Hüseyinoğlu N, Tanyıldız B, Cakici O, Kartal B. Retinal nerve fibre layer, ganglion cell layer and choroid thinning in migraine with aura. BMC Ophthalmol. 2014 31;14:75.
- Demircan S, Atas M, Ank Yüksel S, Ulusoy MD, Yuvacı I, Arifoğlu HB, Başkan B, Zarsız G. The impact of migraine on posterior ocular structures. J Ophthalmol. 2015;2015:868967.
- Reggio E, Chisari C, Ferrigno G, Patti F, Zappia M. Evaluation of retinal nerve fiber layer thickness (RNFLT) with optical coherence tomography spectral domain (OCT-SD) in migraine patients. Neurology 2015; 84 (14): Supplement P1.294.
- Tan FU, Akarsu C, Güllü R. Retinal nerve fiber layer thickness is unaffected in migraine patients. Acta Neurol Scand. 2005;112(1):19-23.