

Retinal nerve fiber layer may predict partial recovery in optic neuritis

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Objective: to evaluate retinal nerve fiber layer (RNFL) in patients with multiple sclerosis (MS) during optic neuritis (ON) or not-optic neuritis (nON) MS relapse and after six months.

Materials and Methods: patients were selected from a cohort of patient consecutively referred to the MS centre of University of Catania, in the period between December 2013 and April 2014. visual function was evaluated with Optical Coherence Tomography (OCT) and high and low-contrast letter acuity during ON and nON MS relapse (T0) and after six months (T1). Measurement of RNFL and ganglion cell (GC) thickness, macular volume (MV) and foveal thickness (FT) were calculated. Disability was assessed by Expanded Disability Status Scale (EDSS).

Results: Ninety relapsing-remitting (RR) MS patients, 60 women (66.6%), age 36.0 ± 10.7 (mean \pm SD), EDSS pre-relapse 1.9 ± 2.0 , disease duration 91.9 ± 82.2 months, were enrolled (Table 1). Twenty-seven patients (30%) experienced an ON MS relapse. Average RNFL was significantly higher in ON at T0 compared with nON and with ON at T1 (111.0 ± 22.5 vs 95.5 ± 15.2 , $p=0.003$; vs 96.6 ± 20.0 , $p=0.02$) (Table 2-3). The most involved sectors were superior and inferior. Moreover, in ON at T1 GC layer thickness was thinner compared with T0 (74.4 ± 8.7 vs 67.7 ± 6.4 ; $p=0.002$). High and low-contrast visual acuities were both significantly reduced in ON at T0 compared with T1 (100%: 19.8 ± 9.9 vs 40.4 ± 8.5 $p<0.001$; 2.5%: 9.1 ± 6.6 vs 29.5 ± 11.0 $p<0.001$; 1.25%: 4.6 ± 5.7 vs 21.0 ± 8.9 $p<0.001$). Multivariate logistic regression analysis showed that a higher RNFL average and a higher number of relapses are predictors of poor recovery (OR 1.35, 95% CI 1.03-3.42 $p=0.05$; OR 3.54, 95% CI 1.82-3.84 $p=0.01$).

Table 1.

	Tot.	ON	nON	p
N° patients (%)	90	27 (30%)	63 (70%)	0.05
Sex ratio F/M (%)	60 (67%)	19 (70%)	41 (65%)	0.6
Age (mean \pm SD)	36 ± 10.7	34.6 ± 10.1	36.6 ± 10.9	0.4
Disease duration (months; mean \pm SD)	91.9 ± 82.2	95.4 ± 91.8	90.4 ± 78.5	0.8
N° of relapse (mean \pm SD)	5.4 ± 4.2	5.1 ± 4.4	5.5 ± 4.1	0.6
Previous ON (mean \pm SD)	37 (41%)	15 (56%)	22 (35%)	0.07
EDSS pre-relapse (mean \pm SD)	1.9 ± 2.0	1.1 ± 1.3	2.2 ± 2.1	0.004
EDSS relapse (mean \pm SD)	3.0 ± 1.9	2.1 ± 1.2	3.1 ± 2.0	0.05
EDSS after relapse (mean \pm SD)	2.4 ± 2.0	1.8 ± 1.6	2.3 ± 1.9	0.1
Recovery (%)	47 (52%)	17 (63%)	30 (48%)	0.2

Figure 1.

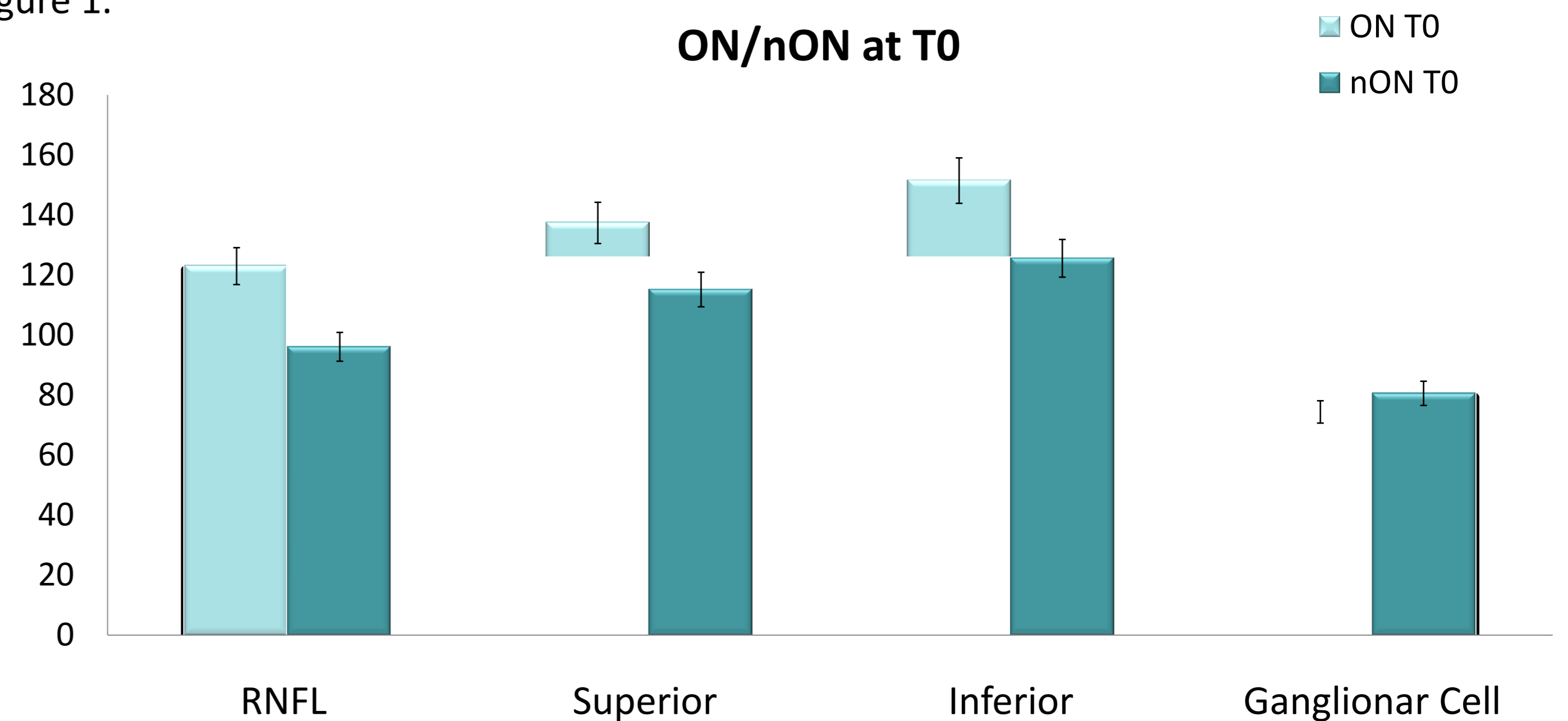


Table 3.	ON		p
	T0	T1	
RNFL	123.0 ± 19.5	96.6 ± 20.2	<0.0001
Nasal sector	74.4 ± 17.4	72.6 ± 20.0	0.7
Temporal sector	81.4 ± 21.5	75.0 ± 21.7	0.3
Superior sector	137.4 ± 30.1	116.1 ± 22.9	0.005
Inferior sector	151.5 ± 32.3	122.1 ± 21.6	0.0002
Macular Volume	9.6 ± 0.8	9.6 ± 0.7	0.9
Foveal Thickness	243.4 ± 15.0	246.4 ± 13.4	0.4
Ganglionic Cell	74.4 ± 8.8	70.9 ± 7.5	0.6

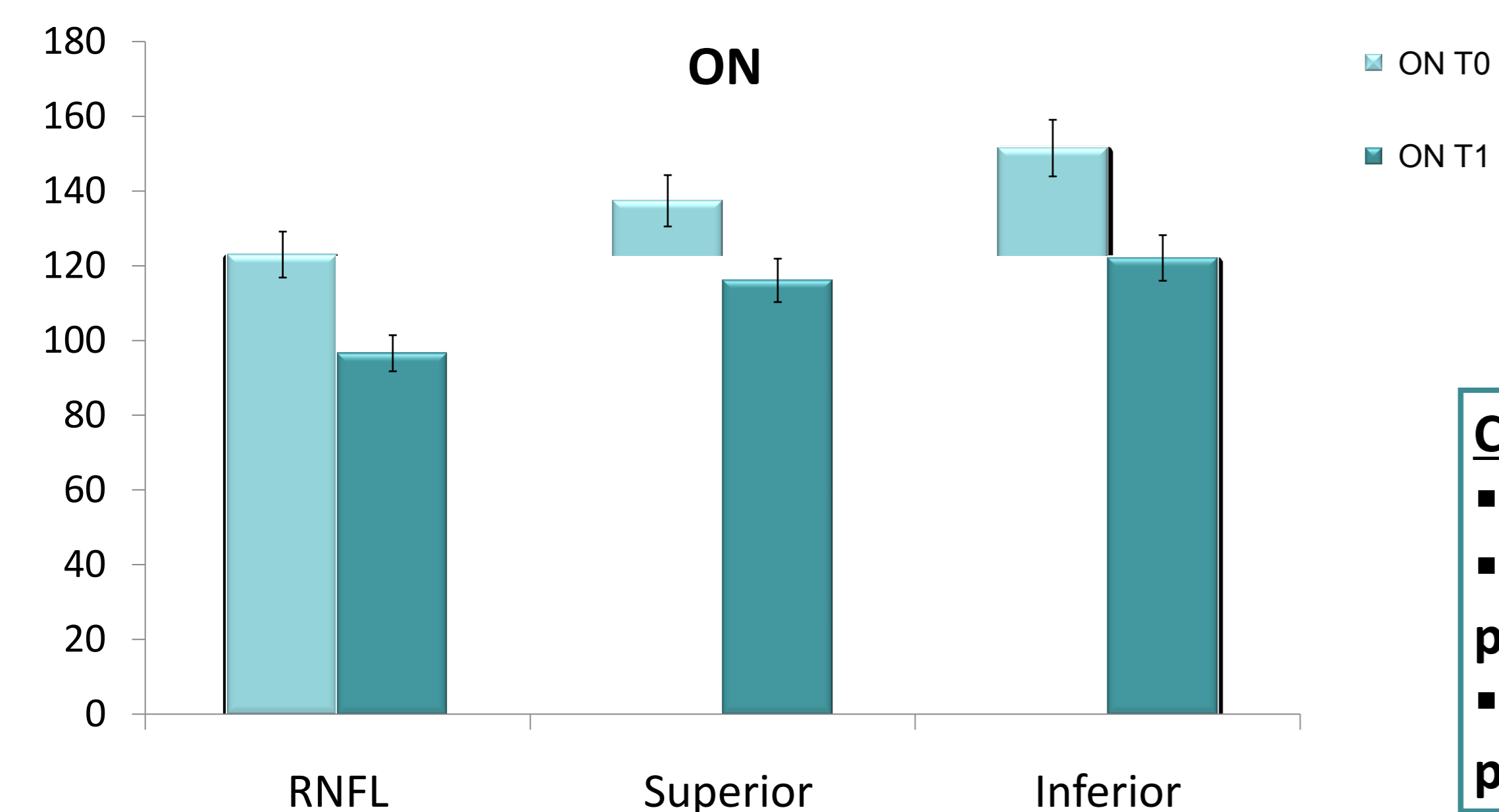


Table 3.	ON T0	nON T0	P
RNFL	123.0 ± 19.5	96.1 ± 15.2	<0.0001
Nasal sector	74.4 ± 17.4	74.1 ± 13.5	0.9
Temporal sector	81.4 ± 21.5	69.1 ± 18.1	0.007
Superior sector	137.4 ± 30.1	115.2 ± 19.4	0.0001
Inferior sector	151.5 ± 32.3	125.6 ± 19.1	<0.0001
Macular Volume	9.6 ± 0.8	9.9 ± 0.7	0.05
Foveal Thickness	243.4 ± 15.0	247.5 ± 14.4	0.2
Ganglionar Cell	74.4 ± 8.8	80.6 ± 9.2	0.004

Conclusion:

- Higher RNFL thickness may reflect fiber swelling
- Thinning following acute ON may support the role of axonal injury in MS pathology
- Swelling of RNFL in acute ON may identify patients with high probability of partial recovery

Stephanie B. Syc et Al. Optical coherence tomography segmentation reveals ganglion cell layer pathology after optic neuritis. Brain 2012; 135; 521-533.

Yi Dua et Al. Disc swelling and mild initial visual acuity loss predict a better short-term visual acuity outcome in bilateral acute optic neuritis. Journal of Clinical Neuroscience 19 (2012) 1380-1382