Natural Course of Chronic Non-arteritic Anterior Ischemic Optic Neuropathy : Pattern Electroretinography review

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INTRODUCTION

Pattern electroretinography (pERG) was known to reflect retinal ganglion cell activity. In non-arteritic anterior ischemic optic neuropathy (NAION), the main pathology occurs at the level of the optic nerve, concerning the axons of retinal ganglion cells (RGC). After RGC apoptosis, retinal nerve fiber layer (RNFL) decline occurs and will manifest as a visual field disturbance in chronic phase NAION.

PURPOSE

to evaluate the natural course of chronic phase NAION in terms of pERG, RGC thickness and visual field defect.

METHODS

Figure 1. Optic disc atrophy in chronic NAION patient

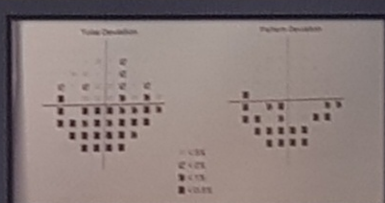

Figure 2. Inferior altitudinal field defect in NAION patient

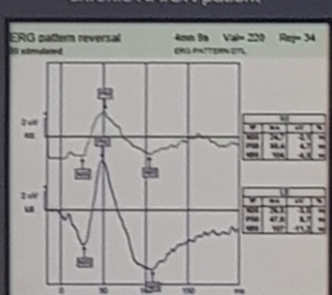

Figure 3. pERG of NAION at right eye (amplitude P50 and N95 ↓ compared to left eye)

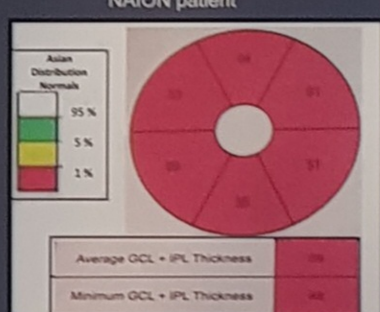

Figure 4. Thinning of RGC thickness in NAION patient

- Prospective at Cipto Mangunkusumo Hospital
- November 2016-April 2017

Chronic NAION patients (>6 weeks onset and disc atrophy)

Consecutive sampling

- pERG using Vision Monitor Monpack one, Metrovision and DTL electrode
- Optical Coherence Tomography (OCT) *Cirrus™* panomap
- Humphrey HFA II-i 750, 24-2 threshold

Examinations were repeated 1 month and 2 months after the 1st one

RESULTS

TOTAL 23 eyes of 17 Patients

11 unilateral | 6 bilateral

1st visit = 24 (12-104) weeks after onset

Figure 5. Comparison p50 amplitude in NAION and fellow normal eyes (p<0,001)

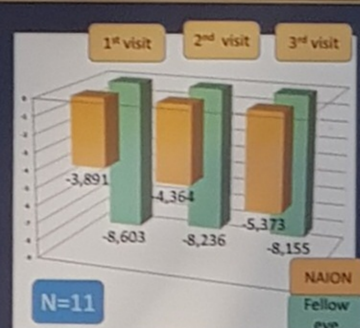

Figure 6. Comparison N95 amplitude in NAION and fellow normal eyes (p<0,001)

Correlation was found between P50 amplitude at 1st visit-RGC thickness at 3rd visit (r = -0,558, p=0,02) and N95 amplitude 1st visit-RGC thickness at 3rd visit (r=0,519, p=0,033)

Table 1. Comparison of P50 and N95, RGC thickness and visual field defect at 1st until 3rd visit (N=23)

Parameter	1st Visit	2nd Visit	3rd Visit	P value
Amplitude P50 (µv)	4,839±1,921	5,291±2,256	5,622±2,377	0,008
Implicit time P50 (ms)	56,652±7,832	55,104±4,426	54,904±6,179	0,563
Amplitude N95 (µv)	-4,304±1,224	-5,574±3,296	-6,213±2,956	0,01
Implicit time N95 (ms)	116,5±14,777	115,248±16,051	117,653±17,49	0,841
RGC thickness(µm)	58,82±15,977	58,59±18,07	61,41±17,321	0,406
Mean deviation (dB)	-17,965(-31,23- -6,32)	-14,365(-30,58- -5,59)	-15,25(-31,27- -11,04)	0,304
Pattern specific deviation (dB)	10±4,071	10,729±4,193	11,814±3,209	0,897

CONCLUSION

Unlike conventional concept, chronic phase NAION still showed fluctuation of P50 and N95 amplitude, suggesting the possibility of regenerating RGC function although its thickness and the visual field defect have stabilized.

P50 and N95 amplitude could differentiate the unilateral NAION and correlated with final RGC thickness.

Keywords : non-arteritic anterior ischemic optic neuropathy; pattern electroretinography; retinal ganglion cell thickness; visual field

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