

– Abstract –

The Significance of Cognitive Evoked Potentials in Non-Insulin Dependent Diabetic Patients

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Objectives : To investigate the findings of cognitive evoked potentials in non-insulin dependent diabetes mellitus (NIDDM) patients and to correlate modified mini-mental state examination (3MS), diabetic complications, and laboratory parameters with cognitive evoked potentials.

Methods : Forty-three NIDDM patients with the duration greater or equal to 5 years and thirty age-, sex-, and education-matched normal controls were recruited for this study. 3MS, nerve conduction studies, cognitive evoked potential test, fluorescent angiography were performed and laboratory parameters such as serum HbA1C, triglyceride, and total cholesterol were obtained via blood sampling.

Results : 1) The latencies of P300 were significantly prolonged in NIDDM patients compared with controls. 2) There was reverse correlation between the score of 3MS and the latencies of P300 in NIDDM patients. 3) The latencies of P300 were not clearly correlated with the laboratory parameters in NIDDM patients. 4) The latencies of P300 were prolonged in NIDDM patients with peripheral neuropathy and retinopathy, but, not prolonged in NIDDM patients with nephropathy.

Conclusion : Cognitive function may be impaired in NIDDM patients without apparent symptoms and signs of central nerve system damage and the latencies of P300 may be useful in evaluating cognitive dysfunction objectively in NIDDM patients.

Key Words : Cognitive evoked potentials, Non-insulin dependent diabetes mellitus, Modified mini-mental state examination, P300

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5
43
30

(Event Related Potential) , 1965 Sutton
1 가 가 300
msec 가 2.
, Halgren 2

(N100), P2(P200), P3(P300) P1(P50), N1 3MS
N100, P300 가 , HbA1C,
. N100 , 24
100 msec Hillyard 3 가 Nicolet
Viking 4 plus
, P300 Hillyard Wood⁴
가 , , ,
P300 가 , , ,
, P300 가 , , ,
, 8,9 , 10 , 5,6 , 7 , 6 , 11 가 ,
Nicolet Viking 4 plus
750 msec 2000 Hz, 20%
750 Hz, 80% 50 (odd-
ball paradigm) 70 dB 0.9
12,13 가 ,
, 14 , 15,16
, 17 , 16,18,19 10-20
Cz , ,
가
3MS, P300
SPSS 10.0 T- , Pearson ,
Mann-Whitney , Spearman rho

1.

2001 1

가 1) 26 , 17 43 ,
, 54.4 ± 11.0 , 12.9

± 6.1 , 8.7 ± 3.4 .
 17 , 13 30 , 52.9 ± 15.3 ,
 9.0 ± 3.7 (Table 1).

2) 3MS 가 79.1 ± 15.3
 94.9 ± 3.8
 ($p < 0.05$)(Fig. 1).

3) P300 가 323.8 ± 27.0 msec
 294.1 ± 12.5 msec
 ($p = 0.01$)(Fig. 2).

4) P300 3MS ,
 가 - 0.704 3MS 가 P300 ,
 가 가 ($p < 0.01$)(Fig. 3).

5) P300 HbA1C ,
 , 가
 $0.033, 0.025, 0.334$
 ($p > 0.05$).

6) P300 ,
 P300 ($p = 0.044$,

Table 1. Age and Sex Distribution of the Patients and Controls

| | Patients | Controls |
|---------------------------------|-----------------|-----------------|
| Age(years) | 54.4 ± 11.0 | 52.9 ± 15.3 |
| Sex(numbers) | | |
| Male | 26 | 17 |
| Female | 17 | 13 |
| DM ¹ Duration(years) | 12.9 ± 6.1 | |
| Education Duration(years) | 8.7 ± 3.4 | 9.0 ± 3.7 |

1. DM : Diabetes mellitus

Values are mean and standard deviation

Table 2. The Latencies of P300 in Patients Divided by Presence or Absence of Diabetic Complications

| | Number of Patients | P300 latency (msec) | p value |
|-------------|--------------------|---------------------|---------|
| Neuropathy | | | 0.044* |
| Yes | 21 | 333.4 ± 26.4 | |
| No | 22 | 314.7 ± 24.8 | |
| Retinopathy | | | 0.041* |
| Yes | 18 | 331.6 ± 24.3 | |
| No | 14 | 311.1 ± 27.1 | |
| Nephropathy | | | 0.687 |
| Yes | 5 | 326.8 ± 40.0 | |
| No | 27 | 326.1 ± 26.0 | |

Values are mean and standard deviation

* $p < 0.05$

$p = 0.041$), P300 ($p = 0.687$)(Table 2).

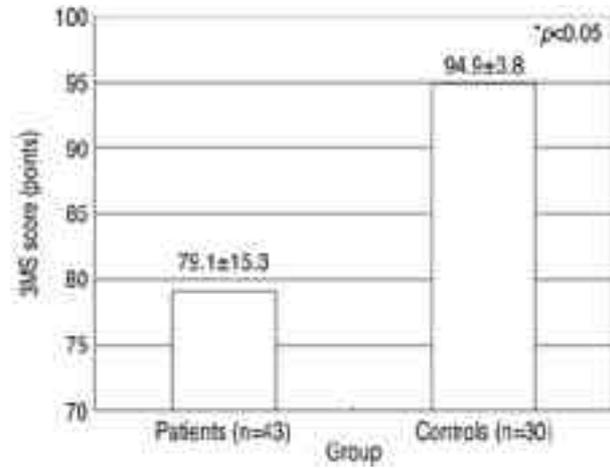


Fig. 1. The scores of 3MS in patients and controls

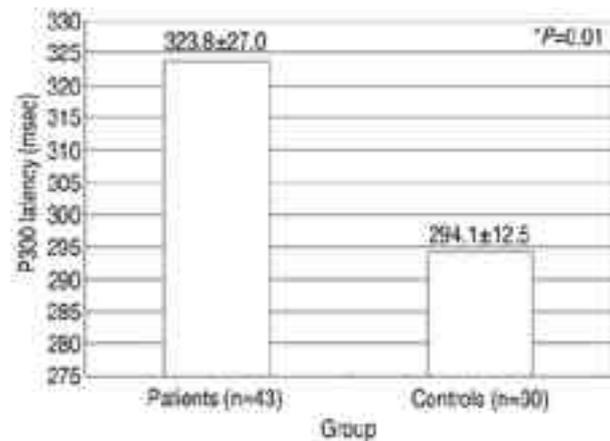


Fig. 2. The latencies of P300 in patients and controls

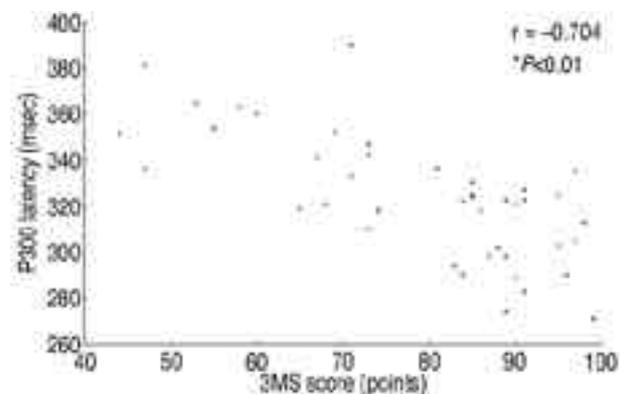


Fig. 3. Scatter diagram of the latencies of P300 according to the scores of 3MS

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