

– Abstract –

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

In Sung Choi, M.D., Jae Young Han, M.D., So Young Lee, M.D.,
Jae Hyung Kim, M.D., Sam Gyu Lee, M.D., Sung Man Rowe, M.D.

Department of Rehabilitation Medicine, Chonnam National University College of Medicine, Kwangju, Korea

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

Address reprint requests to In Sung Choi, M.D.
Department of Rehabilitation Medicine, Chonnam National University College of Medicine
8 Hak-1-dong, Dong-gu, Kwangju 501-757, Korea
Tel : 82-62-220-5186, 5198, Fax : 82-62-228-5975, e-mail : drchois@hanmail.net

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
,
5,6 7 6 11
, 8,9 , 10 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).

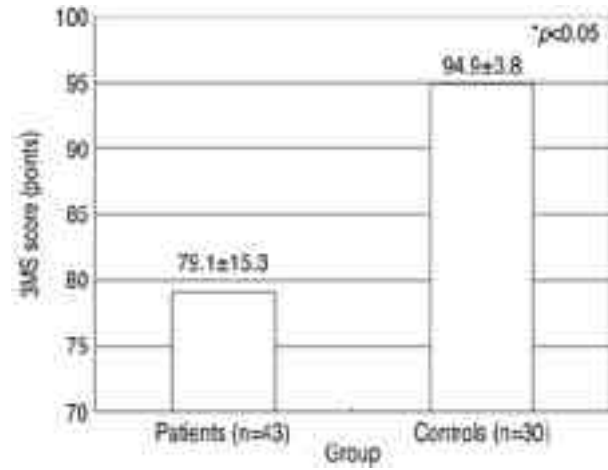


Fig. 1. The scores of 3MS in patients and controls

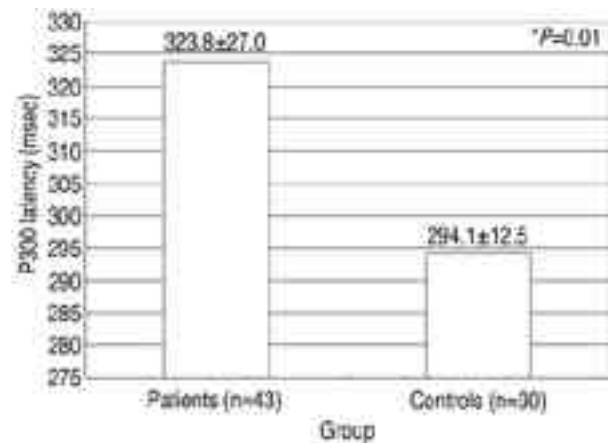


Fig. 2. The latencies of P300 in patients and controls

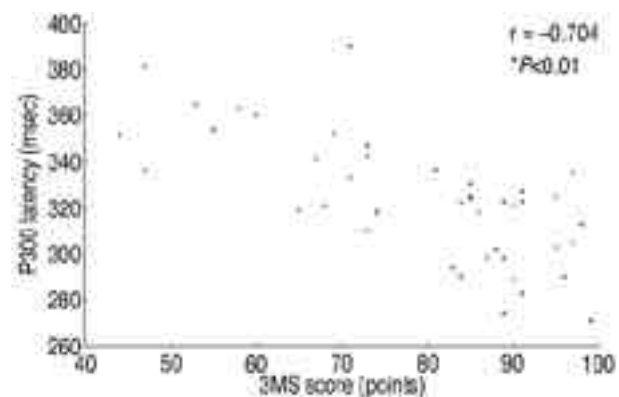


Fig. 3. Scatter diagram of the latencies of P300 according to the scores of 3MS

P300

,²⁷

가 P300 가 ,

, Kurita¹⁹

P300 가 , P300

가

가 , Ryan²⁸

가 1)

, 2)

가

19 13

1965 Sutton¹

가 Kurita¹⁹ P300

, Moora-

Phillips²⁰ dian¹²

가

Carr²¹

, Kropotov Ponomarev²²

P300

가

P300 가

P300 가

가 가

, Folstein²⁹ Mini-Mental State Examination(MMSE)

,³⁰

1987 Teng Chui³¹가 MMSE

3MS

,¹⁹ ,²³

3MS

,²⁴ 가,²⁵

12,23

12,18 26

Kurita¹⁹ HbA1C가 10%

P300 가

4~8

MMSE 100

3MS

Worrall³²

P300 Tallroth²³ HbA1C

가

Mooradian¹²,²⁷

. Dey¹⁸ P300 가 . Digit Span

P300

P300 Mooradian¹²

가 ,²⁷

가

P300 가 Ryan Geckle¹³

가 ,
3MS 가
, 3MS P300
가
가
가
가 가
43
30
1) P300 가
2) P300 3MS
3MS 가 P300 가
3) P300 가
P300
가
가

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