

정신분열병과 양극성 장애의 P300 비교

박인준*[†] · 정희연* · 권영준*

Comparison of P300 between Schizophrenia and Bipolar Disorder

In-Joon Park, M.D.,*[†] Hee-Yeon Jeong, M.D.,* Young-Joon Kwon, M.D.*

ABSTRACT

Objective : Asymmetries in evoked potential P300 topography of schizophrenia and bipolar disorder are still controversial. The purpose of this study was to examine the difference in P300 topography between schizophrenia and bipolar disorder.

Method : P300 was recorded from 16 schizophrenic, 15 bipolar manic, and 16 control subjects. All were right - handed. Subjects silently counted target stimuli(2.0kHz) among trains of standard stimuli(1.0kHz). Averages were constructed from brain responses to target stimuli.

Results :

- 1) Schizophrenics displayed significantly smaller peak amplitude of P300 over Cz, Pz, T3 than controls.
- 2) Schizophrenics displayed significantly smaller peak amplitude of P300 over T3 than bipolar manics.
- 3) Schizophrenics displayed significantly smaller peak amplitude of P300 over T3 than their T4.
- 4) Schizophrenics displayed significantly delayed latency of P300 over T3 than bipolar manics.
- 5) Schizophrenics displayed significantly delayed latency of P300 over T3 than their T4.

Conclusions : Left - sided P300 abnormality, especially left superior temporal gyrus, in schizophrenics relative to bipolar manics and controls suggests that psychophysiological cause of schizophrenia and bipolar disorder is different and P300 asymmetry is specific to the psychophysiological cause of schizophrenia.

KEY WORDS : P300 · Schizophrenia · Bipolar disorder.

서 론

Salisbury (1998) 300msec P300 (latency), P300 (amplitude) (Sadock Sadock 1999). Squire (1975) P300 2가 P300 240msec P300 350msec P300 Donchin (1984) P300

Department of Psychiatry, College of Medicine, Soonchunhyang University, Chon-an, Korea

[†]교신저자 : , 330 - 100 23 - 20) (041) 570 - 2282,) (041) 574 - 7992

Knight (1989) (superior temporal gyrus) (stroke) P300
 Stapleton (1987) P300
 Johnson(1988) P300
 (1999) 가 가 Strik (1998) 가
 P300 P300 P300
 P300 P300
 P300 가
 P300
 (McCarthy 1989 ; Halgren 1986 ; Halgren 1995a ; Halgren 1995b) (Ford 2000 ; Cobourn 1998) P300 가 가
 P300 P300
 가 P300
 P300

연구대상 및 방법

(standard stimuli) (target stimuli)
 “oddball task”
 가 (Roth 1986 ; Pritchard 1986).
 P300 P300
 (amplitude) (latency)
 P300
 가 . Javitt (1995) 8)
 31 10 가
 P300
 1. 연구대상
 2000 2 2000 7
 DSM -
 (American Psychiatric Association 1994)
 16 (12 , 4)
 15 (7 ,
 16
 (8 , 8)

Table 1. Demographic data of the subjects

Items	Schizophrenia (n=16)	Bipolar disorder (n=15)	Control (n=16)	p-value
	Mean ± SD	Mean ± SD	Mean ± SD	
Number(male/female)	16(12/4)	15(7/8)	16(8/8)	
Age(years)	35.3 ± 8.58	29.1 ± 7.00	29.1 ± 4.69	0.07*
Handedness(EHI†)	0.91 ± 0.08	0.93 ± 0.09	0.91 ± 0.08	0.14*
Duration of illness(months)	80.0 ± 50.0	62.6 ± 61.6		0.44**
Medication(CPZ equiv.)	950.0 ± 350.2	655.7 ± 361.3		0.89**

† : Edinburgh handedness inventory * : One-way ANOVA ** : t-test

29.1 ± 7.00 , 35.3 ± 8.58 , 1.0 (2).
가 (1). 29.1 ± 4.69 (1992)
(K - WAIS)
chlorpromazine
가 (Kaplan Sadock 1998) (CPZ , .
equiv.) 950.0 ± 350.2mg, 14.5 ± 1.6 ,
655.7 ± 361.3mg 가 , 15.5 ± 1.5 , 16.6 ± 1.5
80.0 ± 50.0 , , 14.9 ±
62.6 ± 61.6 가 (1). 2.1 , 15.7 ± 1.2 , 16.9 ± 1.3 가
(2).
Overall Gor-
ham(1962) (BPRS) 33.0 ±
36.5 ± 6.0 , 가 (American Ps-
8.7 (2). 34.8 ± 4.7
(Edinburgh Handedness Inventory, Edinburgh
Oldfield(1971) EHI)
37.0 ± 3.2 (2).
P300
(Neuronics MN32) . P300
0.91 ± 0.08 , 0.93 ± 0.09 ,
0.91 ± 0.08 가 , , , , , ,
(1). 가 가 (Polich 1992 ; Polich
1993).
(1999),
가 (Ag - AgCl) , 10~20
5.0
Park Kwon(1990) (Ko-
rean version of mini - mental state examination, MMSEK) KOhm 가 . Fz, Cz, Pz, T₃, T₄
P300
'oddball paradigm'
가 24 , 1000Hz ,
2 1
. 3 2000Hz
(oddball ratio) 4 : 1
26.4 ± 1.6 50msec, 80dB, 0.3~1.0
27.6 ± 2.0 , 27.4 ± 643msec ,

Table 2. Group characteristics and basic cognitive functioning

Items	Schizophrenia (n=16)	Bipolar disorder (n=15)	Control (n=16)	p-value
	Mean ± SD	Mean ± SD	Mean ± SD	
MMSEK [†]	26.4 ± 1.6	27.6 ± 2.0	27.4 ± 1.0	0.09*
K-WAIS ^{††}				
Information	14.5 ± 1.6	15.5 ± 1.5	16.6 ± 1.5	0.16*
digits forward & backward	14.9 ± 2.1	15.7 ± 1.2	16.9 ± 1.3	0.18*
BPRS ^{†††}	36.5 ± 6.0	33.0 ± 8.7		0.17**
GAF Scale ^{††††}	34.8 ± 4.7	37.0 ± 3.2		0.16**

† : Korean version of mini-mental state examination
†† : Brief psychiatric rating scale
* : One-way ANOVA

††† : Korean version of Wechsler adult intelligence scale
†††† : Global assessment of functioning scale
** : t-test

0.5Hz, 50Hz 가 (3).

2) P300 Cz 4.1 ± 1.1uV, Pz 4.5 ± 0.8uV, T3 3.8 ± 1.1uV, 5.8 ± 1.6uV, 6.2 ± 1.5uV, 5.2 ± 1.1uV (p<0.05). Fz T4

(correct counted percent=number of correct count stimuli/number of given stimuli × 100, CCP) CCP 가 (3).

가 100 ± 10% 3) T3 P300 3.8 ± 1.1uV T4 5.2 ± 0.9uV (p<0.05) (3).

(Neuronics MN32) 4) Fz, Cz, Pz, T3, T4 P300 가 (3).

Global Field Power Measurement(GFPM) (Skrandie 1989 ; Michel 1993) 2. P300 잠복기

P300 250~500msec 가 GFP 1) T3 P300 410.0 ± 38.5msec 355.7 ± 70.1msec (p<0.05). Fz, Cz, Pz, T4

(amplitude) 가 (3).

3. 통계처리 (One - way ANOVA) 2) P300 Fz, Cz, Pz, T3, T4 가 (3).

OVA with Scheffe test) t - test T4 가 (3).

p<0.05 3) T3 P300 410.0 ± 38.5msec T4 355.9 ± 59.2msec (p<0.05)(3).

4) Fz, Cz, Pz, T3, T4 P300 가 (3).

결 과

16 (12 , 4), 15 (7 , 8) 16 (8 , 8) P300

고 찰

1. P300 전위값

1) T3 P300 3.8 ± 1.1uV 5.3 ± 1.7uV (Am-
(p<0.05). Fz, Cz, Pz, T4

Table 3. P300 amplitude and latency

	Fz	Cz	Pz	T3	T4
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Peak P300 amplitude(μ V)					
Schizophrenia	5.2 ± 1.3	4.1 ± 1.1*	4.5 ± 0.8*	3.8 ± 1.1*†‡	5.2 ± 0.9‡
Bipolar disorder	5.5 ± 4.0	5.6 ± 2.0	5.8 ± 2.2	5.3 ± 1.7†	4.7 ± 2.3
Control	5.6 ± 1.4	5.8 ± 1.6*	6.2 ± 1.5*	5.2 ± 1.1*	4.7 ± 1.0
Peak 300 latency(msec)					
Schizophrenia	353.3 ± 61.3	341.6 ± 56.5	347.0 ± 60.8	410.0 ± 38.5**¶	355.9 ± 59.2¶
Bipolar disorder	345.3 ± 64.5	349.3 ± 65.2	366.3 ± 64.1	355.7 ± 70.1**	352.9 ± 62.3
Control	348.3 ± 65.3	353.5 ± 70.9	360.9 ± 73.8	362.8 ± 63.3	349.4 ± 69.8

* : Differ significantly between schizophrenic and control groups(p<0.05, ANOVA)
 † : Differ significantly between schizophrenic and bipolar disorder groups(p<0.05, ANOVA)
 ‡ : Differ significantly between T3 and T4 of schizophrenic group(p<0.05, t-test)
 ** : Differ significantly between schizophrenic and bipolar disorder groups(p<0.05, ANOVA)
 ¶ : Differ significantly between T3 and T4 of schizophrenic group(p<0.05, t-test)

erican Psychiatric Association 1994).

P300

가 P300 P300
가 P300 (amplitude)
P300 (latency)

(Ploich 1992 ; Polich 1993). P300

가 P300 Mo-
rstyn (1983) 10
(CPZ equiv.) P300

Polich(1992) P300
Pfefferbaum (1989)

Blackwood (1987) P300
P300 Ford (1994), Weisbrod
(1997)

가 P300 P300 P300

가 (BPRS) 27 26 19
Souza (1995)

가 가 (GAF Scale) P300
가 34.8 ± 4.7 P300

37.0 ± 3.2

(American Psych- Salisbury (1998)
iatric Association 1994). 14 P300

P300 Cz $4.1 \pm 1.1\mu V$, P300

Pz $4.5 \pm 0.8\mu V$, T3 $3.8 \pm 1.1\mu V$

$5.8 \pm 1.6\mu V$, $6.2 \pm 1.5\mu V$, $5.2 \pm 1.1\mu V$

T3 P300

$5.3 \pm 1.7\mu V$

T3 P300 T4

$5.2 \pm 0.9\mu V$

35 20

T3 P300 $410.0 \pm 38.5\text{msec}$ 30 Salisbury (1999)

가 $355.7 \pm 70.1\text{msec}$ P300

가

T3 P300 T4 $355.9 \pm 59.2\text{msec}$

가

P300

Salisbury (1999)

P300

P300

P300

P300

P300

Cz, Pz, T3

가

, T3

가

Cz, Pz

Cz Pz

가 가

가 Salisbury (1999)

P300

P300

(MRI)

McCarley (1993)

가

T3 P300

(posterior superior temporal

gyrus)

가

요 약

P300

Heschl

16 (12 , 4),

(transverse temporal gyrus of Heschl) (planum temporale)

15 (7 , 8),

16 (8 ,

(hippocampus)

(parahippocampal

P300

gyrus)

1)

Cz, Pz, T3

P300

2)

T3

P300

T4

Shenton (1992) 15

3)

T3

P300

(CT)

(MRI)

4)

T3

P300

T4

13

가

5)

T3

P300

(superior frontal gyrus)

가

29

Iwanami

P300

(2000)

P300

가

, P300

가

P300

가

가

P300

P300

중심 단어 : P300

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