

망상의 신경심리학적 기전

Neuropsychological Mechanism of Delusion

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■ ABSTRACT

Objectives: The Psychopathology of schizophrenia was expected to be related with focal dysfunction of brain while schizophrenia is recognized and studied as the brain disease. Authors studied correlation between neuropsychological tests and delusion which is representative symptom of schizophrenia in patients with head trauma and psychiatric patients in order to explore the functional localization of brain in delusional symptom.

Methods: Halstead Reitan Neuropsychological Test Battery and Korean Weschler Intelligent Scale and Minnesota Multiphasic Personality Inventory(MMPI) were administered to one hundred nineteen patients consisted of sixty nine psychiatric patients and fifty patients with brain damage. We tested correlation between results of neuropsychological tests and delusional scale made from twenty four items related with delusion in MMPI. T - test between eighteen higher delusion scorers and twenty one lower scorers was examined in psychiatric group.

Results: In brain damage group, significant correlations were found in the tests related with function of frontal lobe such as category test, trail making AB test, tactual performance test, digit symbol test and fingertip number writing test, and significant correlations were also noted in the tests related with function of left temporal and parietal lobes such as information, comprehension, vocabulary, similarities and speech sound perception test. The tests related with the function of right hemisphere such as tactual performance test location, picture completion and performance, and the tests related with subcortical function such as arithmetic, digit span, attention, digit symbol test, digit symbol and trail making AB test were significantly correlated with delusional scale too. In psychiatric group there were significant difference of delusional score in the tests related with function of left hemisphere such as vocabulary, vocabale IQ, comprehension and language, and in the tests related with subcortical function such as N 120 voltage, digit symbol and arithmetic.

Conclusions: Delusion seems to be related with function of frontal lobe, left hemisphere and subcortex in both groups. Right hemisphere may be also partially related with delusion. *Sleep Medicine and Psychophysiology 2000 ; 7(1) : 60-66*

Key words: Delusion · Neuropsychology · Neuroanatomy.

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system)

가

가

Crow(1)

가

(temporolimbic

(left hippocampal formation)

(parahippocampal gyrus) 69
(2), (3-5) 50 119
(striatum) (6,7)
. Liddle(8)

(psychomotor poverty) 가 68 , 가 51 ,
(left dorsolateral prefrontal cortex) , 31.4 ± 11.7 , 12.8 ± 3.5
(disorganisation syndrome)

(right ventral prefrontal cortex) , 2. 연구 방법 및 분석
(reality distortion syndrome) (medial te- ERP MMPI
mporal lobe)

가
(event related potential ; ERP) 1) 신경 심리검사
가 . Hal-

stead Reitan Neuropsychological Test Battery(HRNB)
(9,10) WAIS(Korean Wechsler Intelligent Scale ;
K - WAIS) (11)

가 . Halstead Reitan (category
test), (actual performance test)
가 (total time), (memory) (location), Seashore
(Seashore rhythm test), (spe-
ech sound perception test)
가 (impairment index)
(finger tapping test) (dominant hand)
(non - dominant hand), (trail
making test) A B , (digit symbol
test) (fingertip number writing test)

(Minnesota Multiphasic 가
Personality Inventory : MMPI) K - WAIS (information), (com-
prehension), (arithmetic), (similarities),
(digit span), (vocabulary), (digit sym-
bol), (picture completion), (picture
arrangement), (block design), (ob-
ject assembly), , , ,
, , (laterality index)
, Seashore
AB ,

연구 대상 및 방법 가 가 (se-
vere) 4 , (moderate) 3 , (mild)
1. 연구 대상 2 가 . K - WAIS
() () 가 20

4, 15, 19, 3, 10, 14, 2, 5, 9, 1 가 가

가 (r=.417, p=.003 ; r = -.488, p=.000).

(r=.372, p=.009), (r = -.420, p=.001), (r = -.427, p=.003),

2) ERP
75 dB 100 Hz 200 Hz 50 msec 1.1 sec
(Pz) 4 : 1

가
(r = -.446, p=.001), (r = -.465, p=.001),
(r = -.480, p=.000), (r = -.419, p=.002),

700 msec 400
2000 Hz
70 120 msec
N120, 260 500 msec
P300

(r = -.400, p=.004), (r = -.397, p=.004),
(r = -.491, p=.000),
(r = -.427, p=.003), (r = -.399, p=.004),

(latency)
Neuroscan Scan(1992)

가
(r = -.420, p=.001),
(r = -.475, p=.000), (r = -.416, p=.003)

Table 1. Significant correlation between scores of neuropsychological tests and delusional scores in brain damage group

Test	R	p
Whole brain		
Impairment index	.417	.003
Total IQ	-.488	.000
Frontal lobe		
Category test	.372	.009
Tactual performance test(location)	-.420	.001
Digit symbol test	-.427	.003
Trail making A test	.340	.017
Trail making B test	.315	.042
Fingertip number writing test	.294	.038
Left hemisphere		
Vocabulary	-.446	.001
Similarities	-.465	.001
Vocabule IQ	-.480	.000
Language	-.419	.002
Information	-.327	.021
Comprehension	-.294	.038
Speech perception test	.300	.012
Subcortex		
Arithmetic	-.400	.004
Digit span	-.397	.004
Attention	-.491	.000
Digit symbol test	-.427	.003
Digit symbol	-.399	.004
Trail making A test	.340	.017
Trail making B test	.315	.042
Right hemisphere		
Tactual performance test(location)	-.420	.001
Picture completion	-.475	.000
Performance IQ	-.416	.003
Performance	-.288	.042
Fingertip number writing test(left)	.294	.038

3) MMPI
MMPI(12) 24
24
.27, 110, 121, 123, 127, 136, 151, 197, 200, 233, 244,
265, 275, 278, 284, 291, 293, 349, 352, 383, 384, 417,
448, 551
1 가 MMPI
MMPI L, F, K 가 70

4) 통계
ERP
가 11
18 가 5 21
ERP t - test
SPSS - window version 7.5
p<.05

결 과

1. 뇌손상 환자군
가 (p<.01)
IQ

Table 2. Significant difference of neuropsychological tests and event related potentials between higher delusional and lower delusional scores in psychiatric group

Test	t*	p
Whole brain		
Total IQ	- 2.56	.015
Left hemisphere		
Vocabulary	- 2.87	.007
Vocable IQ	- 2.77	.009
Comprehension	- 2.38	.023
Language	- 2.20	.035
Subcortex		
N120 voltage	- 3.41	.002
Digit symbol	- 2.21	.033
Arithmetic	- 2.10	.043
P300 voltage	- 1.91	.064
Others		
Category test	1.93	.062
Performance IQ	- 2.59	.014

* : two tail t-test

HRNB

K - WAIS

(working memory)

(13)

(14).

가 (13).

(14).

(13),

(14).

(13)

(14).

가 1

가

2. 정신과 환자군

가

가

가

가

t - test

가

t - test

IQ

가

가

IQ

가

(t = - 2.56, p = .015),

(t = - 2.87, p = .007),

(t = - 2.38, p = .023),

(t = - 2.77, p = .009),

(t = - 2.20, p = .035)

가

N120 (t = - 3.41, p = .002),

(t = - 2.21, p = .

가

033), (t = - 2.10, p = .043)

가

P300

(t = - 1.91, p = .064).

(t = 1.93, p = .062)

IQ

(t = - 2.59,

p = .014)(2).

(3,15 - 17),

(18,19) .

(18 - 21)

(22).

고 찰

가 (cognitive pattern) (generation) 가 . Frith

가 (33), 가 (7) 가

(neural circuit) 가

가 (19,34,35). 가

가 (dorsolateral pre- (anterior cing- (supplementary mo- tor area ; SMA) (striatal system)) (7) 가 (fronto and

2 3 - (heteromodal tem - 3 frontal cortex ; DLPFC) (23), (24). (25) (26) (27,28) (29,30). (31). Alexander(32)가

poroparietal cortex) (heteromodal asso - septo hippocampal system)가 (36). (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

(frontal striatal system)가 가 L, F, K 가 MMPI (70) 가

(7).)

- thought disorder factor extracted by factor-analytic procedures in schizophrenia. *Biol Psychiatry* 1998;44:115-120
25. Norman RMG, Malla AK, Marrison-Stewart SL, Helmes E, Williamson PC, Thomas J, Cortese L. Neuropsychological correlates of syndromes in schizophrenia. *Br J Psychiatry* 1997;170:134-139
 26. Norman RMG, Malla AK, Williamson PC, Morrison-Stewart SL, Helmes E, Cortese L. EEG coherence and syndromes in Schizophrenia. *Br J of Psychiatry* 1997;170:411-415
 27. Goldberg TE, Aloia MS, Gourovitch ML, Missar D, Dicken D, Weinberger PD. Cognitive substrates of thought disorder I: The semantic system. *Am J Psychiatry* 1998;155:1671-1676
 28. Aloia MS, Gourovitch ML, Missar D, Pichan D, Weinberger DR, Goldberg TE. Cognitive substrates of thought disorder II: Specifying a candidate cognitive mechanism. *Am J Psychiatry* 1998;155:1677-1684
 29. Crow TJ. Nuclear schizophrenic symptoms as a window on the relationship between thought and speech. *Br J Psychiatry* 1998;173:303-309
 30. Sarfati Y, Hardy-Bayle MC. How do people with schizophrenia explain the behaviour of other? A study of theory of mind and its relationship to thought and speech disorganization schizophrenia. *Psychol Med* 1999;29(3):613-620
 31. Crosson B. *Subcortical Function in Language and Memory*. New York, The Guilford Press;1992
 32. Alexander GE, DeLong M, Strick PE. Parallel organization of functionally segregated circuits linking basal ganglia and cortex. *Annual Review of Neuroscience* 1986;9:357-381
 33. Graybiel AM. The basal ganglia and cognitive pattern generators. *Schizophr Bull* 1997;23(3):459-469
 34. Robbins TW. The case for frontostriatal dysfunction in Schizophrenia. *Schizophr Bull* 1990;16(3):391-402
 35. Cummings JS. Frontal-subcortical circuit and human behavior. *Arch Neural* 1993;50:873-880
 36. Strauss ME. Relations of symptoms to cognitive deficits in schizophrenia. *Schizophr Bull* 1993;19(2):215-231