

Clinical Article

Influence of History of Brain Disease or Brain Trauma on Psychopathological Abnormality in Young Male in Korea : Analysis of Multiphasic Personal Inventory Test

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Objective : The purpose of this study is to confirm whether brain disease or brain trauma actually affect psychopathology in young male group in Korea.

Methods : The authors manually reviewed the result of Korean military multiphasic personal inventory (KMPI) in the examination of conscription in Korea from January 2008 to May 2010. There were total 237 young males in this review. Normal volunteers group (n=150) was composed of those who do not have history of brain disease or brain trauma. Brain disease group (n=33) was consisted of those with history of brain disease. Brain trauma group (n=54) was consisted of those with history of brain trauma. The results of KMPI in each group were compared.

Results : Abnormal results of KMPI were found in both brain disease and trauma groups. In the brain disease group, higher tendencies of faking bad response, anxiety, depression, somatization, personality disorder, schizophrenic and paranoid psychopathy was observed and compared to the normal volunteers group. In the brain trauma group, higher tendencies of faking-good, depression, somatization and personality disorder was observed and compared to the normal volunteers group.

Conclusion : Young male with history of brain disease or brain trauma may have higher tendencies to have abnormal results of multiphasic personal inventory test compared to young male without history of brain disease or brain trauma, suggesting that damaged brain may cause psychopathology in young male group in Korea.

Key Words : Personality inventory · Personality tests · Physical examination · Brain disease · Brain trauma · Young adult.

INTRODUCTION

Multiphasic personal inventory test is used for personality test in mental health³⁰. The most commonly used tool is Minnesota multiphasic personality inventory test (MMPI)^{24,28}. Although this test was widely used to investigate personality structure and psychopathology in various fields, it is not commonly used in the neurosurgical field. Thus, there are only a few literatures regarding relationship of multiphasic personality inventory and brain disease or trauma^{16,19,26}. Because damaged brain could influence personality structure and psychopathology^{2,10,21}, the authors analyzed result of multiphasic personality inventory test in young male group in order to confirm whether damaged brain actually affect psychopathology in young male group in Korea.

MATERIALS AND METHODS

Since Korea has adopted the conscription system, all men are examined for the conscription at the Military Manpower Administration when they become 19 years old. In the examination of conscription, all examinees were studied by Korean military multiphasic personality inventory test (KMPI). We have obtained data from total 237 young males in this cross-sectional survey from January 2008 to May 2010. Normal volunteers group (n=150) was consisted of those who do not have history of brain disease or brain trauma. Brain disease group (n=33) was consisted of those with history of brain disease. Brain trauma group (n=54) was consisted of those with history of brain trauma. The results of KMPI in each group were compared. All participants allowed their data to be used for this study. This study was conducted with the approval of the committee in the Military Manpower Administration in Seoul.

All participants were 19 years old and, the volunteers (150 cases) were interviewed by one neurosurgeon and were checked on their medical histories, psychological problems, hospital vis-

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its due to brain disease and histories of brain trauma. In the brain disease group, hydrocephalus was reported in 7 cases, astrocytoma in 2 cases, and cerebral glioma in 4 cases. Neurofibroma, Moyamoya disease, and arterio-venous malformation were in 3 cases each. Carvernous lymphangioma, neural migration disorder, meningioma, germinoma, acoustic schwannoma, cerebral aneurysm, cavernous angioma, choroid plexus tumor, craniopharyngioma, cerebral focal ischemia, and uncontrolled seizure with negative imaging studies were in 1 case each. In the brain trauma group, the date of their actual trauma ranged from 2 weeks to 12 years ago.

KMPI is a conventional type of MMPI which was adjusted for the Korean conscription. Several criteria were included in this KMPI analysis such as response scale, neurosis scale, psychopathy scale, accident scale, prediction scale of accident, and other special scales. If one of any scale was exceeded or lacked in each criteria, this was categorized as abnormal result of KMPI by computer processing. In this study, the authors divided the category of abnormal results with 3 scales; Response Scale (faking-good response, faking-bad response, and infrequently scale), Neurosis Scale (anxiety, depression, somatization, and personality disorder scale), and Psychopathy Scale (schizophrenia and paranoid scale). Evaluation of statistical significance of difference was carried out by Student t-test. Test results were considered significant at p -values less than 0.05 and statistical comparisons were analyzed with SPSS 12.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

The proportion of abnormal result of KMPI was markedly increased in the brain disease group and the brain trauma group (Fig. 1). The percentage of abnormal result was 8.67% in the normal volunteers group, but the percentage was increased to 36.36% and 31.48% in the brain disease group and the brain trauma group, respectively ($p < 0.001$).

Result of the Response Scale of KMPI was shown in Table 1. The faking-good response was checked as 52.90 ± 8.06 in the normal volunteers group, but it was statistically significantly decreased to 48.15 ± 11.33 ($p = 0.011$) in the brain disease group and 47.80 ± 10.41 ($p = 0.012$) in the brain trauma group. The faking-bad response was checked as 46.24 ± 8.44 in the normal volunteers group, and it was markedly increased to 52.81 ± 11.76 ($p = 0.010$) in the brain disease group, and not significantly increased to 48.20 ± 10.25 ($p = 0.147$) in the brain trauma group. The infrequency scale was checked as 48.77 ± 8.11 in the normal volunteers group, and it was increased to 50.64 ± 9.04 in the brain disease group and

50.87 ± 10.90 in the brain trauma group, but statistical differences were not observed ($p = 0.340$ and 0.112 , respectively).

Table 2 shows the result of the Neurosis Scale of KMPI. The anxiety scale was checked as 46.94 ± 8.57 in the normal volunteers group and it was increased only in the brain disease group significantly (51.64 ± 11.37 , $p = 0.005$). The depression scale was checked as 47.25 ± 8.42 in the normal volunteers group, and it was markedly increased in both the brain disease group (52.97 ± 12.96 , $p < 0.001$) and the brain trauma group (52.43 ± 10.35 , $p = 0.029$). The somatization scale was checked as 48.33 ± 9.23 in the normal volunteers group, and it was also markedly increased in both the brain disease group, (56.55 ± 12.75 , $p = 0.006$) and the brain trauma group (55.15 ± 10.59 , $p = 0.048$). The personality

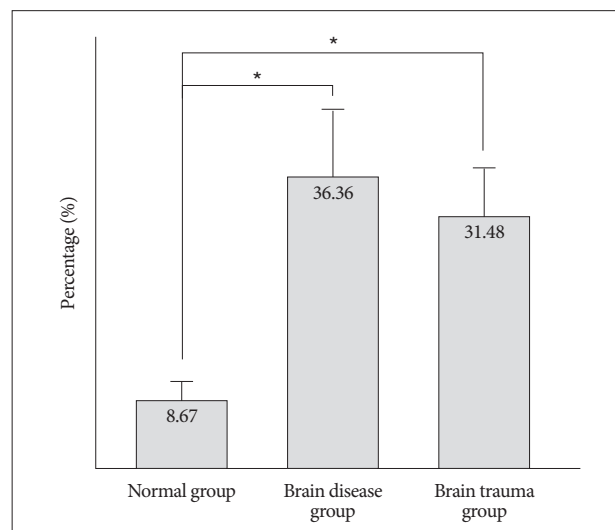


Fig. 1. Results of KMMPI in the normal volunteers group, the brain disease group, and the brain trauma group. The percentage of abnormal result was shown as 8.67% in the normal volunteers group, but the percentage was increased to 36.36% and 31.48% in the brain disease group and the brain trauma group, respectively ($*p < 0.001$). KMMPI : Korean military multiphasic personality inventory test.

Table 1. The Response Scale on KMMPI in the normal volunteers group, the brain disease group, and the brain trauma group

Response set	Normal volunteers	Brain disease	p -value	Brain trauma	p -value
Faking-good response	52.90 ± 8.06	48.15 ± 11.33	0.011	47.80 ± 10.41	0.012
Faking-bad response	46.24 ± 8.44	52.81 ± 11.76	0.010	48.20 ± 10.25	0.147
Infrequency scale	48.77 ± 8.11	50.64 ± 9.04	0.340	50.87 ± 10.90	0.112

KMMPI : Korean military multiphasic personality inventory test

Table 2. The Neurosis Scale of KMMPI in the normal volunteers group, the brain disease group, and the brain trauma group

Neurosis	Normal volunteers	Brain disease	p -value	Brain trauma	p -value
Anxiety	46.94 ± 8.57	51.64 ± 11.37	0.005	50.65 ± 9.03	0.337
Depression	47.25 ± 8.42	52.97 ± 12.96	0.000	52.43 ± 10.35	0.029
Somatization	48.33 ± 9.23	56.55 ± 12.75	0.006	55.15 ± 10.59	0.048
Personality disorder	45.21 ± 7.26	52.58 ± 14.59	0.000	50.74 ± 10.16	0.002

KMPI : Korean military multiphasic personality inventory test

disorder scale was checked as 45.21±7.26 in the normal volunteers group, and it was significantly increased in both the brain disease group (52.58±14.59, *p*<0.001) and the brain trauma group (50.74±10.16, *p*=0.002).

The results of Psychopathy Scale of KMPI are summarized in Table 3. The schizophrenia and paranoid scales are included. The schizophrenia scale was checked as 47.26±7.50 in the normal volunteers group, and it was increased statistically significantly only in the brain disease group (54.67±14.16, *p*<0.001). Although it was also increased in the brain trauma group, it was not statistically significant (50.39±10.94, *p*=0.123). The paranoid scale was checked as 47.79±9.07 in the normal volunteers group, and it was also significantly increased only in the brain disease group (51.21±10.42, *p*=0.032) and it was not increased significantly in the brain trauma group (50.63±11.91, *p*=0.184).

DISCUSSION

The multiphasic personality inventory is a personality test to assist in identifying personality structure and psychopathology²⁹. The MMPI is one of the most frequently used personality tests in mental health^{24,28}. In the MMPI, ten types of clinical scales are described such as hypochondriasis (concern with bodily symptoms), depression (depressive symptoms), hysteria (awareness of problems and vulnerabilities), psychopathic deviate (conflict, struggle, anger, respect for society's rules), masculinity/femininity (stereotypical masculine or feminine interests/behavior), paranoia (level of trust, suspiciousness, sensitivity), psychasthenia (worry, anxiety, tension, doubts, obsessiveness), schizophrenia (odd thinking and social alienation), hypomania (level of excitability), and social introversion (people orientation)²². The analysis of the MMPI focuses on relative elevation of profiles and these profiles are compared to profiles of various normal groups. Raw scores of the scales are transformed into standardized metric scores which were known as T-scores in order to make interpretation easier for clinicians.

KMPI is a conventional type of MMPI by adjusting for the Korean conscription^{14,15,23}. KMPI was created via 5 stages. First, several military-associated questions were added to pre-existed MMPI. And, pre-test (575 questions) was performed to normal soldiers, normal university students, military prisoners, military hospital psychiatric patients and private hospital psychiatric patients. After then, 3 scales (validity scale, clinical scale, content scale) were established and divided by several profiles similar to MMPI. For the final examination, score standardiza-

tion and yield of distinct function were performed. Thus, KMPI shows similar aspect with MMPI in overall¹⁵. KMPI also sets the scores on each scales and this scores are transformed into a standardized metric score known as T-scores. Therefore, as comparing T-scores of each group, we can easily measure the tendency of personality structures and psychopathology.

As shown in Fig. 1, the proportion of abnormal result was markedly increased in the brain disease group and the brain trauma group about 4 times larger than that in the normal volunteer group, and it indicates that cerebral organic problem could be a trigger of abnormal personality or psychopathology^{11,12}.

Several subjects were analyzed in the KMPI, such as response, neurosis, psychopathy, accident, prediction of accident, and special scales, but only 3 scales were included in this study. Response Scales is comprised of faking-good response, faking-bad response, and infrequently scale (Table 1). In the faking-good and faking-bad response, high scores meant examinees trying to appear better or worse than reality^{14,24}. Compared to the normal volunteers group, faking-good response was decreased and faking-bad response was increased in the brain disease group. In the brain trauma group, only faking-good showed significant difference. These findings indicated that the brain disease group tended to think better or worse about their condition, and the brain trauma group tended to think their condition better.

The Neurosis Scales are comprised of anxiety scale, depression scale, somatization scale, and personality disorder scale (Table 2). All scales were markedly increased in the brain disease group compared to the normal volunteers group. All scales except anxiety scale were significantly increased in the brain trauma group compared to the normal volunteers group. Finally, the Psychopathy Scale (schizophrenia and paranoid scale) was significantly increased only in the brain disease group.

Between behavioral, cognitive symptoms and post-traumatic brain injury have correlation on the MMPI-2.²⁰ Chervinsky et al.⁶ and Dearth et al.⁷ reported that hypochondriasis, schizophrenia, and depression scales showed the highest elevation in individuals with traumatic brain injury on the MMPI-2. In a group of individuals with moderate to severe traumatic brain injury, Alfano et al.¹ found prominent elevations on depression and hypochondriasis for both men and women, but higher elevations on hysteria for woman and schizophrenia for men.

In the brain disease group, there were fewer tendencies of faking-good and more tendencies of faking bad response, neurotic and psychopathic behavior. And, higher tendencies of faking-good, depression, somatization and personality disorder were observed in the brain trauma group. These

results were similar with other literature reviews. Miller and Paniak¹⁹ report that brain-damaged patients (n=137) who applied the conventional MMPI revealed significant psychological maladjustment. Louks et al.¹⁷ suggested that patients with deficits in left hemisphere functions

Table 3. The Psychopathy Scale of KMPI in the normal volunteers group, the brain disease group, and the brain trauma group

Psychopathy	Normal volunteers	Brain disease	<i>p</i> -value	Brain trauma	<i>p</i> -value
Schizophrenia	47.26±7.50	54.67±14.16	0.000	50.39±10.94	0.123
Paranoid	47.79±9.07	51.21±10.42	0.032	50.63±11.91	0.184

KMPI : Korean military multiphasic personality inventory test

tend to score in the psychotic range and patients with deficits in right hemispheric functions tend to score in the neurotic range of the MMPI Goldberg Index. Woodward et al.⁵⁾ reported that significant abnormal MMPI profiles were found in right hemisphere lesion groups. Hessen and Nestrold¹³⁾ investigated MMPI scores in traumatic brain injury patients by impact of trauma and reported that complicated patients showed poor outcomes.

There are some reports that do not support those hypotheses. Warriner et al.²⁷⁾ reported that 25 percent of their population of primarily mild, moderate traumatic brain injured individuals had profiles without psychopathological elevations on the MMPI-2. In addition, Bowen et al.⁴⁾ found that approximately 60 percent of individuals with traumatic brain injury of various severities did not qualify for a clinically significant mood disorder based on self-report of psychological functioning. However, many other authors have supported that there are much correlations between brain disease or injury with personality as this study^{3,8,10,11,20,25)}.

Therefore, if someone has history of brain disease or brain trauma, consideration of personality or psychological aspect is needed. In special situation (like a military service), person who showed abnormal result of multiphasic personal inventory, some problems (like a suicidal attempt) can occur^{5,9,30)}. Thus, it would be helpful to perform multiphasic personal inventory to solve and to prevent those problems, giving proper ways to handle such situations.

There were some limitations in this study. First of all, the KMPI was not widely documented or analyzed by literatures because its purpose was for unique environment such as military conscription⁹⁾. But, this KMPI is officially approved by the Korean government which does not differ widely from the MMPI^{4,15,23)}. Secondly, because the data were achieved from the military conscription physical examination, only male was included in this study. A well-designed longitudinal prospective study with a larger number of young populations, including females, is needed to overcome these limitations.

CONCLUSION

Young male with history of brain disease or brain trauma may have more tendencies to have abnormal results of multiphasic personal inventory test compared to those without history of brain disease or brain trauma, suggesting that damaged brain may cause psychopathology in young male group in Korea. Therefore, clinicians may consider psychopathological problems as examining young males with brain disease or brain trauma in Korea.

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