

# The Impact of Primary Spontaneous Pneumothorax on Multiphasic Personal Inventory Test Results in Young South Korean Males

Hyun Kyoung Lim,<sup>1</sup> Seung Hwan Yoon,<sup>2</sup> Chang Hyun Oh,<sup>2,3</sup> Seol Ho Choo,<sup>3</sup> and Tae Hyun Kim<sup>3</sup>

Departments of <sup>1</sup>Anesthesiology and Pain Medicine and <sup>2</sup>Neurosurgery, Inha University School of Medicine, Incheon;

<sup>3</sup>Seoul Regional Military Manpower Administration, Seoul, Korea.

Received: October 10, 2011

Revised: January 9, 2012

Accepted: February 3, 2012

Corresponding author: Dr. Chang Hyun Oh,  
Department of Neurosurgery, Inha University  
School of Medicine, 27 Inhang-ro,  
Jung-gu, Incheon 400-711, Korea.  
Tel: 82-32-890-2370, Fax: 82-32-890-2374  
E-mail: dhckdgus@gmail.com

The authors have no financial conflicts of interest.

**Purpose:** Few reports have documented psychopathological abnormalities in patients with primary spontaneous pneumothorax (PSP). We analyzed the results of a multiphasic personal inventory test to investigate the psychopathologic impact of PSP in young Korean males. **Materials and Methods:** The authors reviewed the results of a Korean military multiphasic personal inventory (KMPI) administered to military conscripts in South Korea. A total of 234 young males participated in this study. The normal volunteer group (n=175) comprised individuals who did not have any lung disease. The PSP group (n=59) included individuals with PSP. None of the examinees had any psychological problems. The KMPI results of both groups were compared. **Results:** There were more abnormal responses in the PSP group (17.0%) than the normal volunteer group (9.1%,  $p=0.002$ ). The anxiety scale and depression scale scores of the neurosis category were greater for the PSP group than the normal group ( $p=0.039$  and  $0.014$ , respectively). The personality disorder and paranoia scale scores of the psychopathy category were greater for the PSP group than the normal group ( $p=0.007$  and  $0.018$ , respectively). **Conclusion:** Young males with PSP may have greater tendencies to suffer from anxiety, depression, personality disorders, and paranoia compared to normal individuals. Clinicians should be advised to evaluate the psychopathological aspects of patients with PSP.

**Key Words:** Primary spontaneous pneumothorax, multiphasic personal inventory test, personality changes, psychopathology

## INTRODUCTION

Primary spontaneous pneumothorax (PSP) is a collection of air or gas in the pleural cavity of the chest. The air pocket forms spontaneously between the lung and chest wall in the absence of chronic lung conditions.<sup>1,2</sup> Although PSP is a relatively common disease, PSP-associated psychopathological conditions have not been extensively studied. The multiphasic personal inventory test is widely used to investigate personality structure and psychopathology in various disciplines, but it is not

### © Copyright:

Yonsei University College of Medicine 2012

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

commonly used in the field of thoracic surgery. Additionally, few published studies have documented psychopathological abnormalities in patients with PSP.<sup>3,4</sup> Thus, we analyzed the results of a multiphasic personal inventory test administered to young Korean males. Using South Korean military conscription data, we identified the psychopathologic effects of PSP in young males.

## MATERIALS AND METHODS

In South Korea, all men are examined for military conscription by the Military Manpower Administration when they are 19 years old. During the conscription examination, all examinees are evaluated with the Korean military multiphasic personality inventory test (KMPI). We obtained data on 234 young males from this cross-sectional survey administered between April 2011 and June 2011. The normal group (n=175) was comprised individuals who did not have any lung disease. These volunteers were interviewed by one physician (Oh CH) to ensure that they did not have any medical history of respiratory disease, psychological problems, or had sought medical treatment for lung disease. The PSP group (n=59) consisted of patients with PSP confirmed by chest radiographs, computed tomography, or a medical certificate. Individuals in the PSP group were also interviewed by one physician (Oh CH) to confirm that they did not have any psychological problems. The KMPI results of both groups were compared. All participants were 19 years old and provided informed consent. This study was conducted with approval from the committee of the Military Manpower Administration (Seoul, South Korea).

The KMPI is a conventional version of the Minnesota multiphasic personality inventory test (MMPI), which has been revised for use in South Korean conscripts.<sup>5-7</sup> Several aspects are analyzed by various parts of the KMPI such as

response, neurosis, psychopathy, accident, prediction of accident, and special categories. If one of any scale was exceeded in or lacked fulfillment of all criteria of the KMPI, the data were considered indicative of an abnormal response by the computer. In this study, the authors evaluated the results from only four categories of interest: the response (faking of good and bad responses as well as infrequent responses), neurosis (anxiety, depression, and somatization), psychopathy (schizophrenia, personality disorders, and paranoia), and social relation (behavioral retardation, adjustment problems, and absence without leave) categories. Statistical analysis was conducted applying Student's t-test via SPSS software, version 12.0 (SPSS, Inc., Chicago, IL, USA). *p*-values less than 0.05 were considered significant.

## RESULTS

Table 1 shows the demographic data of the normal and primary spontaneous pneumothorax groups. All examinees were 19-year-old males who lived in Seoul, South Korea. Height was not statistically different (*p*=0.225) between the two groups. However, the body weight and body mass indices (weight/height<sup>2</sup>) of the two groups were significantly different (*p*<0.001). Members of the PSP group had unique body structures, e.g. weighed less and were thinner than the normal volunteers. Among the normal volunteers, 44.0% smoked while 64.4% of the PSP group were smokers (*p*=0.007). Examinees with psychological problems (depression, anxiety disorder, schizophrenia, etc.) were not included in this study.

Patients in the PSP group (59 cases) were treated with various methods including conservative therapy with oxygen inhalation (19 cases, 32.2%), chest tube drainage (17 cases, 28.8%), and wedge resection (23 cases, 39.0%). The average time between pneumothorax occurrence and participation in this survey was 21.88±16.56 months. Recur-

**Table 1. Demographic Data of the Normal Volunteer and Primary Spontaneous Pneumothorax (PSP) Groups**

Demographic data	Normal volunteer group	PSP group	<i>p</i> value
No. of cases	175	59	
Age	19 yrs old	19 yrs old	
Gender	Male	Male	
Area of Residence	Seoul, South Korea	Seoul, South Korea	
Height (cm)	174.77±5.83	175.83±5.54	0.225
Weight (kg)	70.86±13.65	60.56±7.04	<0.001
Body Mass Index	23.15±3.86	19.58±2.02	<0.001
Smoking	44.0%	64.4%	0.007
Psychological problems	No	No	

rence of PSP after wedge resection was observed in nine cases. Two PSP cases occurred in combination with a funnel chest.

Table 2 summarizes the KMPI results of the normal and PSP groups. The proportion of abnormal results among the response, neurosis, psychopathy, and social relation categories of the KMPI were compared between the two groups. More abnormal results were recorded for the PSP group (17.0%) than the normal volunteer group (9.1%,  $p=0.002$ ). The anxiety scale and depression scale scores from the neurosis category were greater in the PSP group than the normal volunteer group ( $p=0.039$  and  $0.014$ , respectively). The personality disorder and paranoia scale scores from the psychopathy category were greater in the PSP group than the normal volunteer group ( $p=0.007$  and  $0.018$ , respectively). The results for the other scales were not significantly different between the two groups.

## DISCUSSION

Pneumothorax is defined as air in the pleural space. PSP occurs without a provoking factor such as trauma, surgery, or diagnostic intervention. This condition implies that air is leaking from the lung parenchyma into the pleural space through the visceral pleura. This causes the lung to col-

lapse, resulting in pain and shortness of breath. A survey conducted in Minnesota showed that the incidence of PSP is 7/100000 for men and 1/100000 for women.<sup>8</sup> In England and Wales, the overall rate of people seeking medical consultation for pneumothorax is 24/100000 per year for men and 10/100000 per year for women.<sup>9</sup> As this reports shows, PSP is not a rare disease, but a commonly observed disease in a community.

In the present study, the body structures of the normal volunteers and PSP group did not resemble each other. Height was similar ( $p=0.225$ ), but body weight and body mass index scores were significantly different ( $p<0.001$ ) (Table 1). PSP patients are often thin and tall as previously observed.<sup>1,9,10</sup> However, differences in body structure were unable to be matched with controls in this study due to the nature of the illness; thus, future studies should be conducted to address this limitation. Smoking increases the incidence of PSP by 22-fold for men and 8-fold for women; furthermore, the incidence of PSP is directly related to the amount of tobacco used.<sup>10</sup> In the present study, smoking was also more frequently observed in the PSP group ( $p=0.007$ ) (Table 1).

The multiphasic personality inventory is a personality test administered to help examine personality structure and psychopathology.<sup>11</sup> The MMPI is one of the most frequently used personality tests in the mental health field.<sup>12,13</sup> This test is widely used to evaluate personality structures and

**Table 2.** Results of the Korean Military Multiphasic Inventory Test for the Normal Volunteer and Primary Spontaneous Pneumothorax (PSP) Groups

Korean military multiphasic inventory test category	Normal volunteer group (n=175)	PSP group (n=59)	<i>p</i> value
Abnormal result (n, %)	16 (9.1)	10 (17.0)*	0.002*
Response category (mean±SD)			
Faking-good response	52.43±8.36	51.88±9.39	0.443
Faking-bad response	46.27±7.97	48.66±9.65	0.142
Infrequent response	48.62±7.57	49.44±9.90	0.115
Neurosis category (mean±SD)			
Anxiety	46.86±7.98	48.61±10.41*	0.039*
Depression	47.59±8.15	49.85±11.17*	0.014*
Somatization	49.07±9.44	53.05±11.42	0.061
Psychopathy category (mean±SD)			
Schizophrenia	47.51±7.97	48.56±13.26	0.087
Personality disorder	45.53±7.24	48.83±10.78*	0.007*
Paranoia	47.57±8.56	49.46±11.49*	0.018*
Social relation category (mean±SD)			
Behavioral retardation	46.94±8.67	47.56±10.81	0.097
Adjustment problem	49.52±31.12	48.80±11.22	0.748
Absence without leave	46.63±8.94	48.19±10.36	0.193

SD, standard deviation.

\*Statistically significant differences between two groups.

study psychopathology in various disciplines. However, it is not commonly used in the field of thoracic surgery and there are few published studies about psychopathological abnormalities in PSP patients.<sup>3,4</sup> One reported that psychopathological differences can play a role PSP patients,<sup>3</sup> and another reported that no definite differences in psychopathological abnormalities in PSP patients were observed.<sup>4</sup>

The MMPI includes 10 clinical scales such as hypochondriasis (concern with bodily symptoms), depression (depressive symptoms), hysteria (awareness of problems and vulnerabilities), psychopathic deviate (conflict, struggle, anger, and respect for society's rules), masculinity/femininity (stereotypical masculine or feminine interests/behavior), paranoia (level of trust, suspiciousness, and sensitivity), psychasthenia (worry, anxiety, tension, doubts, and obsessiveness), schizophrenia (disrupted thought-patterns and social alienation), hypomania (level of excitability), and social introversion (people-orientation).<sup>14</sup> MMPI analyses focus on the relative elevation of profiles; these profiles are compared to those of various normal groups. Raw scores of the scales are transformed into standardized metric scores (known as T-scores) in order to facilitate interpretation for clinicians.

The KMPI is a conventional type of MMPI which has been modified for use in South Korean military conscripts.<sup>5-7</sup> The KMPI was created in five stages. First, several military-associated questions were added to the pre-existing MMPI. A pre-test (575 questions) was then administered to normal soldiers, normal university students, military prisoners, military hospital psychiatric patients, and private hospital psychiatric patients. Afterwards, three scales (validity, clinical, and content scales) were established and divided into several profiles similar to the MMPI. For the final examination, score standardization and yield of distinct function were performed. Thus, the KMPI shares similar aspects with the MMPI.<sup>6</sup> The KMPI also encompasses set scores for each scale, which are transformed into standardized T-scores. Therefore, by comparing the T-scores of each group we were able to easily measure personality structure and psychopathologic tendencies.

In the present study, we used only four categories of the KMPI. First, the response category was composed of faking a good response, faking a bad response, and infrequent response scales. People can fake good behavior (faking a good response) when they feel it will serve in their best interest. Therefore, people with this tendency may be tempted to skew their answers in a way that puts them in a good light. The opposite of this is faking a bad response. The infrequent

response scale is intended to detect infrequent responders among psychopathological populations. Second, the neurosis category is composed of anxiety, depression, and somatization scales. These scales measure the degree of each neurotic characteristic. Third, the psychopathy category is composed of schizophrenia, personality disorder, and paranoia scales. These scales also evaluate the degree of each social relation characteristic. Finally, the social relation category includes behavioral retardation, adjustment problems, and absence without leave scales. The behavioral retardation and adjustment problem scales are used to examine the degree of each social relation characteristic, and the absence without leave scale is used to examine disagreement with a particular order from a superior.

As shown in Table 2, the proportion of abnormal responses among the anxiety, depression, personality disorder, and paranoia scales was increased more in the PSP group than the normal volunteer group ( $p=0.002, 0.039, 0.014, 0.007$  and  $0.018$ , respectively). The anxiety scale results were similar to those of a previous report by Lee, et al.,<sup>3</sup> who noted that anger plays a role in the pathophysiology of PSP. The present study administered various personality assessment tests to 91 patients with first-onset PSP and 77 patients who recently suffered from minor trauma as controls. The scores for anger-in, anger-out, state anger, and trait anger were significantly higher for the PSP group than the control group. However, Martín Martín, et al.<sup>4</sup> concluded that there are no differences in personality, depression, or anxiety and only the rate of type-A behavior is statistically different in PSP patients. This study by Martín Martín, et al. compared personality, depression, anxiety, and type-A behavior patterns in a group of 34 patients with PSP to those of 33 control patients admitted for a variety of minor surgical procedures. Psychopathological differences associated with PSP are still being debated in the literature; this present study would be helpful to understand these differences.

Although there were more abnormal results in the PSP group than the normal group, it was not clear as to whether PSP initially disturbs the individual's psychopathologic state or vice versa. Anxiety is a psychological and physiological condition characterized by somatic, emotional, cognitive, and behavioral components.<sup>15</sup> Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and physical well-being.<sup>16</sup> This condition may include feelings of sadness, anxiety, emptiness, hopelessness, worthlessness, guilt, irritability, or restlessness. Personality disorders, formerly referred to as character

disorders, are defined as enduring patterns of inner experience and behavior that deviate markedly from expectations of society in the individual who exhibits these patterns.<sup>17</sup> Paranoia is a thought process believed to be heavily influenced by anxiety or fear, often to the point of irrationality and delusion.<sup>18</sup> Paranoid thinking typically includes persecutory beliefs concerning a perceived threat towards oneself.<sup>18</sup> All these psychopathological conditions are normal reactions to stressors or certain life events, symptoms of many medical conditions, and are features of certain psychiatric disorders. It is therefore difficult to determine whether PSP causes psychopathological disturbances or vice versa.

The present study had some limitations. First, use of the KMPI has not been widely documented or analyzed because it is designed for unique purposes such as military conscription.<sup>19</sup> However, the KMPI used in this study has been officially approved by the South Korean government and is similar to the MMPI.<sup>5-7</sup> Second, only males were included in this study because the data were obtained from military conscription physical examinations. Third, the mismatch in body structure between the two groups was not statistically compensated for in this study due to the nature of PSP. Future studies should be performed to address this limitation. Despite these limitations, this multiphasic personal inventory test may be a meaningful method for identifying personality changes or psychopathologies in PSP patients.

In conclusion, young males with PSP demonstrated greater tendencies to respond abnormally on the anxiety, depression, personality disorder, and paranoia scales of a multiphasic personal inventory test, compared to normal individuals. Therefore, it may be useful for clinicians to evaluate the psychopathological characteristics of patients with PSP.

## REFERENCES

1. Tschopp JM, Rami-Porta R, Noppen M, Astoul P. Management of spontaneous pneumothorax: state of the art. *Eur Respir J* 2006; 28:637-50.
2. Noppen M, De Keukeleire T. Pneumothorax. *Respiration* 2008; 76:121-7.
3. Lee SH, Choi H, Kim S, Choi TK, Lee S, Kim B, et al. Association between anger and first-onset primary spontaneous pneumothorax. *Gen Hosp Psychiatry* 2008;30:331-6.
4. Martín Martín M, Cuesta Serrahima L, Rami Porta R, Soler Insa P, Mateu Navarro M. [Study of the personality of patients with spontaneous pneumothorax]. *Arch Bronconeumol* 2001;37:424-8.
5. Paik HK, Oh CH, Choi K, Kim CE, Yoon SH, Chung J. Influence of history of brain disease or brain trauma on psychopathological abnormality in young male in Korea: analysis of multiphasic personal inventory test. *J Korean Neurosurg Soc* 2011;50:114-8.
6. Lee JG, Nam WM, Park JH, Lim HS, Yoon HH, Han JH. The relationship between the KMPI and the military personality inventory. *Korean Psychol* 2006;6:464-5.
7. Song GJ, Han M, Han SY. The influence of the enlistment motivation on the military life. *Korean Psychol* 2008;8:148-50.
8. Melton LJ 3rd, Hepper NG, Offord KP. Incidence of spontaneous pneumothorax in Olmsted County, Minnesota: 1950 to 1974. *Am Rev Respir Dis* 1979;120:1379-82.
9. Gupta D, Hansell A, Nichols T, Duong T, Ayres JG, Strachan D. Epidemiology of pneumothorax in England. *Thorax* 2000;55:666-71.
10. Bense L, Eklund G, Wiman LG. Smoking and the increased risk of contracting spontaneous pneumothorax. *Chest* 1987;92:1009-12.
11. Wolf EJ, Miller MW, Orazem RJ, Weierich MR, Castillo DT, Milford J, et al. The MMPI-2 restructured clinical scales in the assessment of posttraumatic stress disorder and comorbid disorders. *Psychol Assess* 2008;20:327-40.
12. van Balen HG, de Mey HR, van Limbeek J. A neurocorrective approach for MMPI-2 use with brain-damaged patients. *Int J Rehabil Res* 1999;22:249-59.
13. Wetzel RD, Guze SB, Cloninger CR, Martin RL, Clayton PJ. Briquet's syndrome (hysteria) is both a somatoform and a "psychoform" illness: a Minnesota Multiphasic Personality Inventory study. *Psychosom Med* 1994;56:564-9.
14. Reitan RM, Wolfson D. Emotional disturbances and their interaction with neuropsychological deficits. *Neuropsychol Rev* 1997;7: 3-19.
15. Barlow DH. Unraveling the mysteries of anxiety and its disorders from the perspective of emotion theory. *Am Psychol* 2000;55: 1247-63.
16. Salmans S. Depression: questions you have - answers you need. People's Medical Society: Demos Medical Publishing; 1997. ISBN 9781882606146.
17. Berrios GE. European views on personality disorders: a conceptual history. *Compr Psychiatry* 1993;34:14-30.
18. Diagnostic and Statistical Manual of Mental Disorders Fourth edition Text Revision (DSM-IV-TR). Washington DC: American Psychiatric Association; 2000.
19. Fiedler ER, Oltmanns TF, Turkheimer E. Traits associated with personality disorders and adjustment to military life: predictive validity of self and peer reports. *Mil Med* 2004;169:207-11.