

Original Article

Are there any psychological factors in male patients with primary spontaneous pneumothorax?

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Received January 16, 2014; Accepted April 11, 2014; Epub April 15, 2014; Published April 30, 2014

Abstract: Background: Primary spontaneous pneumothorax (PSP) is usually seen in young male smokers. Pathophysiology of PSP remains unclear, and studies concerning emotional status are scarce. The aim of this study is to investigate psychological factors associated with primary spontaneous pneumothorax. Methods: The Beck Depression Inventory, Beck Anxiety Inventory, State-Trait Anger Expression Inventory, and State-Trait Anxiety Inventory were administered. Results: A total of 40 patients and 40 healthy controls were included in this study. The mean age in the patient group was 24.60 years, while that in the control group was 26.45 years. The difference was not significant. The weight and body mass index of the patient group were significantly lower compared to those of the control group. The mean Beck Anxiety Inventory scores in the patient and control groups were 10.37 ± 11.34 and 8.25 ± 10.60 , respectively. Anxiety levels did not differ between the groups ($p = 0.389$). The mean Beck Depression Inventory scores of the patient and control groups were 8.20 ± 8.37 and 6.80 ± 7.57 , respectively, but the difference was not significant ($p = 0.435$). When the anger structures of the groups were compared, no difference was found in any sub-scale. Trait anxiety scores were higher in the patient group compared to those in the control group, but the difference was not significant ($p = 0.369$). Conclusions: This study's findings indicated that anger, anxiety, and depression levels did not differ between the primary spontaneous pneumothorax and healthy groups.

Keywords: Pneumothorax, anxiety, anger, depression, male, smoking, body mass index

Introduction

Although primary spontaneous pneumothorax (PSP) is often treated by clinicians, its pathophysiology has not yet been established. In the literature, tall and thin male smokers are a prototype for PSP [1, 2]. The emotional status of people with PSP may differ from that of healthy people; however, we do not know how alterations in human mood encourage the occurrence of pneumothorax. The presence of an association between anger, anxiety, or depression and pneumothorax in young male smokers with low body mass index (BMI) was a hypothesis for this study. The aim of our study was to investigate whether the etiology of PSP involves any psychological factors.

Materials and methods

Subject recruitment

This study was conducted in the department of thoracic surgery. It consisted of all patients

were referred to an outpatient unit or the emergency unit with a diagnosis of PSP. This population included literate male patients with PSP. Patients completed psychometric assessments after treatment of pneumothorax. All of the study participants provided written permission for us to use their data in the clinical trial.

Patients with an intellectual disability, a psychiatric disease that hindered the assessment, or a severe neurological or physical disability were excluded from the study. Control group were selected among relatives and neighbors of hospital staffs with similar age, sex and educational level with the patient group. The control group was composed of 40 healthy males without any history of diseases.

Instruments

Sociodemographic data form: This form was prepared by the researchers to extract the specific information required for this study. Age,

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Table 1. Sociodemographic Features Of Patient And Control Group

Variable	Patient Group (n = 40) (mean ± standard deviation)	Control Group (n = 40) (mean ± standard deviation)	P Value
Age (years)	24.60 ± 5.22	26.45 ± 4.48	0.093
Education (years)	10.62 ± 2.39	12.85 ± 3.12	0.001
Height	176.82 ± 6.97	174.05 ± 17.91	0.364
Weight	66.17 ± 9.38	81.75 ± 18.8	0.000
BMI	21.35 ± 3.05	24.87 ± 4.98	0.000

BMI: Body mass index, p = significance level (< 0.05).

marital status, profession, and educational background information was collected.

Beck Depression Inventory (BDI): The BDI is an instrument that assesses the presence and severity of depression [3]. The 21 items of the inventory were selected to represent symptoms commonly associated with a depressive disorder. Item categories include mood, pessimism, crying spells, guilt, self-hate and accusations, irritability, social withdrawal, work inhibition, sleep and appetite disturbance, and loss of libido. Validity and reliability studies have been performed for the Turkish form, and the total score is 0-63 with a cutoff score of 17 [4].

Beck Anxiety Inventory (BAI): The BAI is a 21-item self-reported questionnaire that focuses on somatic anxiety symptoms such as heart pounding, nervousness, inability to relax, and dizziness or light-headedness [5]. Items are rated on a four-point scale ranging from 0 (not at all) to 3 (severe; I could barely stand it). Validity and reliability studies have been performed for the Turkish form by Ulusoy and colleagues [6].

State-Trait Anger Expression Inventory (STAXI): The STAXI is a self-assessment scale containing 10 questions concerning trait anger and 24 questions regarding anger expression. In this study, the Turkish-adapted version of the STAXI was used [7]. A high "trait anger" score indicates a high level of anger, and a high "anger control" score shows that anger is well controlled. A high "anger out" score means that anger is easily expressed, while a high "anger in" score indicates suppressed anger. The STAXI was developed by Spielberger, while the Turkish validity and reliability studies were performed by Ozer [7, 8].

State-Trait Anxiety Inventory (STAI): The STAI is a 40-item tool that assesses both state and

trait anxiety. State anxiety describes the person's feelings at a particular time and under particular conditions, whereas trait anxiety describes the person's usual feelings [9].

Statistical analysis

Statistical analysis was performed using SPSS statistical software package version 13.0 (SPSS Inc., Chicago, IL). Normal distribution of quantitative data was evaluated using the Kolmogorov Smirnov test. The comparison of quantitative data between the patient and control groups was made using Student's *t*-test for normally distributed data and the Mann-Whitney U-test for non-normally distributed data.

Comparison of qualitative data was performed using the chi-square test. Quantitative data are presented as mean ± standard deviation, and ordinal data are presented as percentages. A *p* value less than 0.05 was considered statistically significant. All tests of statistical significance were two-tailed.

Results

Patients' characteristics

A total of 40 patients and 40 healthy controls were included in this study. All of participants were male. The mean age in the patient group was 24.60 ± 5.22 years, while that in the control group was 26.45 ± 4.48 years; the difference was not significant (*p* = 0.973). The level of education differed significantly between groups (*p* = 0.001). A total of 80% and 52.5% of the subjects in the patient and control groups, respectively, were unmarried.

The weight and BMI were significantly lower in the patient group compared to those in the control group. The height was greater in the patient group compared to that in the control group (**Table 1**). The smoking rate was significantly higher in patient group compared to that in the control group. The mean ratio of pneumothorax was 46.54%. Most people in the patient group

Table 2. Clinical Features Of Patient Group

Variable		n (%)
Episode of pneumothorax	First	34 (85)
	Second	6 (15)
Laterality of pneumothorax	Right	27 (67.5)
	Left	13 (32.5)
Presence of bleb	Yes	18 (45)
	No	22 (55)
First treatment	Conservative	4 (10)
	Pleural catheter	16 (40)
	Tube thoracostomy	20 (50)
Surgery	Yes	15 (37.5)
	No	25 (62.5)

(n = 25, 62.5%) did not undergo surgery (**Table 2**). The mean duration of hospitalization in the patient group was 4.93 ± 2.64 (1-11 days).

Psychiatric symptoms

Mean BAI scores in the patient and control groups were 10.37 ± 11.34 and 8.25 ± 10.57 , respectively. Anxiety levels did not differ between the two groups ($p = 0.389$). The mean BDI scores of the patient and control groups were 8.20 ± 8.36 and 6.80 ± 7.56 , respectively, but the difference was not significant. When anger structures of the groups were compared, none of the sub-scales was higher in the patient group. Trait anxiety scores were higher in the patient group compared to those in the control group, but the difference was not significant (**Table 3**).

Discussion

PSP is the idiopathic variety of pneumothorax that occurs spontaneously and is not caused by trauma or an obvious precipitating factor. Few reports have documented psychopathological abnormalities in patients with PSP.

Lim et al. reported that young males with PSP may have a higher tendency to suffer from anxiety, depression, personality disorders, and paranoia compared with normal individuals [10]. Trait anxiety, which indicates long-standing anxiety, was higher in the patient group in our study; this may be related with personality traits implicated in pneumothorax. However, state anxiety was not higher in the patient group. Although the depression and anxiety levels were higher in patients with PSP compared

to those in healthy controls in our study, they were not significantly higher. The anger scores were lower in patients with PSP compared to those in the healthy controls. Martín et al. concluded that there were no differences in personality, depression, or anxiety and that only the rate of type-A behavior was statistically different in patients with PSP [11].

In one study, anger was reported to have a role in the pathophysiology of PSP via increased inflammatory mediators [12]. The authors found that state anger, trait anger, anger-in, anger-out, and BDI scores were significantly higher in the PSP group compared to those in the control group. In terms of stress response, scores on the anger, somatization, depression, tension, fatigue, and frustration sub-scales were significantly higher in the PSP group compared to those in the control group. However, the control group consisted of patients with minor traumas, and the association between anger and PSP has not been closely examined. In our study, the control group was composed of healthy individuals, and we found similar anger status scores in the patient and control groups.

PSP is associated with heavy smoking, morphometric features, and genetic and atmospheric changes [13-18]. In the literature, there are only few studies on the psychological mechanisms associated with the development of PSP.

Smoking has been strongly implicated in the pathogenesis of PSP and is associated with a nine-fold or greater risk of developing a first episode of PSP [13]. Despite actual knowledge of the strong link between PSP and smoking, > 80% of PSP patients continue smoking after their first PSP episode [19]. In our study, most of the patients with PSP were heavier smokers compared with the healthy controls at the time of their first episode of PSP.

The presence of an apical sub-pleural bleb on computerized tomography of the thorax in patients with PSP was common [20]. Blebs result from alveolar rupture and are surrounded by visceral pleura. In our study, the bleb ratio was 45% in patients with PSP.

Atmospheric pressure changes may be another cause of PSP [18]. The pleural pressure gradi-

Table 3. Scores Of Inventories In Patient And Control Groups

Variable	Patient Group (n = 40) (mean ± standard deviation)	Control Group (n = 40) (mean ± standard deviation)	P Value
BDI	8.20 ± 8.36	6.80 ± 7.56	0.435
BAI	10.37 ± 11.34	8.25 ± 10.57	0.389
STAXI-State	19.55 ± 5.99	20.12 ± 6.53	0.683
STAXI-In	17.27 ± 4.98	19.30 ± 4.96	0.073
STAXI-In-Out	16.97 ± 5.54	18.22 ± 4.90	0.289
STAXI-Control	15.35 ± 4.06	16.15 ± 4.76	0.422
STAI-State	41.25 ± 10.67	42.32 ± 9.14	0.630
STAI-Trait	43.55 ± 8.91	41.97 ± 6.47	0.369

BAI: Beck Anxiety Inventory, BDI: Beck Depression Inventory, STAXI: State-Trait Anger Expression Inventory, STAI: State-Trait Anxiety Inventory, p = significance level (< 0.05).

ent from the base to the apex of the lung and the alveolar mean inflation pressure on the apex are much greater in tall people [18]. Patients with PSP have been shown to be taller and thinner compared with other people. The rapid increase in the vertical dimension of the thorax during the period of physical development is considered to affect intra-thoracic pressure at the apex of the lung, which would have some influence on bulla formation in thin, tall, 10-30-year-old people [14]. In this study, patients with PSP were taller and had lower BMI values compared with healthy controls.

This study has some limitations. The study has a sample composed of patients with pneumothorax were recruited from only one medical center, so the results cannot be generalized to all patients with PSP. Additionally, the evaluations depended on self-reported questionnaires and scales and lacked clinical interviews.

In our study, we investigated psychological factors, including depression, state-trait anxiety, and anger in male patients with PSP because it occurs most often in men, but we could not find any significant difference in depression, anger, or anxiety status between the patients and the healthy controls. Future multi-center trials in different locations with larger sample sizes are needed to investigate the different psychopathological conditions associated with PSP.

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