

The evaluation of anxiety and depression in spontaneous pneumothorax

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ABSTRACT

Aim: Psychiatric disorders are common in patients with advanced respiratory diseases. The prevalence of primary spontaneous pneumothorax ranges from 1.2-37 per 100,000 population per year, and the risk of recurrence causes anxiety and depression for the patients.

Material and Method: The Hospital Anxiety and Depression (HAD) scale was applied to 50 patients with a primary spontaneous pneumothorax that underwent treatment in our clinic and a control group of 50 individuals. The study and control group had similar participants (50 patients, 9 women and 41 men). The control group comprised otherways healthy participants aged between 18-40 who had admitted to the smoking cessation clinic.

Results: While the study group's mean age was 25.2, it was 29 in the control group (covariance analysis used for the correction). On an anxiety scale, the study group's mean score was calculated as 8.6, while it was 5.7 in the control group. The difference was found to be significantly higher in the patient group. The depression scale score of the study group was 5.8, and the control group's score was 5.7. There was no statistically significant difference between the groups.

Conclusion: Since pneumothorax is a sudden, recurring, and severe illness that can cause respiratory distress, it may lead to anxiety or depression in patients. Without treatment, life-threatening consequences such as dyspnea and cardiac collapse may occur. Furthermore, the painful procedure of tube thoracostomy increases the patients' anxiety. Our objective is to identify potential anxiety-depression in pneumothorax patients, leading to improved mental health outcomes, increased satisfaction, lower readmission rates, and reduced care costs.

Keywords: Primary spontaneous pneumothorax, anxiety, depression

INTRODUCTION

Pneumothorax is the presence of air in the pleural space (1). A primary spontaneous pneumothorax (PSP) occurs without underlying lung disease or trauma. The prevalence of PSP in the general population is 7.4 per 100,000 in men and 1.2 per 100,000 in women (1). It is typically seen in tall, thin, and smoking men. Bulla and bleb structures commonly located in the lung apex are held responsible for the etiology. It is thought that cigarette smoke is involved in pathology due to the destruction of elastic fibers by disrupting the protease-antiprotease and oxidase-antioxidase balance, causing inflammation in the distal airways. PSP recurrence rates are generally cited as between 16- 52%, making counseling about forthcoming risks complex and creating uncertainty regarding optimal management. If recurrence rates are as high as 50%, a statement could be made for definitive surgical repair at

an earlier stage. However, if the actual rate is closer to the lower estimate, waiting for a recurrent episode before considering surgery is appropriate (2). Unfortunately, no established factors predict recurrence and, consequently, no method for risk-stratifying patients. Female sex, lower body weight, smoking and height in males have all been proposed as risk factors for recurrence.

PSP treatment is applied in different ways depending on the clinic and the degree of pneumothorax. These can be listed as simple to invasive; observation, simple needle aspiration, percutaneous drainage catheter, tube thoracostomy, and surgical treatment. In our clinic, we don't prefer simple needle aspiration, and we perform surgical operation to patients with recurrent pneumothorax. Video-assisted thoracic surgery (VATS) is used in surgical treatment. Patients are called for outpatient clinic control on the 10th day after discharge.

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We observed increased clinic admissions with these patients, disrupting their daily work due to the disease's anxiety of recurrence. Only a few published studies have documented psychopathological abnormalities and decreased quality of life in patients with PSP (3). The study aimed to investigate whether the levels of anxiety and depression in PSP patients are higher than in the general population.

MATERIAL AND METHOD

The study was carried out with permission of University of Health Sciences Ankara Atatürk Sanatorium Training and Research Hospital Ethics Committee (Date: 22.02.2023, Decision No: 2012-KAEK-15/2658). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

We obtained data on 100 young individuals from this cross-sectional survey between January 2019 and January 2020. The control group (n=50) comprised individuals admitted to the smoking cessation clinic. To ensure that the volunteers had no medical history of respiratory, psychiatric, or chronic diseases, a physician conducted interviews with them. The PSP group (n=50) consisted of patients with PSP confirmed by chest radiographs or computed tomography and treated in the hospital. The HAD results of both groups were compared. All participants were between 18-40 years old and provided informed consent. The study excluded participants with known psychiatric disorders, medical therapy users, and individuals with co-existing pulmonary pathologies.

The Hospital Anxiety and Depression (HAD) scale was used to collect it in the study (Figure 1). HAD is a study measuring anxiety and depression in a hospital that Zigmond and Snaith described in 1983. HAD is a test that can be completed in 2-5 minutes and is easily applied in the general population. Scores below 8 are classified as non-cases, while scores between 8 and 10 indicate mild effects, and scores above 11 are positive. The hospital and non-hospital reliability of the HAD scale and the Turkish form of the scale have been proved by various studies (7,8).

Uni- and multivariate statistical analyses were done using IBM SPSS Standart Concurrent User Version 26 (IBM Corp., Armonk, New York, USA). Spearman's rank correlation is used to analyze data. The analysis of covariance was used to adjust or control for differences between the study and control groups.

Hospital Anxiety and Depression Scale (HADS)					
Tick the box beside the reply that is closest to how you have been feeling in the past week. Don't take too long over you replies: your immediate is best.					
D	A		D	A	
		I feel tense or 'wound up':			I feel as if I am slowed down:
3		Most of the time	3		Nearly all the time
2		A lot of the time	2		Very often
1		From time to time, occasionally	1		Sometimes
0		Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			I get a sort of frightened feeling like 'butterflies' in the stomach:
0		Definitely as much	0		Not at all
1		Not quite so much	1		Occasionally
2		Only a little	2		Quite Often
3		Hardly at all	3		Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			I have lost interest in my appearance:
3		Very definitely and quite badly	3		Definitely
2		Yes, but not too badly	2		I don't take as much care as I should
1		A little, but it doesn't worry me	1		I may not take quite as much care
0		Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			I feel restless as I have to be on the move:
0		As much as I always could	3		Very much indeed
1		Not quite so much now	2		Quite a lot
2		Definitely not so much now	1		Not very much
3		Not at all	0		Not at all
		Worrying thoughts go through my mind:			I look forward with enjoyment to things:
3		A great deal of the time	0		As much as I ever did
2		A lot of the time	1		Rather less than I used to
1		From time to time, but not too often	2		Definitely less than I used to
0		Only occasionally	3		Hardly at all
		I feel cheerful:			I get sudden feelings of panic:
3		Not at all	3		Very often indeed
2		Not often	2		Quite often
1		Sometimes	1		Not very often
0		Most of the time	0		Not at all
		I can sit at ease and feel relaxed:			I can enjoy a good book or radio or TV program:
0		Definitely	0		Often
1		Usually	1		Sometimes
2		Not Often	2		Not often
3		Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
 Total score: Depression (D) _____ Anxiety (A) _____
 0-7 = Normal
 8-10 = Borderline abnormal (borderline case)
 11-21 = Abnormal (case)

Figure 1. Summary of assessment scores for videos regarding robotic-assisted knee replacement videos

RESULTS

The study included 50 patients with primary spontaneous pneumothorax (9 women, 41 men) and 50 healthy controls (11 women, 39 men). The control population comprises individuals who have applied to the smoking cessation clinic with a mean age of 29.8 and no history of illness. The mean age of the patient group was 25.2 (18-40) compared to 29.8 (18-40) in the control group, covariance analysis is used for correction.

The mean number of hospital admission was 8.9 (2-39), and the number of hospitalization was 1.9 (1-6). The mean hospitalization rate after admission to the hospital was %26.3 (7.7-66.7%). The patient group had a higher mean anxiety scale score of 8.6 when compared to the control group's mean score of 5.7. The anxiety score of the patient group was found to be significantly higher in the calculation shown by correcting the values for age (p <0.05). The patient group had a depression scale score of 5.8, similar to the control group's score of 5.7.

When evaluated with Spearman's rank correlation test, the hospital admission frequency was significantly higher in patients with increased anxiety scores (p:0.12). However, there was no significant difference in

the number of hospitalization and length of stay with anxiety scores. Also, there was no significant difference between depression scores with the hospital admission frequency, the number of hospitalizations and the length of stay (Table 1).

Table 1. Correlation between anxiety and depression and hospital administrations and stays.

Spearman's rho	Anxiety	Depression
The hospital administration		
Correlation Coefficient	.354*	-.012
Sig. (2-tailed)	.012	.936
N	50	50
The number of hospitalizations		
Correlation Coefficient	.014	-.103
Sig. (2-tailed)	.923	.476
N	50	50
The length of stay		
Correlation Coefficient	.150	-.053
Sig. (2-tailed)	.297	.716
N	50	50

*Correlation is significant at the 0.05 level (2-tailed)

Twenty-six of the cases had a recurrence of PSP (52%). Surgery (VATS Bullae resection) was performed in 19 (38%) cases. 28 F chest tube was used for 45 (90%) patients, a 24 F chest tube for 3 (6%) patients and a 10 F catheter was inserted in 2 (4%) patients (Table 2).

Table 2. The treatment course of the patients with PSP.

	Frequency	Percent
10 F Pleurocan	2	4.0
24 F Chest TUBE	3	6.0
Recurrence	26	52.0
Surgery	19	38.0

DISCUSSION

In this study, we found that the prevalence of anxiety in PSP was significantly higher than in the control group. The frequency of admission to the hospital was also found to be significantly increased in patients with anxiety. Pneumothorax is an annoying disorder that presents with a variable spectrum. It may occur in young and healthy patients without a precipitating external event and the absence of clinical lung disease (PSP) or as an underlying lung disorder complication (secondary pneumothorax).

A few methods have been described to evaluate pneumothorax size. The light index calculates pneumothorax dimensions from the ratio of cubed diameters of collapsed lung and hemithorax on a chest radiograph (pneumothorax size [%] = 100 × [1 – average lung diameter³/average hemithorax diameter³]) and

demonstrates a good correlation with the volume of air removed (4). Jalli et al. (5) prospectively compared the precision of ultrasound with chest radiography in the detection of pneumothorax, using a CT scan as the reference standard. The sensitivity and specificity in the detection of PSP were 80.4% and 89%, respectively, with an overall accuracy of 85%.

Moreover, the treatment options are also variable. Observation, needle aspiration, and chest tube insertion are generally recommended for the first episode of pneumothorax.

Concerning the interventional treatment, the indication to drain the air magnitude from the pleural space can be conducted using aspiration or a chest tube. A permanent catheter is more often suggested rather than simple aspiration (6, 7). Bullae resection with VATS have excellent results in terms of low rate of recurrence after surgery, length of hospital stay, functional recovery and cosmetic outcomes when compared to thoracotomy (8-11).

For recurrent or persistent pneumothorax, chemical pleurodesis, surgery by video-assisted thoracic surgery (VATS) or thoracotomy may be helpful (12).

Although PSP is not associated with a known clinical lung disease (e.g., COPD), most of the affected patients have unrecognized lung abnormalities (mostly sub-pleural blebs) that likely predispose to pneumothorax (13).

Anxiety disorders and depressive disorders are approvingly prevalent conditions that frequently co-occur. Individuals impacted by anxiety and depressive disorders concurrently have commonly shown more significant functioning impairment, decreased quality of life, and inferior treatment outcomes than individuals with only one disorder (14). Rare reports have demonstrated psychopathological anomalies in patients with pneumothorax (3,13,18). A study evaluated the etiology of primary spontaneous pneumothorax and suggested an association between anger and primary spontaneous pneumothorax (13). Other studies also examined psychological aspects, including depression, anxiety, and anger, in patients with pneumothorax compared with normal individuals; however, the result is inconsistent (3, 17).

In the study, the relationship between anxiety and depression disorders with PSP structures was evaluated. There is only a few studies on this subject in the literature (3,12,18,19).

Many studies showed that patients with advanced COPD and severe asthma is at elevated risk of recurring hospitalization and emergency care utilization episodes. These patients experience distressing symptoms of depression, anxiety, and dependence on caregivers.

These experiences, in turn, can cause worse outcomes, more pronounced deterioration in their health status, respiratory symptoms, or increased burden on the healthcare system (17).

The results of the anxiety control group applications of PSP patients were found to be high. Hyun Kyoung Lim et al. (3) found that young male PSP patients tended more to anxiety, depression, and personality traits. On the other hand, Sang-Hyuk Lee et al.'s (19) study showed that anger character could predict the pathophysiology of PSP. Eryiğit et al. (18) did not find a relationship between depression and PSP.

Manen et al.'s (20) study found that the prevalence of depression in COPD patients with severe airway obstruction (FEV1 <50%) was 25%, and they had a 2.5 times greater risk of depression than controls who were comparable for demographic variables and the presence of comorbidity. In patients with mild to moderate COPD, no increased risk for depression was seen.

According to the HAD questionnaire, it is noteworthy that the relapse rate in those with high anxiety scores was similar to that of the general PSP population but that the clinical admission of the patients with high scores were frequent.

The strength of the patients incorporated in the study is the analysis of 1-year clinical data. The group age dissimilarity between the patient population and the control required correction by covariance analysis. As we conducted this study in a single center, its validity, and broader applicability are limited. The study aimed to determine the prevalence of anxiety and depression disorders in patients with PSP. Our study suggests a higher incidence of anxiety attacks in PSP patients.

CONCLUSION

This study establishes a preliminary association between the incidence of anxiety and depression in patients with PSP. Anxiety and depression screening can help develop appropriate medical and psychosocial treatment programs, improve the quality of life for some patients, and reduce unnecessary hospital admissions.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with permission of University of Health Sciences Ankara Atatürk Sanatorium Training and Research Hospital Ethics Committee (Date: 22.02.2023, Decision No: 2012-KAEK-15/2658).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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