RESEARCH ARTICLE

PREVALENCE OF VARIOUS CAUSES OF PNEUMOTHORAX IN COMPARISON TO MALE AND FEMALE

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ABSTRACT
Pneumothorax is the collection of air in the pleural cavity that causes failure of the affected lung. Depending on the primary disease, the peak incidence of secondary spontaneous pneumothorax can occur in elder age that is most common in emphysema patients. In such patients air enters in the pleural spaces directly through alveolar rupture by lung interstitium or backward through mediastinal pleura. This study compares the prevalence and recurrence of pneumothorax in male versus female patients. Data of 94 patients was collected from the Aga Khan University Hospital Radiology Information System. Their risk of recurrence was analyzed with particular reference to the variables such as age and sex of the patient, initial size of pneumothorax, smoking status of the patient, height and body mass index and the treatment employed. Results showed that males are more prone to pneumothorax and to its recurrences. The incidence of causes included emphysema (64.9% male while 14.9 females), atelectasis (60.6% male while 12.8% females), cystic fibrosis (77.7% male while 18.1% females), pneumonia (78.7% male while 18.1% females), pleural effusion (67% male while 11.7% females), embolism (80.9% male while 18.1% females), tachypnea (80.9% male while 18.1% females), fracture (78.7% male while 17% females), and tuberculosis (79.8% male while 16% females). Male height was the second most important factor while smoking cessation also significantly influenced the risk of recurrence.

Keywords: Pneumothorax, primary spontaneous pneumothorax, secondary spontaneous pneumothorax, recurrent pneumothorax.

1. INTRODUCTION
The pathophysiology of pneumothorax was first described in 1747 by Combulser, where he identified that the air in pleural spaces causes lung compression resulting in decreased pulmonary functioning. The term pneumothorax was first created by Itard in 1803 while clinical pneumothorax was regarded as being derived to pulmonary tuberculosis up to 1932 when Kjaergard illustrated primary spontaneous pneumothorax (PSP) as a distinct entity occurring in previously healthy adults1,2.

Basically pneumothorax is the collection of air in the pleural spaces that results in the collapse of affected lung. Its degree of intensity depends on quantity of air that is present within the spaces. Pneumothorax can be classified as non-spontaneous and spontaneous. Spontaneous pneumothorax occurs without any preceding trauma or apparent precipitating origin. If it occurs with no underlying lung disease than it is termed as primary spontaneous pneumothorax (PSP). The major cause of PSP is decrease in the vital capacity of lungs and increase in the alveolar-arterial oxygen gradient resulting in varying degree of hypoxemia.3 When the underlying lung function is normal, hypercapnia does not build up in patients with primary spontaneous pneumothorax.4 Secondary spontaneous pneumothorax (SSP) develops in the presence of an underlying lung condition such as atelectasis, chronic obstructive pulmonary disease (COPD), emphysema or cystic fibrosis, etc.5 In patients with core lung disease, dyspnea is constantly present with pneumothorax and is usually in severe form even in those with less severe pneumothorax. Most patients of pneumothorax suffer from ipsilateral chest pain, hypoxemia or hypotension that can be life-threatening.5-7
Symptoms do not resolve spontaneously in patients with SSP. Pneumothorax related to menses typically occurs in women who are 30 to 40 years old and who have a history of pelvic endometriosis. Catamenial pneumothorax usually has an effect on the right lung and arises within 72 hours after the onset of menses. 

2. METHOD
Data of 94 patients was collected from Aga Khan University Hospital Radiology Information System. Their recurrence risks were examined with specific reference to the accompanying variables including age and sex of the patient, the starting size of pneumothorax, smoking habit of the patient, height and body mass index, and the essential manifestation of treatment utilized.

3. RESULTS
Results showed that males are more prone to pneumothorax and its recurrences than females. The occurrence of causes included emphysema (64.9% male while 14.9 females), atelectasis (60.6% male while 12.8% females), cystic fibrosis (77.7% male while 18.1 females), pneumonia (78.7% male while 18.1% females), pleural effusion (67% male while 11.7% females), embolism (80.9% male while 18.1% females), tachypnea (80.9% male while 18.1% females), fracture (78.7% male while 17% females), tuberculosis (79.8% male while 16% females) (Fig. 1). Male height was the second most important factor, and smoking cessation the only other variable which significantly influenced the risk of recurrence.

Fig. 1. Various causes of pneumothorax in comparison of male to female.
4. DISCUSSION
Male are more prone to pneumothorax as compared to females as men attributes to several factors like higher rate of smoking, taller body and differences in mechanical properties of lungs. Their recurrence risk has been examined with reference to the subsequent variables like age, sex, height and body mass index (BMI) of the patient, early size of pneumothorax, smoking condition of the patient, and the primary form of treatment in use. Male height was the second most important factor, and smoking cessation the only other variable which significantly influenced the risk of recurrence. In spite of the fact that women are at low risk of progression of initial pneumothorax, their chances of recurrence are much higher than males. Smoking cessation appeared to reduce the risk of recurrence while in female catamenial pneumothorax type is common in which lesions associated with diaphragmatic perforations and thoracic endometriosis mostly occur during menstruation. Smoking is clearly involved in the development of pneumothorax. Most of the patients in this study were smokers, and smoking cessation seemed to reduce the recurrence rate. The pattern of recurrence in smokers seemed to differ from that seen in non-smokers with recurrences tending to occur earlier and on the same side as the initial pneumothorax. This risk might simply be mediated by an increased tendency to coughing and transmission of increased intrathoracic pressures to an area of healing visceral pleura or it may be associated with structural changes consequent upon the reduced antiprotease activity that is associated with the smoking habit. Smoking increases the relative risk of contracting a first SP approximately nine fold in women and 2-fold in men. The increase is especially large among heavy smokers.11

The other frequent underlying disorders are COPD with cystic fibrosis, emphysema, atelectasis, tuberculosis, pneumonia, lung cancer, fracture, pulmonary embolism, pulmonary hernia, pulmonary edema, transient tachypnea, pleural effusion and haziness but the major diseases are transient tachypnea and pulmonary embolism.12 Depending on the underlying disease, the peak incidence of SSP can occur in older age that is most common in emphysema patient in which air enter in pleural spaces during different mechanisms directly through alveolar rupture by lung interstitium or backward through mediastinal pleura.13

Recent studies suggest that age is an independent predictor of the risk of recurrence of PSP. Since most recurrences occur within three years of the initial pneumothorax and risk decreases after 40 years of age. Younger patients are at risk for a longer period and have a greater likelihood of benefiting from preventive procedures after a first pneumothorax than older patients.14

5. CONCLUSION
Analysis of several potential risk factors revealed that male is more prone to pneumothorax as compared to female. Their risk of recurrence was analyzed with reference to the subsequent variables like age, sex, height and body mass index (BMI) of the patient, the initial size of pneumothorax, the smoking status of the patient, and the primary form of treatment in use.

REFERENCES
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