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Original Research Article

Clinical and aetiological spectrum of spontaneous pneumothorax in adults in Sub-Himalayan: a prospective study at tertiary care institute

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ABSTRACT

Background: The spontaneous pneumothorax has been classified as major cause of morbidity and mortality among respiratory diseases. The objectives of the study were to determine the incidence and aetiology of spontaneous pneumothorax and to assess the clinical profile of affected patients admitted in our institute.
Methods: A hospital based prospective study was conducted in year 2011-12 in the Department of Medicine, IGMC Shimla (H.P.) India. During study period the total admissions were 7335 out of which 30 patients were diagnosed as spontaneous pneumothorax and treated as cases under study. The data was collected on proforma includes demographic profile, probable cause, clinical and outcome indicators of Spontaneous Pneumothorax, master chart framed and analysed into frequency percentage.
Results: Incidence of spontaneous pneumothorax was found to be 408.99/yr/100000 admissions in the department of medicine. Incidence of primary spontaneous pneumothorax was 81.79/yr/100000 admissions. Incidence of secondary spontaneous pneumothorax was 327.19/yr/100000 admissions. Majority of the patients of primary spontaneous pneumothorax were of the 20-29yrs age group. Higher proportions of cases were from male gender (93.33%). Secondary pneumothorax patients were mostly of 50 to 59 years age group. The predominant aetiology for secondary spontaneous pneumothorax was COPD (36.66%) followed by Pulmonary tuberculosis (33.33%).
Conclusions: Spontaneous pneumothorax was more common in men. The predominant aetiology for secondary spontaneous pneumothorax was COPD (36.66%) followed by pulmonary tuberculosis (33.33%).

Keywords: Clinical profile, Primary spontaneous pneumothorax, Secondary spontaneous pneumothorax, Tuberculosis

INTRODUCTION

Pneumothorax is a pathological condition characterised by the accumulation of air within the pleural space.[1] Pneumothorax is classified as spontaneous, traumatic, or iatrogenic. Primary spontaneous pneumothorax occurs in persons without clinically apparent lung disease whereas secondary spontaneous pneumothorax is a complication of pre-existing lung disease. Traumatic pneumothorax can be iatrogenic or non-iatrogenic. Non-iatrogenic variety is caused by penetrating or blunt trauma to the chest, whereas iatrogenic pneumothorax results from a complication of a diagnostic or therapeutic intervention.[2] Primary spontaneous pneumothorax occurs without a precipitating event in a person with no clinical evidence

of lung disease. Many of these individuals have occult lung disease with sub pleural blebs on computed tomography (CT) scans. In contrast, secondary spontaneous Pneumothorax occurs as a complication of underlying lung disease, most often Tuberculosis, COPD.[3] Dyspnoea, chest pain and decreased air entry are the cardinal clinical features of pneumothorax. Some patients may present with atypical symptoms or may remain asymptomatic. There should be a high index of suspicion for pneumothorax in patients with underlying lung disease, those receiving mechanical ventilation or following transthoracic needle procedures. Pneumothorax may be recurrent in patients with underlying lung disease. After one episode of pneumothorax the probability that it will occur again increases greatly and taller males have been shown to have higher recurrence rates.[4] Spontaneous pneumothorax is usually suggested by clinical history and physical examination. Radiological investigation of the chest is needed to establish the diagnosis. Expiratory chest radiograph is occasionally useful in diagnosing patients missed by inspiratory film especially apical ones.[5]

Aims and objectives

The aims and objectives were to study the clinical profile and aetiology of spontaneous pneumothorax over a period of one year in adults in sub Himalayan region.

METHODS

This was a prospective study conducted at a tertiary care institute in North India between June 2011 and May 2012. All the patients admitted to the hospital with a diagnosis of SP were included. A predesigned proforma that had demographic details (age, gender, residence, smoking habit), anthropometry [height, weight, body mass index (BMI), upper segment to lower segment ratio], clinical presentation (pre-existing known cardiopulmonary disease or other comorbid conditions, respiratory and other symptoms at presentation, findings on general, respiratory and systemic examination), chest radiography, and details of other relevant investigations, was used to collect information. The tests carried out for individual patients included were of radiological, microbiological (e.g., sputum culture and examination for acid-fast bacilli), serological (e.g. antibodies to bacteria, fungi, human immunodeficiency virus) and other investigations. The patients were classified as having PSP if routine clinical, radiologic evaluation and relevant additional investigations, failed to reveal an underlying pathology that could potentially explain the occurrence of pneumothorax. All patients, with associated pulmonary disorder that could be linked to pneumothorax, were categorized as having SSP. Group comparisons were made between patients with PSP and SSP. Risk factor analysis for PSP was done for variables like age, sex, smoking, BMI, height, upper to lower segment ratio, and presence of exertion at the onset, using patients with SSP as controls. Results are analysed by using percentage, mean and median. No intervention was required and the study was cleared by the ethical committee of the hospital. Patients were enrolled in study after obtaining written informed consent

RESULTS

We evaluated 30 patients of spontaneous pneumothorax including primary and secondary pneumothorax all of the patients who met the inclusion criteria in above said study period.

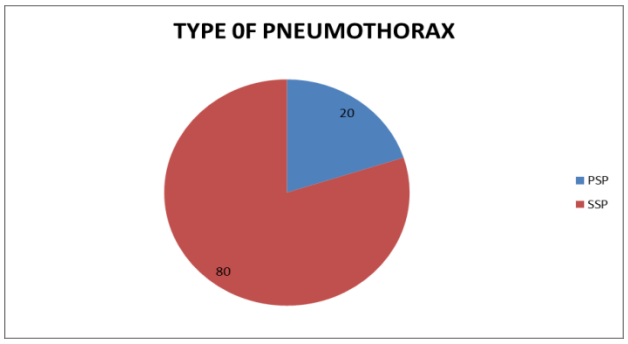

Figure 1: Types of spontaneous pneumothorax.

Majority of the patients were of secondary spontaneous pneumothorax. Out of 30 patients 80% (24) were of secondary spontaneous pneumothorax. Primary spontaneous pneumothorax was 20% (6) only (Figure 1).

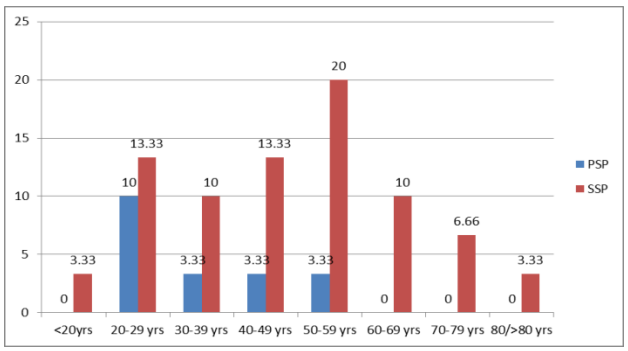

Figure 2: Age distribution of spontaneous pneumothorax.

The age distribution showed a biphasic pattern. Majority of the patients of primary spontaneous pneumothorax were of the 20-29yrs of age group. Secondary pneumothorax patients were mostly of 50 to 59 years age group (Figure 2).

Table 1: Sex distribution of spontaneous pneumothorax.

	Male (%)	Female (%)	Total (%)
PSP	6 (20)	-	6 (20)
SSP	22 (73.33)	2 (6.66)	24 (80)
Total	28 (93.33)	2 (6.66)	30 (100)

It was found that only 2 i.e. 6.66% out of all 30 patients of spontaneous pneumothorax were females, and remaining were i.e. 28 (93.33%) were males.

Table 2: Anthropometric data of patients of pneumothorax.

Variables	SP	PSP	SSP
Height			
Mean	166.96 cm	172.91	165.33
Range	138-180	160-180	138-177
Weight			
Mean	52.53	62.16	49.90
Range	30-80	51-80	30-64
Body mass index			
Mean	18.67	20.83	18.09
Range	11-25	16-25	11-22
U/L segment			
Mean	0.94	0.98	0.93
Range	0.96-0.99	0.97-0.99	0.96-0.99

Average height of patients with primary spontaneous pneumothorax was (172.91 cm), higher than secondary spontaneous pneumothorax (165.33 cm). Mean body mass index of patients was 20.83 and 18.09 Kg/m^2 for primary spontaneous pneumothorax and secondary spontaneous pneumothorax patients, respectively.

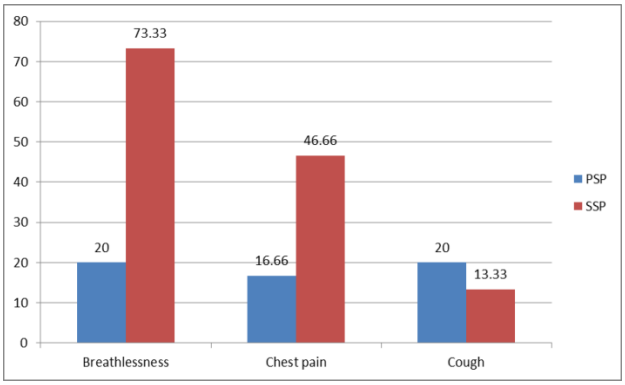

Figure 3: Distribution of spontaneous pneumothorax according to presenting complaints.

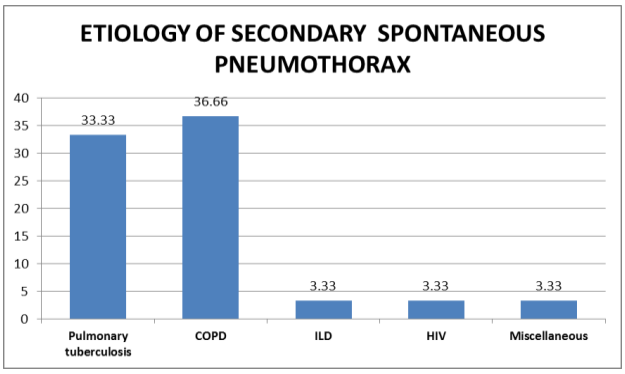

Figure 4: Etiologic distribution of secondary spontaneous pneumothorax.

Breathlessness, (mainly Grade III on MRC scale) was the main presenting complaint in 93% of our patients followed by chest pain in 19% of the patients and cough was in 10% as presenting symptom (Figure 3).

In our study we observed that the predominant etiology for secondary spontaneous pneumothorax was COPD (36.66%) followed by pulmonary tuberculosis (33.33%) rest ILD, HIV and miscellaneous causes were each 3.33% (Figure 4).

DISCUSSION

Spontaneous pneumothorax is well known entity recognized since the beginning of 9th century, very few studies are available regarding its epidemiology in our country. Incidence of SP in our institute was 0.4% which is not comparable with incidence in western world. This figure may also not reflect the true incidence of SP in the population because our tertiary institute cater a lot of referral cases. Though study of Gupta et al [6] having incidence of SP approx. 0.1%. In our study, SSP group was having 24 patients (80%), leaving only 6 (20%) in the PSP group which are again comparable with study done by Gupta et al.[6]

In our study the 1st peak was observed between 20-29 years age group and 2nd peak was between 50-59 years age group and results are comparable with study done by Gupta et al which also observed that the age distribution for Pneumothorax showed a biphasic distribution.[7]

Patients with PSP were relatively taller (mean height 172.91 cm), which is a well-known observation.[8] The higher incidence in tall people is possible due to greater pleural pressure gradient at the lung apex than at the base.[9]Weight and BMI however, were lower in patients with SSP, which may be attributed to the nature of chronic illnesses they suffered from.

The sex incidence in our study showed the male preponderance. The results were comparable to the other studies. This higher incidence in men has been attributed to higher smoking rates in men, body habits and different mechanical properties of the lungs.[8]

In the present study, dyspnoea was the commonest presentation seen in 93% of the patients while chest pain was seen in 63% and cough seen in 33% of patients which are comparable with study done by Gupta et al.[6]

In our study the commonest cause was COPD accounted to 37% followed by Pulmonary Tuberculosis 33% followed by ILD, HIV associated pulmonary infection and miscellaneous each accounted for 3% of cases which are comparable with study conducted by Gupta et al.[6]

CONCLUSION

Spontaneous pneumothorax is more common in male than female with maximum incidence in 20-30 years age

group. Maximum of Spontaneous Pneumothorax cases were due to COPD (37%) and pulmonary tuberculosis (33%). Since COPD is a common clinical entity, therefore the treating physician should always try to rule out spontaneous pneumothorax, in COPD patients presenting with worsening dyspnoea, cough and/or chest pain, considering spontaneous pneumothorax as an important differential diagnosis.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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