

Research Article

Profile of patients of spontaneous pneumothorax of North Gujarat region, India: a prospective study at GMERS medical college, Dharpur-Patan

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ABSTRACT

Background: Spontaneous pneumothorax is a respiratory emergency, which we come across in clinical practice. It needs quick diagnosis and prompt treatment. Its immediate and prompt management can save a life of the patient. Delayed management can produce serious implication on respiratory function. The objective was aimed to study profile of patients of spontaneous pneumothorax.

Methods: This was a prospective descriptive study conducted among purposively selected 100 patients of pneumothorax at a GMERS Medical College and Hospital, Dharpur-Patan of North Gujarat region, India between February 2013 and January 2015 after taking written informed consent. A predesigned semi-structured performa was used. Detailed demographic and clinical data were recorded. Patients were treated with simple needle aspiration or Intercostal drainage tube (ICDT) as per the standard practice at our institute. Data was statistically analyzed using SPSS software (trial version).

Results: Based on the total number of admissions to our hospital during the study period, the annual incidence of SP was calculated as 99.9 per 100,000 hospital admissions. Out of 100 patients 84 patients were above the age of 40 years. 96 % of the patients were male. Dyspnea was the most common symptom at the onset and was present in all patients. History of smoking was present in 88% of the patients. Past history of COPD and tuberculosis were found in 58% and 34% of the patients respectively. Radiological evidence showed right sided pneumothorax in 50% of the patients whereas 48% had left sided pneumothorax. 86% of the patients were treated with Intercostal drainage tube. Among all patients treated with ICDT, 6% of the patients had surgical emphysema while 10% of the patients had secondary infection of pleural space leading to hydro pneumothorax.

Conclusion: Spontaneous pneumothorax in India is more often secondary to an underlying lung disease. COPD and pulmonary tuberculosis remains the common causes of SP. Smoking is an important risk factor for the development of pneumothorax. X-Ray chest is one of the most important investigations for diagnosis of pneumothorax & underlying etiological factors.

Keywords: Spontaneous pneumothorax, ICDT, Pulmonary tuberculosis, COPD, Smoking

INTRODUCTION

Pneumothorax is defined as the presence of air in the pleural cavity. It is usually classified into spontaneous,

occurring without a preceding cause, and traumatic which follows penetrating, blunt or barometric trauma to the chest. Spontaneous pneumothorax (SP) is subdivided into primary spontaneous pneumothorax (PSP), occurring in

otherwise healthy individuals and secondary spontaneous pneumothorax (SSP), which occurs in patients with an underlying lung disease.¹

Spontaneous pneumothorax is a respiratory emergency, which we come across in clinical practice. It needs quick diagnosis and prompt treatment. Its immediate and prompt management can save a life of the patient. Delayed management can produce serious implication on respiratory function. Spontaneous pneumothorax can be found accidentally on chest X-ray examination; when the patient is totally asymptomatic. The management should be according to urgency and etiological factors. The etiology and clinical spectrum of pneumothorax have undergone a marked change in the recent years. For example, pulmonary manifestations of acquired immunodeficiency syndrome (AIDS) have emerged as important cause of SSP.² Data regarding epidemiology and clinical profile of SP are limited, especially so from the Indian subcontinent. Besides several case reports focusing on pneumothorax, there are few studies dealing with diagnosis and treatment of SP in India.³⁻⁵ Occasional studies have also dealt with etiology and clinical profile of SP in Indian adults and children.⁶⁻⁸ The present study describes profile of adult patients admitted with SP to GMERS Medical College and Hospital, Dharpur-Patan.

METHODS

This was a prospective descriptive study conducted at a GMERS Medical College and Hospital, Dharpur-Patan of North Gujarat region, India between February 2013 and January 2015. Total 100 purposively selected patients admitted to the hospital during these periods with a diagnosis of SP were included. Written informed consent was obtained from all the patients before enrolment in the study. A predesigned semi-structured performa was used to collect demographic details. Each patient was interrogated in details regarding the history & symptoms; thereafter a thorough clinical examination was made. All the patients were investigated, radiological, hematological & bacteriological investigation were carried out in view to identify etiology & estimate the extent of pneumothorax. Patients were treated with simple needle aspiration or Intercostal drainage tube (ICDT) as per the standard practice at our institute. Data was statistically analyzed using SPSS software (trial version).

RESULTS

Based on the total number of admissions to our hospital during the study period, the annual incidence of SP was calculated as 99.9 per 100,000 hospital admissions. Out of 100 patients 84 patients were above the age of 40 years. The youngest patient was 20 year old female & the eldest one was of a man of 90 years. The mean age was 53.24 years. 96 % of the patients were male. Dyspnea was the most common symptom at the onset and was present in all patients followed by cough in 80%, chest pain in 40% and fever in 34% of the patients. Onset was

sudden in 64% of the patients while the insidious onset was found in 36% of patients. Pneumothorax occurred in 76% of patients when they were resting/sleeping, light work & heavy work found as precipitating factors in 16% & 4% of the patients respectively. 74 patients were smokers out of them 22 patients were smoking < 25 bidis per day, 42 were smoking between 25-50 bidis per day & 10 gave history of smoking more than 50 bidis per day. 12 patients were Ex-Smokers & 14 patients were non-smokers. Past History of Pulmonary Tuberculosis was found in 34 patients, 58 patients had history of COPD, 2 patients were known case of Bronchial Asthma, 14 patients had a past history of pneumothorax- out of them 8 (57.14%) were having ipsilateral pneumothorax while 4 (28.57%) had contralateral pneumothorax and 2 (14.28%) had bilateral pneumothorax in past. 2 patients had past history of pleurodesis and presented with ipsilateral recurrent pneumothorax due to failure of pleurodesis.

Typical signs of pneumothorax like diminished or absent air entry, hyper resonance on percussion, reduced vocal resonance & diminished movement of respiration on side of pneumothorax were found in almost all cases. Tachypnea & Tachycardia were most common findings and were found in 80% & 70% of the patients respectively (Table 1).

Table 1: Distribution of the patients according to clinical signs at presentation.

Clinical Sign	No. of Patients (n=100)	Percentage
Tachypnoea	80	80
Tachycardia	70	70
Hypoxia	42	42
Cyanosis	28	28
Fever	20	20
Clubbing	16	16
Hypotension	14	14
Edema feet	4	4

Radiological evidence showed right sided pneumothorax in 50% of the patients whereas 48% had left sided pneumothorax. Mediastinal shift was found in 42% of the patients. Radiological evidence of pulmonary tuberculosis was found in 72% of patients out of them 28 % were active 44% of the patients had old tuberculosis. Changes of COPD were found in 62% of the patients (Table 2). Out of 100 patients AFB were detected in sputum of 14 patients.

In 58% of the patients pneumothorax was secondary to COPD which was found to be the most common cause. Pulmonary tuberculosis was found to be the etiological factor in 34% of the cases (Table 3).

Table 2: Distribution of the patients according to their radiological (X-ray) findings (PA view) before treatment.

X-ray Findings	No. of Pts. (n=100)	Percentage (%)
A. Side of pneumothorax		
Right	50	50
Left	48	48
Bilateral	02	02
B. Shift of Mediastinum		
Present	42	42
Absent	58	58
C. Associated findings		
Pul. Tuberculosis		
→ Active	28	28
→ Old	44	44
COPD	62	62
Bronchiectasis	14	14
Consolidation	04	04
Pleural effusion	04	04
Cardiomegaly	04	04

Table 3: Distribution of the patients according to their etiology of spontaneous pneumothorax.

Etiology	No. of Patients	Percentage (%)
COPD	58	58
Tuberculosis	34	34
Bronchial Asthma	02	02
Primary/Idiopathic	02	02
Pneumonitis	04	04
Total	100	100

Initially all patients presented with pneumothorax were assessed for type of management they require. Out of 34 patients with tuberculosis 30 (88.23%) patients were treated with ICDT, 4 (11.76%) patients were treated conservatively by bed rest. Out of 58 patients of COPD, 52 (89.65%) were treated with ICDT, 6 (10.34%) with bed rest (Table 4).

Table 4: Distribution of the patients according to their management.

Etiology	Bed Rest	Procedure Done		Total
		needle aspiration	ICDT	
Tuberculosis	04	02	30	36
COPD	06	--	48	54
Primary/ Idiopathic	--	02	02	04
Bronchial Asthma	--	--	02	02
Pneumonitis	02	--	02	04
Total	12	04	86	100

Among all patients treated with ICDT, 6% of the patients had surgical emphysema while 10% of the patients had secondary infection of pleural space leading to hydro pneumothorax.

DISCUSSION

Although the entity of pneumothorax has been well recognized since the beginning of 19th century, very few studies are available regarding its epidemiology, particularly from India. The most widely quoted study on the incidence of SP was conducted in Olmsted County, Minnesota.⁹ In this study, the incidence of PSP was 7.2 per 100,000 per year among men and 1.2 per 100,000 per year among women, while the incidence of SSP was 6.3 per 100,000 per year and 2.0 per 100,000 per year for men and women respectively. Recently, large quantitative data from national databases in UK have been presented.¹⁰ The overall person consulting rate for pneumothorax (primary and secondary combined) in the general practice was 24.0 per 100,000 each year for males and 9.8 per 100,000 each year for females. Hospital admissions for pneumothorax as a primary diagnosis occurred at an overall incidence of 16.7 per 100,000 per year and 5.8 per 100,000 per year for males and females respectively. In the present study, the incidence of SP was calculated to be 99.9 per year per 100,000 hospital admissions (~0.1%). This figure does not reflect the true incidence of SP in the general population and is not strictly comparable to the figures quoted in Western studies, since our study is from a tertiary care institute wherein the denominator comprises of patients predominantly referred hospital admissions. The reported incidence of PSP among all patients presenting with SP have been widely variable in the few studies available from India, and has ranged from 12.5% in a study from Jaipur⁷ to 25% from Rohtak³ and 64% from Srinagar.⁶

In our study, out of 100 patients, 84 patients were above the age of 40 years. The youngest patient was 20 year old female & the eldest one was of a man of 90 years. The mean age was 53.24 years. Similar findings were also obtained in the other Western studies.^{9,10} In our study, 96% of the patients were male. This is in keeping with previously published studies. The higher incidence in men has been attributed to higher rates of smoking, body habitus and different mechanical properties of the lungs.¹¹ In our study Smoking is known to be an important risk factor for development of SP. Out of 100 patients, 88 were smokers. In fact, a study from Sweden even established that incidence of PSP was significantly affected by the sale of cigarettes.¹² Another commonly held belief is that exertion could promote the onset of SP. This hypothesis, though seemingly attractive, has never been proven in any study.¹³ We also could not demonstrate any such significant association.

Until the description of PSP by Kjaegard¹⁴ more than 70 years ago, tuberculosis was thought to be the leading cause of SP. The scenario has changed over the years,

and COPD has now emerged as the leading cause of SSP in the literature from the West.¹⁵ In our study, 58% of the patients had history of COPD and we found COPD to be still the commonest etiology for SP, while tuberculosis accounted for only 34% cases of SP. Tuberculosis has remained the dominant cause for SP in all studies in adults from India.^{6,7,16,17}

CONCLUSION

In summary, spontaneous pneumothorax in India is more often secondary to an underlying lung disease. COPD and pulmonary tuberculosis remains the common causes of SP. Smoking is an important risk factor for the development of pneumothorax. X-Ray chest is one of the most important investigations for diagnosis of pneumothorax & underlying etiological factors. Hydropneumothorax & surgical emphysema were the most common complication associated with ICDT insertion. Spontaneous pneumothorax has a good clinical outcome.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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