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Original Research Article

Different treatment modalities and their outcomes in 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. Objectives of the study were to determine the various modalities of treatment of spontaneous pneumothorax and their outcome in affected patients 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 treatment modalities and their outcome in 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. Various treatment modalities include observation alone, needle aspiration, traditional intercostal tube, pleurodesis and antitubercular treatment.
Conclusions: Most common treatment modality was intercostal tube drainage in PSP and antitubecular drugs in SSP.

Keywords: Chest tube, Primary spontaneous pneumothorax, Secondary spontaneous pneumothorax, Treatment modalities

INTRODUCTION

Pneumothorax is defined as the entry of air in the pleural space.[1] They can either be spontaneous, traumatic, or iatrogenic (Table 1).[2,3] 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. Chest X-ray is often utilized for the initial diagnosis of pneumothorax, due to its comparative low cost and easy obtainability at the

patient's bedside. The traditional standard for pneumothorax evaluation is with an expiratory, upright chest X-ray. Limiting the sensitivity of this test, a large pneumothorax that layers anteriorly may potentially be missed in a supine patient who cannot sit upright.[5] The treatment of spontaneous pneumothorax is largely dependent on the patient's clinical presentation. A summary of treatment guidelines for subtypes of pneumothorax is listed in (Table 2).[6-8]

Table 1: Clinical classification of pneumothorax.

Spontaneous primary	No apparent underlying lung disease
Secondary	clinically apparent underlying lung disease e.g. chronic obstructive pulmonary disease (COPD)
Catamenial	in conjunction with menstruation
Traumatic	
Iatrogenic	secondary to transthoracic and trans bronchial biopsy, central venous catheterization, pleural biopsy and thoracentesis
Non-iatrogenic	secondary to blunt or penetrating chest injury

Table 2: Treatment guidelines for various subtypes of pneumothorax.

Pneumothorax size (% of hemi thorax)	Interventions with options
<15-20%	Observation and oxygen
≥20% (asymptomatic)	Pigtail catheter placement
	Needle aspiration
≥20% (symptomatic)	Pigtail catheter placement
	Chest tube placement
Tension pneumothorax	Immediate needle decompression then followed by placement of pigtail catheter or chest tube
	Immediate pigtail catheter placement
	Immediate chest tube placement
Pneumothorax with haemothorax	Chest tube placement

Aim and objective was to study the treatment modalities and their outcome 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), details of treatment offered, including needle aspiration, intercostal chest tube drainage and pleurodesis was recorded. The final outcome of the intervention was noted for each patient. For this, patients were reviewed at the time of discharge. 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. 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.

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).

In the study it was observed that all of the patients had to be managed by intercostal tube insertion, however initially pleural aspiration was tried to relieve symptoms in six patients of PSP. Pleurodesis was done in four patients, one with PSP and three with SSP. Moreover, ATT was given to 11 (36.66%) patients of SSP. Table 3

showing the distribution of spontaneous pneumothorax according to treatment modality.

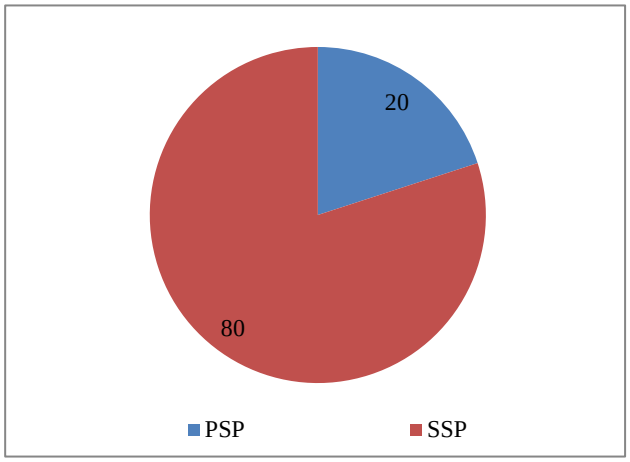

Figure 1: Showing type of pneumothorax (total number of patients=30).

Table 3: Treatment modalities used (total number of patients = 30).

Treatment modality used	SP (n=30)	PSP (n=6)	SSP (n=24)
Aspiration	6 (20%)	6 (20%)	-
Intercostal tube	30 (100%)	6 (20%)	24 (80%)
Pleurodesis	4 (13.33%)	1 (3.33%)	3 (10%)
Anti-tubercular treatment	11 (36.66%)	-	11 (36.66%)

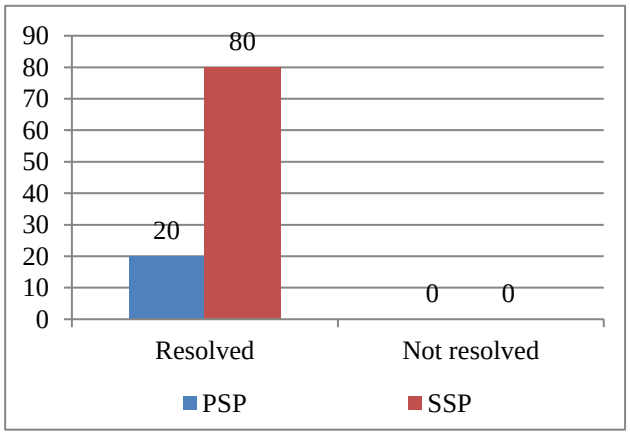

Figure 2: Treatment outcome (total number of patients=30).

It was observed in our study that in all of the patients pneumothorax was resolved. Figure 2 revealed the treatment outcome of pneumothorax in the study.

It was seen in our study that 13.33 % of the patients were having recurrence of pneumothorax and it was more common in secondary pneumothorax. Figure 2 revealed the distribution of spontaneous pneumothorax according to recurrence that is 3.33% PSP and 10% in SSP cases.

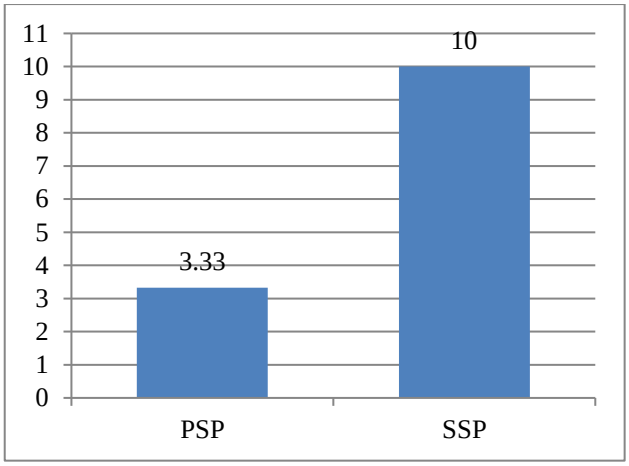

Figure 3: Reoccurrence of spontaneous pneumothorax.

DISCUSSION

Spontaneous pneumothorax with underlying lung disease is categorized as SSP and it is considered to be a more serious disorder, as the patients have a premorbid cardiopulmonary compromise for the underlying lung diseases. PSP occurs in young patients without any apparent lung disease. According to Ferraro and colleagues, PSP is found in 80% of the cases of SP and only 20% have an underlying pulmonary disease.[9] In our study, SSP group was having 24 patients (80%), leaving only 6 (20%) in the PSP group which are again comparable with the above study.

We studied the distribution of spontaneous pneumothorax according to size of pneumothorax. In the study it was observed that all of the patients were having large Pneumothorax. Six patients of primary spontaneous pneumothorax were treated initially with needle aspiration, but due to the large volume of pneumothorax and higher grades of breathlessness, ICT was inserted ultimately. This observation differed from previous observations of success rate of 50-70% of needle insertion in primary spontaneous pneumothorax. This was due to the fact that primary spontaneous pneumothorax that was amenable to treatment with this modality was already treated at primary and secondary level hospitals. Majority patients with secondary spontaneous pneumothorax were very ill and required intercostal chest tube drainage along with treatment for the underlying disease.

In the study it was seen that 13.33 % of the patients were having recurrence of pneumothorax and it was more common in secondary pneumothorax rate of recurrence was 10% in secondary and 3.33% in primary pneumothorax in a previous study by Gupta D et al, the recurrent pneumothorax was seen in 13.33% patients in the study.[10] Rate of recurrence was incidentally identical in both the studies.

CONCLUSION

Since the American and British Thoracic Society recommendations differ from simple needle aspirationto placement of a small-bore thoracostomy tube. These smaller pigtail thoracostomy catheters present a promising treatment alternative to traditional larger chest tubes, even in a tension PTX. Therefore, our study concluded that Intercostal tube drainage is the mainstay of the treatment and the overall response has been good.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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