



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

Available online at: <http://www.iajps.com>

Research Article

PRIMARY SPONTANEOUS PNEUMOTHORAX: CLINICAL PROFILE, SEASONALITY AND RECURRENCE OF 132 ADULT PATIENTS IN A UNIVERSITY HOSPITAL, KINGDOM OF SAUDI ARABIA

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Abstract:

Objectives: The current study aimed to study the presenting features of Primary Spontaneous Pneumothorax (PSP) patients including demographic (gender, age, smoking, height and weight, Body mass index (BMI)), symptoms and seasonality among adult patients in KKHU during the period from 2010 to 2016.

To describe the recurrence of PSP and length of hospital stay in patients who were managed surgically in KKHU during the period from 2010 to 2016.

Methods: Quantitative, Observational, Retrospective, Case-series study. 132 Patients was studied who were diagnosed with primary spontaneous pneumothorax disease from Jan 2010 to Dec 2016 in King Khalid University Hospital were studied. Data was collected by reviewing the transfer sheet case report form (CRF), and by reviewing variables in medical records of PSP patients.

Results: The mean age was 24.62 (S.D \pm 8.8) years old. 88.6% of patients were males (11.4% females). 59.8% were smokers and 40.2% were non-smoker. The (BMI) average was 19.4 kg/m².

The season of the attack was more in spring and summer accounting a 29.6% for each. 90.9% of the Patients were treated surgically. The average length of hospital stay after surgical management was 6.45 days (S.D \pm 3.15), recurrent after surgical management was (4.1%).

Conclusion: Based on this case series study, majority of primary spontaneous pneumothorax (PSP) patients were male, at young age group, with low body mass index (BMI). Most of the admissions occurred in warm climate (spring/summer). Furthermore, short hospital stays, and low state of recurrence were noted among the patients treated surgically.

Key words: (Primary Spontaneous Pneumothorax, variables, seasonality, recurrence)

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Please cite this article in press Waseem HAJJAR et al., *Primary Spontaneous Pneumothorax: Clinical Profile, Seasonality and Recurrence of 132 Adult Patients in a University Hospital, Kingdom Of Saudi Arabia., Indo Am. J. P. Sci, 2019; 06(01).*

INTRODUCTION:

Pneumothorax has been identified as presence of air or gas in the pleural cavity. A pneumothorax can occur spontaneously or after trauma to the lung or chest wall.(1) Spontaneous pneumothorax (SP) can be classified either as primary or secondary. Primary spontaneous pneumothorax (PSP) occurs with no apparent lung disease while secondary spontaneous pneumothorax (SPS) occurs mostly as a complication of underlying lung diseases. PSP is caused by ruptured apical blebs.(2) The incidence of PSPs depends on the region and ranges anywhere from 7.4 to 37 per 100,000 for males and 1.2 to 15.4 per 100,000 for females.(3) The incidence of PSP in men is approximately 12 per 100,000 population per year and in women is 3 per 100,000 population per year.(4)

It usually occurs in tall and thin males. The age of presentation is early adulthood range from 10 to 30 years old and rarely occurs in people at the age of more than 40 years. PSP occurs at rest and might be associated with some environmental factors such as smoking. Previous studies have shown the possibility that climatic changes can be precipitating factors in the development of PSP. (1) Almost all patients with PSP report a sudden ipsilateral chest pain and sudden onset of dyspnea with diminished breath sounds and hyper resonant percussion on the affected side.(3)

Much has been written about the classification, etiology, clinical features and management of PSP but there is limited data about the epidemiology and clinical profile studies relate to PSP in Kingdom of Saudi Arabia, we sought to explore the clinical profile of PSP patients. Usually PSP comes with no obvious underlying lung disease, knowing the risk factors for PSP recurrence may enable us to optimize patient selection to avoid further recurrence and complications.(5) The elucidation of the exact clinical profile is important for physicians to reach the diagnosis and management faster and thus crucial for saving life. To future researchers, this study can provide baseline information on the recent status of PSP disease.

METHODS:

A Quantitative, observational, retrospective, case series study in King Khalid University Hospital from January 2010 to December 2016 targeting PSP patients whom were diagnosed with PSP. A total of 145 patients with PSP were admitted to the KKUH during the period of 2010 to 2016; of these, 132 were considered eligible as they matched the study inclusion criteria which were age

from 14 to 60 years whom diagnosed with primary spontaneous pneumothorax, from Jan 2010 – Dec 2016. We exclude patients whom diagnosed with other types of pneumothorax, whom found to have secondary pneumothorax or traumatic pneumothorax. Patients with group age less than 14 years or more than 60 years and patients before Jan 2010 or after Dec 2016 were excluded as well. While the remaining 13 patients were excluded as, they had no complete information in medical record.

The total number of reviewed patients was 132. Patients' data were retrospectively collected from patients' medical records for the current study, during the study patients' entire information related to age, gender, nationality, smoking, height and weight, type of attack, site, symptoms and type of managements were collected. Length of hospital stay and recurrence after surgery were also collected by using of the transfer sheet case report form (CRF).

Ethical Considerations:

1. Medical Records Department approval was taken.
2. Participants' anonymity were assured by assigning each participants with a code number for the purpose of analysis only.
3. The Institutional Review Board (IRB) at College of Medicine, King Saud University, Riyadh, Saudi Arabia, has reviewed this research and it has been accepted for data collection.

RESULTS:

Data was entered in a Microsoft Office Excel Version 15.19.1 spread sheet, then it was analyses using statistical package for the social science (SPSS) version 21.

A total of 145 patients with PSP were admitted to the KKUH during the period of 2010 to 2016 Jan-Dec; of these, 132 were considered eligible for inclusion in the study. The 13 excluded patients had no complete information in medical records. The distribution of patients by age, gender and nationality is given in table 1. The mean age of patients was 24.62 (\pm S.D 8.8) years old. On the study population 117 (88.6%) of patients were males and 15 (11.4%) were females. Saudi patients were 115 (87.1%) and the non-Saudi were 17 (12.9%). The non-smoker patients were 53 (40.1%) while 79 (59.1%) were smokers (**Table 1**).

In regard to the presenting features of PSP patients, the mean weights were 56.78 and the mean height was 171.60. The average of (BMI) was 19.4 For the type of attack, patients presented with first time attack were 66 (50%) while patients whom had recurrent PSP were 66 (50%) as well.

The season of the attack was summer in 39 (29.5%) of the patients, autumn in 29 (22%), winter in 25 (18.9%), and 39 (29.5%) in spring. Site of the bullae was in the left lung in 60 (45.5%), right lung in 66 (50%) and bilaterally or both lungs in 6 (4.5%). (**Figure 1**).

The presenting symptoms include chest pain, shortness of breath or both two symptoms together. 33 (25%) of the patients had only chest pain, 14 (10.6%) had only shortness of breath and majority of the patients 82 (62.1%) had both symptoms, while 3 (2.3%) were asymptomatic. 120 (90.9%) were surgically treated in the form of video-assisted thoraoscopy, apical bullectomy, and pleurodesis. Patients who were treated conservatively either by chest tube drainage or by observation were 12 (9%) patients only (**Table 2**). Regarding the recurrence of PSP and length of hospital stay in the group of patients who managed surgically, it was 6.45 (S.D \pm 3.26) days and the recurrence was (4.2%) in 5 cases only, while 115 (95.8%) had no recurrence. (Table 3)

DISCUSSION:

Our study aimed to study the presenting features of Primary Spontaneous Pneumothorax (PSP) patients including demographic (gender, age, smoking, height and weight, Body mass index (BMI)), symptoms and seasonality among adult patient and to describe the recurrence of PSP and length of hospital stay in patients who were managed surgically in KKHU during the period from 2010 to 2016.

In our current study, the mean age was 24.62 years (S.D \pm 8.8), ranged from 14-60 years old, which was similar to what has been previously in a study conducted in Kuwait. (6) The PSP is typically uncommon in children, according to the study conducted in Poland in 2015, there were 18 boys and 4 girls. The mean age was 16 years old which was similar to our minimum age cut off point which is 14 years old. (7) A large proportion (88.6%) of our patients were male which is lower than that reported previously, while a smaller proportion (11.4%) were female which is higher than what has been studied

before. (6) Majority (87.1%) of the patients were Saudi, which might be explained by the fact that KKHU is located in Saudi Arabia.

The association between cigarette smoking and developing pneumothorax is still questionable given the fact that non-smokers are also prone to develop pneumothorax. (8). Our data corresponds to that, as smokers and non-smokers were 59.8% and 40.1% respectively. However other studies concluded that smoking also a precipitating factor for PSP with a risk ranged from 7 to 100 times higher in heavy smokers than light ones. (1)

(BMI) in our patients had a mean of 19.36 kg, which is similar to what other studies. (6) Another study concluded that PSP in patients with low BMI was significantly more frequent. (9) Based on our data, patients were over-presented in warm climate (spring/summer), which corresponds is similar to other study that concluded an increase in presentation during summer. (6).

According to this study, most of the patients presented with both chest pain and shortness of breath, which is in line with other studies. (1,10). While minority of the patients presented with either chest pain or shortness of breath alone.

The majority of patients were treated surgically and the rest treated conservatively. The mean hospital stay of this group, which was treated surgically, was 6.45 days and 5 patients had recurrence (4.2%) of pneumothorax. Furthermore, these findings were similar to other studies done. (11–14).

Moreover, short hospital stay, and low state of recurrence might be suggestive indicators for the safety of surgical approach. Even though the ideal approach for treatment of PSP is still questionable. (11) Divisi D. concluded that the surgical approach is associated with low morbidity, short hospitalization and excellent quality of life. (14) That might contribute to the noted tendency toward surgical approach in our study.

Limitations:

We are aware of the limitations of this study including the retrospective nature of the design, limited number of cases and a single hospital experience. However, our results were consistence with other international studies.

Conclusion / Recommendations:

Based on this case series study, majority of primary spontaneous pneumothorax (PSP) patients were male,

at young age group, with low body mass index (BMI). Most of the admissions occurred in warm climate (spring/summer). Furthermore, short hospital stay and low state of recurrence were noted among the patients which were treated surgically.

We would like to encourage researchers to conduct further prospective studies with larger sample size, possibly by including more hospitals, wider age group including the pediatric and the geriatric patients (<14 and >60 years of age) and more variables. Therefore, it would be feasible to compare the type of management (conservative or surgical) and the state of recurrence of primary spontaneous pneumothorax.

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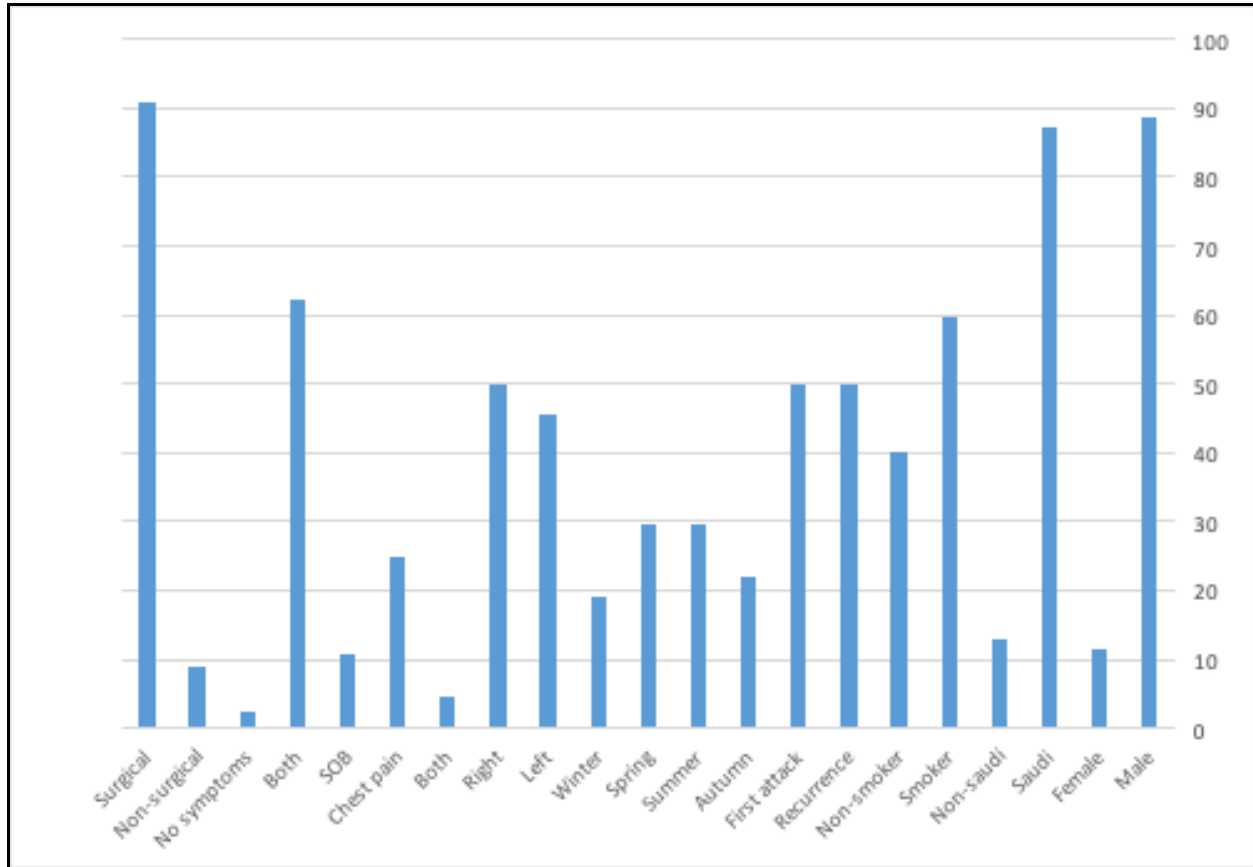


Figure 1: presenting features of primary spontaneous pneumothorax patients (n=132).

Table 1: Socio demographic of primary spontaneous pneumothorax patients (n=132).

	Mean
Age	24.62
	N (%)
Gender	
Male	117 (88.6%)
Female	15 (11.4%)
Nationality	
Saudi	115 (87.1%)
Non-Saudi	17 (12.9%)
Smoking	
Smoker	79 (59.8%)
Non-smoker	53 (40.2%)

Table 2: Clinical characteristics of primary spontaneous pneumothorax patients (n=132).

	Mean	Std. Deviation
Wight	56.78	11.816
Height	171.60	11.777
BMI	19.3648	4.19361
	No (%)	
Type		
Recurrence	66 (50%)	
First attack	66 (50%)	
Seasons		
Autumn	29 (21.96%)	
Summer	39 (29.5%)	
Spring	39 (29.5%)	
Winter	25 (18.93%)	
Site		
Left	60 (45.5%)	
Right	66 (50%)	
Both	6 (4.5%)	
Symptoms		
Chest pain	33 (25%)	
Shortness of breath	14 (10.6%)	
Both	82 (62.1%)	
No symptoms	3 (2.3%)	
Surgery		
Non- surgical	12 (9%)	
Surgical	120 (90.1%)	

Table 3: the recurrence of PSP and length of hospital stay in patients who were managed surgically (n=120).

	Mean	Std. Deviation
Hospital stay	6.45	3.263
	No (%)	
State of recurrence		
Recurrence	5 (4.2%)	
No recurrence	115 (95.8%)	