ETIOLOGY, PRESENTATION AND MANAGEMENT OUTCOME OF PNEUMOTHORAX

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Background: This study was carried to determine etiology, presentation, complications and management outcomes of pneumothorax in patients presenting at two hospitals in NWFP province of Pakistan.. **Methods:** Pneumothorax patients reporting at the chest unit of Post Graduate Medical Institute, Lady Reading Hospital, Peshawar, and Pulmonology unit of Ayub Teaching Hospital, Abbottabad from 1999 to 2002 were included in the study. Patients of all ages were included. They were admitted and followed up to the full recovery/late complications. **Results:** A total of 146 pneumothorax patients reported during this period. Majority of the patients were diagnosed to have pneumothorax due to pulmonary tuberculosis making about 36.30% of the total cases. Second most common cause was primary spontaneous pneumothorax (19.86%). Bacterial infections were also sizeable at 16.43%. Other causes included COPD, Asthma, Iatrogenic, Interstitial lung disease, tuberous sclerosis and bronchiectasis. **Conclusion:** It was concluded from this study that pulmonary tuberculosis is the commonest cause of pneumothorax in our setup.

KEY WORDS: Pneumothorax, Tuberculosis, Pulmonary, Lung diseases, Obstructive

INTRODUCTION

Pneumothorax is defined as the presence of air in the pleural cavity, with secondary lung collapse.[1] The term Pneumothorax was first coined by Itard in 1803, and clinical features of this condition were described by Laennec in 1819.[2] Primary spontaneous pneumothorax is a common clinical problem and its incidence is thought to be increasing.[2] The objectives of this study were to determine the most common etiology, most affected age group, symptoms, extent of disease, complications encountered and response to treatment in pneumothorax patients reporting to two important tertiary care hospitals of our province.

MATERIAL AND METHODS

Pneumothorax patients diagnosed at Ayub Teaching Hospital, Abbottabad and Lady Reading Hospital, Peshawar in the period between 1999 to 2002 (4 years) were included irrespective of age and gender. All these patients were admitted and observed till full recovery or late complications. Those referred for surgical treatment were followed up. A detailed history was taken from each patient. They were asked especially about their smoking habits. Apart from general physical examination, chest was examined thoroughly in each patient to evaluate the extent of disease and compare it with radiological findings. Later on chest x-ray, Full blood count with ESR, Urea, Sugar and sputum AFB were done to know the etiology of pneumothorax. Chest intubation was the treatment of choice in each patient alongwith noting the chest extubation time. Each patient was followed up till full recovery. The late complications or surgical treatment of each patient were also brought on record. Monthly/ fortnightly interval observation was carried out to see any recurrence.

RESULTS

146 patients reported in this 04 years period. Frequency of disease in various age groups, its distribution in either sex, common symptoms of disease and its extent are shown in Table-1.

The etiology of disease is shown in descending order with the most common on the top in table-2. It also shows each etiology with its sex distribution, age group, side involvement in chest, weeks of extubation and later on complications or surgical treatment. The relationship of smoking and pneumothorax is shown in figure-1.

Table-1: Frequency, presentation and extent of pneumothorax with reference to age groups

Age in years	Total	Male	Female	Symptoms		Extent
8-20	53	21	32			
21-30	28	2	4			<20% - 2.74%
31-40	21	15	6	Productive cough	92.46%	
41-50	16	7	9			20-50% - 48.63%
51-60	17	15	2	Pain	95.20%	
61-70	8	6	2			
>70	3	3	0	SOB (II-IV)	98.63%	>50% - 48.63%
	146	91	55			
				Fever	63.69%	

Table-2: Etiology, gender, side and weeks of extubation

Cause	Total	Male	Female	Age	Side			Weeks of Extubation							
					Bilat	LT	RT	1st	2nd	3rd	4th	5th	6th	7th	>7th
Pul –Tuberculosis	53	28	25	11-45	1	23	29	14	16	7	-	3	20	1	-
PSP	29	24	5	30-50	1	13	15	16	6	4	1	-	-	-	-
Infection	24	12	12	8-48	2	8	14	1	9	4	2	2	-	-	1
COPD	12	11	1	47-70	-	3	9	8	4	-	-	-	-	-	-
Iatrogenic	12	5	7	15-85	-	5	7	7	3	-	-	-	-	1	-
Trauma/ Bullet Injury	6	5	1	15-65	-	2	4	5	-	1	-	-	-	-	-
ILD	3		3	25-50	1	1	1	1	-	1	-	-	-	-	1
Asthma	4	3	1	30-60		-	1	3	1	1	2	-	-	-	-
Bronchiectasis	2	1	1	12-16	-	2	-	1	1	-	-	-	-	-	-
Tuberous Sclerosis	1	-	1	45			1	1	-	-	-	-	-	-	-
TOTAL	146	89	57	8-85	3	59	76	36	32	17	3	3	4	1	1

PSP – Primary spontaneous pneumothorax COPD- chronic obstructive pulmonary disease ILD – Interstitial lung disease

Table-3: Complications in relation to etiology of pneumothorax

Cause	Complications/Surgical Treatment
Pul –Tuberculosis (n=53)	Infection of Tube site –1 Peritubular leak –2 Surgical Emphysema – 10 Tube Dislodged – 1 Decortications – 6 Plenrodesis – 1 Broncho Pleural fistula – 1 Died –6
	Surgical emphysema – 3

PSP (n=29)	Decortications – 1 Pleurodesis – 3 Died – 1 Tube site infection – 2 Brancho Pleural fistula - 1
Infection (n=24)	Decortications – 5 Surgical emphysema – 5 Peritubular leak – 1 Died – tension pneumothorax – 1 Brancho Pleural fistula - 1
COPD (n=12)	Surgical emphysema – 6 Died – 1 Necrosis of stitches & Peritubular leak – 2
Iatrogenic (n=12)	Surgical emphysema – 2
Trauma/ Bullet Injury (n=6)	Surgical emphysema – 1
ILD (n=3)	Broncho Pleural fistula – 1 Refer for surgical treatment Died – 1
Asthma (n=4)	Tube site infection + leak –1 Peritubular leak – 1
Bronchiectasis (n=2)	Surgical emphysema – 1
Tuberous Sclerosis (n=1)	Nil

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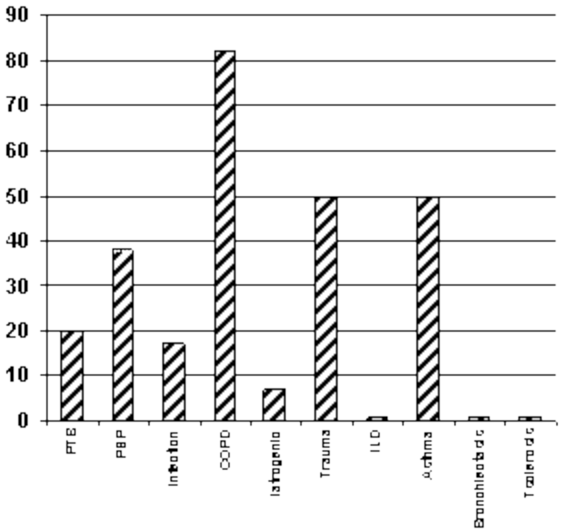

Fig-1: Percentage of smoker in different disease entities

DISCUSSION

Pneumothorax is classified into spontaneous occurring without a preceding event, traumatic due to direct or indirect trauma and iatrogenic, categorized by some investigators as a subdivision of traumatic pneumothorax.[3] Spontaneous pneumothorax is further subdivided into primary spontaneous pneumothorax and secondary pneumothorax.

Pneumothorax in apparently healthy individuals is a relatively common disease, particularly in those in their second and third decades of life.[4] Spontaneous pneumothorax is primarily a disease of young people and is predominant in males.[5] Our study also showed that pneumothorax is common in young people and particularly in second and third decade of life.

Primary spontaneous pneumothorax is usually caused by the rupture of the subpleural bleb. They are usually multiple and mostly occur at lung apices.[6] According to this study Primary Spontaneous pneumothorax (PSP) occured in 29 (1.86%) cases. So it can be concluded by this study that PSP is not the commonest cause of pneumothorax in our country. It is occurring more in males as we see in this study with tall and thin bodies.[7-8]

Secondary spontaneous pneumothorax is caused by an underlying lung disease. The disease that is associated the most with secondary spontaneous pneumothorax is chronic obstructive pulmonary disease (COPD).[9] COPD patients tend to be middle aged or elderly while emphysema is the commonest cause of pneumothorax above the age of 40.[10] This study shows that COPD is responsible for 8.22% of the total cases. All the patients were above the age of 40, showing that they were middle age or elderly. Almost all of them were smokers except one who was a female. It is well established that smoking increases the risk of contracting first pneumothorax.[11] In this study 28% of our patients were smokers. Whereas 91% of COPD patients were smokers.. Therefore, smoking could be implicated clearly in the development of initial pneumothorax mainly in COPD patients. Secondary spontaneous pneumo-thorax (SSP)is an important complication of pulmon-ary tuberculosis that demands appropriate manage-ment. Tuberculous lung cavities or blebs rupturing in to pleural space cause pneumothorax. However, most of the time mechanism of SSP in pulmonary TB is unclear.[12,13] Our study shows that Pulmonary Tuber-culosis is the leading cause of pneumothorax in 36.30% cases. According to Ferraro and associates[14] PSP represents 80% and SSP represents only 20% of spontaneous pneumothorax. The data of Light[5] point to a nearly equal frequency of PSP and

SSP while our study shows that SSP is responsible for more than 67.80% cases and the major cause of SSP is pulmonary TB. The treatment options available for spontaneous pneumothorax are observation, supple-mentary oxygen, simple aspira-tion, tube thoracos-tomy, tube thoracostomy with instillation of sclero-sant, thoracoscopy, and open thoractomy.[15] In our setup intercostal tube drainage is the mainstay of treatment as majority of patients present to us in advanced stages of disease. In PSP the resolution time was within 3 weeks time in 60% of cases. In Pulmonary Tuberculosis (PTB) some patients took longer time to respond even more than 5 weeks due to under lying parenchymal lung disease. In some patients the lung does not expand fully after the chest tube is inserted. The usual reason that the lung does not expand is that there is a persistent air leak. In PTB patients about 7% were subjected to surgical intervention i.e. decortications (thoracotomy) while in PSP only 2 had thoracotomy. Six patients having SSP with infection had thoracotomy. Six patients having PTB died. The recurrence rate could not be analyzed because most of the patients did not turn up for follow up. This study indicates that most of the patients had resolution of pneumothorax within 2-3 weeks of chest intubation. It can be concluded that if the pneumothorax does not resolve within this period, then surgical intervention is advisable as also recommended by Javed et al.[16]

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