FREQUENCY AND MANAGEMENT OUTCOME OF PNEUMOTHORAX PATIENTS

Nisar Khan, Huma Jadoon*, Munawar Zaman, **Aqeel Subhani, Abdur Rab Khan, Mian Ihsanullah†**

Department of Pulmonology, *Department of Community Medicine, **Department of Physiology, Ayub Medical College, Abbottabad, †Department of Pathology, Kohat Institute of Medical Sciences, Kohat, Pakistan

Background: Primary spontaneous pneumothorax is a common clinical problem and its incidence is thought to be increasing. This study was conducted to see the frequency, aetiology, presentation and management outcomes of pneumothorax in patients presenting at Pulmonology unit, Ayub Teaching Hospital, Abbottabad, Pakistan. **Methods:** Pneumothorax patients reporting at the Pulmonology unit of Ayub Teaching Hospital, Abbottabad from 2002 to December 2008 were included in the study. Patients of all ages were included. They were admitted and followed up to the full recovery. **Results:** A total of 195 pneumothorax patients reported during this period. Majority of the patients were diagnosed to have pneumothorax due to pulmonary tuberculosis making about 36.92% of the total cases. Second most common cause was primary spontaneous pneumothorax (21.53%). COPD were also sizeable at 8.71%. Other causes included Bacterial infections, Asthma, iatrogenic, interstitial lung disease, bronchiectasis and Trauma. **Conclusion:** It was concluded from this study that pulmonary tuberculosis is the commonest cause of pneumothorax in our setup.

Keywords: Primary spontaneous Pneumothorax (PSP), Secondary spontaneous Pneumothorax (SSP), Tuberculosis, Pulmonary, Lung diseases, Obstructive.

INTRODUCTION

Pneumothorax is defined as the presence of air in the pleural cavity, between lung and chest wall.[1] The term Pneumothorax was first coined by Itard in 1803, and Laennec described the clinical features sixteen years later in 1819.[2] Primary Spontaneous Pneumothorax (PSP) is a common clinical problem and its incidence is thought to be increasing.[2] The Modern concept of PSP was given be Kjaergard.[3] Pneumothorax is classified into spontaneous occurring without a preceding event, traumatic due to direct or indirect trauma Spontaneous pneumothorax is further subdivided into primary spontaneous pneumothorax and secondary pneumothorax.[4] Radiologically Pneumothorax is classified as small, Moderate and Complete.[5]

The objectives of this study was to identify the common aetiologies, presenting complaints/ clinical status of the patient at the time of admission, age group affected, complications and response to the treatment.

MATERIAL AND METHODS

Pneumothorax patients of all ages diagnosed at Ayub Teaching Hospital, during the period 1999 to 2002 (4 years) were included in this study. This cross-sectional descriptive study was done on 195 patients of pneumothorax. The purpose of the study was explained to each patient and fully informed, understood and voluntary consent was obtained from all patients. All these patients were admitted and observed till full recovery. A detailed history with emphasis on smoking was obtained in every case. Patients were asked especially about the duration, number of cigarettes consumed daily, way of inhalation, filtered or non filtered cigarettes. General physical examination and thorough examination of respiratory system were carried out in each patient. Chest x-ray, Full blood count with ESR, Urea, Sugar and sputum AFB were done for confirmation of diagnosis and aetiology of pneumothorax. Chest intubation was the treatment of choice in each patient, as only 12.2% patients presented Grade 1 dyspnoea, the remaining 87.8% presented with Grade 2, 3, 4 dyspnoea. Intubation and extubation dates were noted. Each patient was followed up till full recovery. Fortnightly/monthly interval observation was carried out to see any recurrence.

RESULTS

A total of 195 patients were included in this study conducted over a period of six years (2002–2008). Patients of different age groups, gender, their common pathology and symptoms are shown in Table-1. The study revealed pulmonary tuberculosis as the major cause of pneumothorax (36.92%). Common causes with their age range, mean stay of the patients at the hospital and percentage of post-intubation complications for that cause is shown in Table-2. Complications related with chest intubation were found more in patients with diseased lung parenchyma such as COPD and pulmonary tuberculosis. Figure-1 shows the type of complications encountered in these patients due to chest intubation.

Table-1: Frequency, commonest aetiology and symptomatology (n=195)

Age groups	Total	Male (n=124)	Female (n=71)	Commonest Aetiology	Symptoms
8–20	67	26	41	Pulmonary Tuberculosis	Productive cough 94%
21–40	63	49	14	Pulmonary Tuberculosis	Pain 96%
41–60	47	34	13	PSP	SOB (II–IV) 100%
61 and above	18	15	3	Pulmonary Tuberculosis	Fever 61.2%

Table-2: Causes, mean stay at the hospital and percentage of post-intubation complications

Aetiology	Age Range	Total Cases	Male	Female	Mean stay at Hospital (Resolution Time)	Post intubation Complications
Pul – Tuberculosis	9–82	72	39	33	10.2105	56.94
PSP	17–60	42	35	7	9.7692	25.7
COPD	46–70	17	15	2	11.0000	76.4
Bronchiectasis	16–75	3	1	2	8.0000	0
Infections (Pneumonia)	12–65	28	14	14	11.7500	46.4
Trauma	8–70	11	9	2	6.8000	27.27
Malignancy	65	1	1	0	8.0000	0
Pneumoconiosis	45–55	1	0	1	23.0000	0
Iatrogenic	32–64	14	7	7	11.3930	14.28
ILD	30–55	6	2	4	14.3200	33.33

Table-3: Aetiology and post-intubation resolution time

Aetiology	No. of cases	Resolution within 2wks	Resolution >2wks
PSP	42	33	7
Pulmonary TB	72	42	30
COPD	17	16	1
Infection	28	12	11
Trauma	11	10	1
Iatrogenic	14	10	1
Bronchiectasis	3	3	-
ILD	6	2	1
Pneumoconiosis	1	-	1
Malignancy	1	1	-

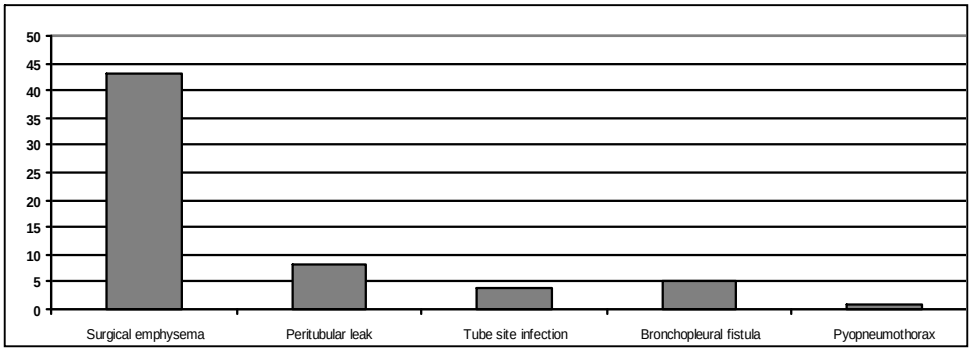

Figure-1: Complications of chest Intubation

DISCUSSION

Pneumothorax is a common disease that we come across at Pulmonology unit. Incidence of Primary spontaneous pneumothorax is 18–28 and 1.2–6/100000 for men and women respectively and that for secondary spontaneous pneumothorax is 16.7 and 5.8/100000.[6,7] respectively; showing that it predominantly affects males. In our study PSP accounted for 21.53% of the total cases, and 92.85% of PSP patients were male. The common age group affected was between 21–60years.

Primary spontaneous pneumothorax is caused by the rupture of the subpleural blebs mostly at the apex in tall and thin individuals.[8,9] This finding is observed in 80% of the cases on CT scanning and 90% on thoracotomy. Smoking plays an important role in development of subpleural blebs. The lifetime risk for smokers to develop PSP is 12% in comparison to 0.19% for non smokers.[10] In our study Primary Spontaneous pneumothorax (PSP) occurred in 21.53% cases; 54.1% of them were smokers.

Secondary spontaneous pneumothorax is caused by an underlying lung disease, which in our study accounted for 62.56% and the leading cause was found to be Pulmonary tuberculosis; accounting for 59% of all the SSP cases and 36.92%of all cases. The same results were found by Khan *et al.*[11] This actually reflects the burden of Pulmonary TB in Pakistan. Pakistan ranks 6th amongst the countries with a highest

burden of TB in the world. Pakistan contributes about 44% of tuberculosis burden in the Eastern Mediterranean Region. According to WHO, the incidence of sputum positive TB cases in Pakistan is 80/100,000 per year and for all types it is 177/100,000. TB is responsible for 5.1 percent of the total national disease burden in Pakistan.[12] COPD is another disease that is strongly associated with pneumothorax.[13] COPD was found in 13.9% of all SSP. All the patients were above the age of 40 years, 81% of them were smokers; the only non smoker was a female. Among smokers 12.5% are likely to develop COPD[14], which further shows the effects of smoking in Spontanous pneumothorax whether primary or secondary. Smoking is less common in our country in comparison to the rest of the world,[15] which can explain the decreased incidence of PSP and COPD related Pneumothorax.

The treatment options available for spontaneous pneumothorax are observation, supplementary oxygen, simple aspiration, tube thoracostomy, tube thoracostomy with instillation of sclerosant, thoracoscopy, and open thoractomy[16]. In our setup intercostal tube drainage is the mainstay of treatment as majority of patients present in advanced stages of disease and are breathless (Table-1). Underwater seal drainage using a chest tube was first introduced in 1875.[17] Intercostal chest drain in its current form was first used in 1916 by Kenyon.[18]

As shown in table.2, mean days for resolution of pneumothorax in PSP were 9.7 days and mostly 12 days in other diseases. Same results were found by Mathur R *et al.*[19] The post intubation resolution time is shown in table.3. For PSP and SSP it was within first two weeks in 78.5% and 67.6% patients respectively. In some patients the lung does not expand fully after the insertion of the chest tube. The usual reason of non-expansion is the persistent air leak. The other main complication was surgical emphysema[20], which in our case was found in 22.56% patients (Figure-1). 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.*[21]

CONCLUSION

Pulmonary Tuberculosis is the leading cause of pneumothorax in our setup. Furthermore follow up of the patients is difficult because of the non-compliance, lack of education and people coming from far flung areas.

REFERENCES

1. Light RW. Pneumothorax. In: Pleural diseases. 3rd ed. Baltimore: Williams and Wilkins, 1995. p.242–77.
2. Laennec RTH. De l'auscultation médiate ou Traité du Diagnostic des Maladies des Poumon et du Coeur. 1st ed. Paris: Brosson & Chaudé; 1819.
3. Kjaergard H. Spontaneous pneumothorax in the apparently healthy. Acta Med Scand 1932;43(Suppl):1–159.
4. Baumann M H, Strange C. Treatment of spontaneous pneumothorax. Chest 1997;112:789–804.
5. Miller AC, Harvey JE. Guidelines for the management of spontaneous pneumothorax. BMJ 1993;307:114–6.
6. Melton LJ, Hepper NCG, Offord KP. Incidence of spontaneous pneumothorax in Olmsted County, Minnesota: 1950–1974. Am Rev Respir Dis 1979;29:1379–82.
7. Bense L, Wiman LG, Hedenstierna G. Onset of symptoms in spontaneous pneumothorax: correlations to physical activity. Eur J Respir Dis 1987;71:181–6.
8. Donahue DM, Wright CD, Viale G, Mathisen DJ. Resection of pulmonary blebs and pleurodesis for spontaneous pneumothorax. Chest 1993;104:1767–9.
9. Lesur O, Delorme N, Frogamet JM, Bernadac P, Polu JM. Computed tomography in the aetiological assessment of idiopathic spontaneous pneumothorax. Chest 1990;98:341–7.
10. Bense L, Eklund G, Wiman LG. Smoking and the increased risk of contracting pneumothorax. Chest 1987;92:1009–12.
11. Khan N, Wazir MS, Yasin M, Mohammad J, Javed A. Etiology, presentation and management outcome of pneumothorax. J Ayub Med Coll Abbottabad 2005;17(1):62–4.
12. National Tuberculosis Control Programme. Pakistan ranks 6th amongst the countries with a highest burden of TB in the world. Available from: http://www.ntp.gov.pk/about.htm
13. Light RW. Pneumothorax. In: Light-RW (ed). Pleural diseases. Philadelphia: Lea and Febiger;1990.p. 237–62.
14. Shigeru T, Kikan N, Shokudoka, Kaiho G. Smoking and COPD. J Japan Broncho-esophagological Soc 2005;56(5):410–6.
15. Ahmad K, Jaffery F, Jehan I Hatcher J, Khan AQ, Chaturvedi N, *et al.* Prevalence and predictors of smoking in Pakistan: results of the National Health Survey of Pakistan. Eur J Cardiovasc Prev Rehabil, 2005;12(3):203–8.
16. Light RW. Veterans Administration Medical Center, Long Beach, and University of California, Irvine, California. Am Rev Resp Dis 1993;148;245–8.
17. Playfair EE. Case of empyema treated by aspiration and subsequently by drainage. BMJ 1875;1:45–50.
18. Seaton D, Yoganathan K, Coady T, Baker R. Spontaneous pneumothorax: marker gas technique for predicting outcome of manual aspiration. BMJ 1991;302:262–5.
19. Mathur R, Cullen J, Kinnear WJM, Johnston ID. Time course of resolution of persistent air leak in spontaneous pneumothorax. Respir Med 1995;89:129–32.
20. Maunder RJ, Pierson DJ, Hudson LD. Subcutaneous and mediastinalemphysema. Pathophysiology, diagnosis and management. Arch Intern Med 1984;144:1447–53.
21. Javed A. Pneumothorax: Aetiology, complications and outcome. J Coll Physicians Surg Pak 1998;8:14–6.

Address for Correspondence:

Dr. Nisar Khan, Department of Pulmonology, Ayub Medical College, Abbottabad, Pakistan. Cell: +92-333-9341529.
Email: nsr_mzy@yahoo.com