International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Clinical Profile, Etiological Factors and Treatment Outcome in Patients of Spontanous Pnuemothorax

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Abstract: ***Background: Pneumothorax is a life-threatening condition, so studying its etiology, clinical profile and treatment outcome is significant for better patient care. Objectives: To study clinical profile and etiological factors of spontaneous pneumothorax. To study the treatment outcome of spontaneous pneumothorax. Material and Methods: A prospective observational study was carried out on diagnosed spontaneous pneumothorax at Respiratory medicine department, SMIMER over 15 months and data analysis conducted over 3 months. Results: SP showed bimodal age distribution where first peak was between 21-30 years and second peak was between 41-50 years. Male-female ratio for SP were 4.7:1, mean height, weight, BMI for spontaneous pneumothorax was 160.6 cm, 52.6 kg, 19.9 Wt/ ht2 respectively.10% of total cases had p/h/o pulmonary koch's. most common symptom was breathlessness followed by chest pain. all 70 cases had sharp chest pain.14(17.5%) cases had no any known etiology (PSP). Other 66(83.5%) cases had known etiology (SSP). Among SSP, 32(40%) cases had Pulmonary Koch's. 18(22.5%) cases had COPD 36(45%) cases had pneumothorax between 51-75%, (30%) cases had not any additional chest X-ray findings as these were cases of PSP. 24(30%) cases showed cavity, majority of cases [71(88.75%)] were effectively managed by ICDT. 86.25% cases show complete resolution. Conclusion: Pneumothorax is a life-threatening condition, so studying its etiology, clinical profile and treatment outcome is significant for better patient care.***

Keywords: spontaneous pneumothorax, clinical profile, etiological factors, treatment outcome, pulmonary tuberculosis

1. Introduction

Pneumothorax is a Greek word in which "pneumo" means air and "thorax" means chest. The term pneumothorax first describes by Jean Marc Gaspard Itard who was French physician in 1819. In fifth century, BC Hippocrates mentioned pneumothorax as Hippocrates succussion of the chest. Globally reported incidence of Spontaneous pneumothorax is 7.4 to 18/1,00,000 cases per year for men and 1.2-6/1, 00,000 for women. Burden of spontaneous pneumothorax has been reported as alarming health problem in medical science. Pneumothorax defined as abnormal presence of air in the pleural cavity. Pneumothorax can be either Traumatic pneumothorax or spontaneous pneumothorax. Most of pneumothorax diagnosed by physical examination and x-ray chest and sometime CT chest required. The management of pneumothorax varies from observation by clinically and radiological, simple needle aspiration, Tube thoracostomy with or without insertion of sclerosing agents to more invasive procedure like pleurectomy by thoracoscopy, Video assisted thoracoscopic surgery (VATS) and open thoracotomy with help of thoracic surgeon.

2. Methodology

Study design - This study was a prospective observative study,performed in the department of Respiratory medicine at tertiary care hospital over a period of 18 months. patients with chest complaints showing radiological evidence of pneumothorax were assessed by enrollment. Diagnosed patients of age above 18 years Age and giving consents were included in the study. Patients under 18 years of age,pregnant and traumatic pneumothorax excluded in study. The study was approved by the institutional ethics committee.

Data Collection- Data was collected using predesigned, structured Performa to enter patient details, detailed clinical history including dyspnea, chest pain, cough and Hemoptysis signs like chest bulging, tracheal shifting, clubbing, cyanosis, hyper resonant node on percussion and radiological finding on chest x-ray who met the inclusion criteria.

3. Results

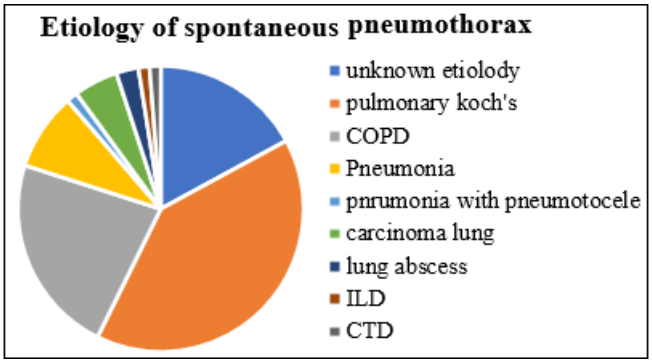
Out of 80 cases of spontaneous pneumothorax, 14(17.5%) cases of pneumothorax were PSP while other 66(82.5%) cases were SSP. So as per our study incidence of SSP was more as compare to PSP. SP showed bimodal age distribution here first peak was between 21-30 years and second peak was between 41-50 years. Out of 80 Spontaneous pneumothorax patients, 66(82.5%) were males while 14(17.5%) were females. the mean height for spontaneous pneumothorax was 160.6 cm. the number and percentage of people who smoke among those with SP, 44 were smokers (55%).4 (5%) had P/H/O pneumothorax.

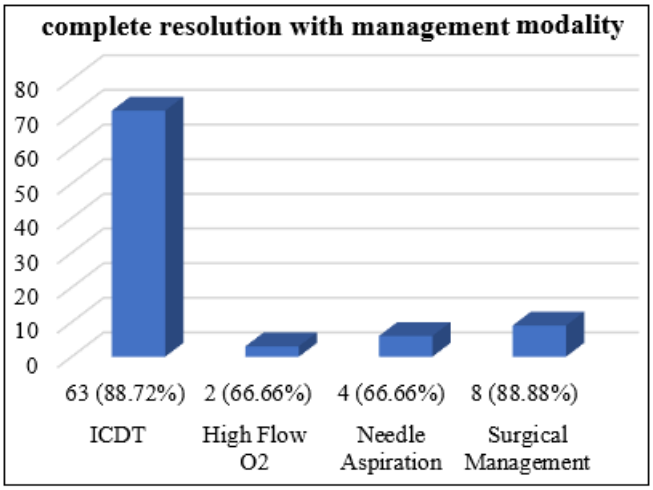
Analyses of Symptoms in Spontaneous Pneumothorax

Symptoms	Number of cases (n=80)
Breathlessness	75
Chest pain	70
Cough	67
Fever	10
Haemoptysis	5

On inspection, 15(18.75%) cases had tracheal shifting. On palpation, 30(37.5%) cases had chest bulging. **On**

percussion, 70(87%) cases had hyper resonant note on same side of pneumothorax**. On auscultation,** almost all the 80 cases had decrease air entry on same side, among of them 50(62.5%) cases had absent air entry on right and 30(37.5%) cases had absent air entry on left side. **On general examination** 4(5%) cases had cyanosis, while 12(15%) cases had clubbing, due to underlying lung disease like lung CA.75(93.74%) cases had tachycardia, 70(87%) cases had tachypnea. 4(5%) cases had hypotension. Hypotension and cyanosis were seen in tension pneumothorax. out of 80 cases, 14(17.5%) cases had no any known etiology (PSP). Other 66(83.5%) cases had known etiology (SSP). Among SSP, 32(40%) cases had Pulmonary Koch's.18(22.5%) cases had COPD ,7(8.75%) cases had Pneumonia, 1(1.25%) case had pneumonia with pneumatocele, 4(5%) cases had CA Lung, 2(2.5%) cases had Lung abscess, 1(1.25%) cases had ILD, 1(1.25%) cases had CTD. According to our study, SSP was more common than PSP and most common cause of SSP was Pulmonary Koch's followed by COPD. 2(2.5%) cases had < 25% of pneumothorax, 27(35.75%) cases had pneumothorax between 26-50%, 36(45%) cases had pneumothorax between 51-75%, While only 15(18.75%) cases had pneumothorax >76% which also include Tension Pneumothorax.





out of 80 cases, 50(62.5%) and 30(37.5%) cases had right and left pneumothorax respectively. Out of 80 cases, 24(30%) cases had not any additional chest X-ray findings as these were cases of PSP. 24(30%) cases showed cavity. 2(2.5%) cases showed abscess cavity, 8(10%) cases showed bulla, 2(2.5%) cases showed miliary mottling, 11(13.75%) cases showed consolidation, 7(8.75%) cases showed fibrosis, 6(7.5%) cases showed calcification, 5(6.25%) cases showed fibrosis with calcification.Cavity was most common additional CXR finding due to tuberculosis as common etiology.

majority of cases [71(88.75%)] were effectively managed by ICDT. Other modalities were high flow O2 and needle aspiration required in 3(3.75%) and 6(7.5%) cases respectively. high flow O2 given in total 3 cases; among of them, 2(66.66%) cases showed complete resolution of pneumothorax in chest X-ray, while 1(33.33%) case showed partial resolution. Needle aspiration was performed in 6 cases; among of them 4(66.66%) cases showed complete resolution, 1(16.66%) case had partial resolution while 1(16.66%) case had no resolution of pneumothorax. ICDT performed in total 71 cases; out of them complete resolution, partial resolution and no resolution of pneumothorax seen in 63 (88.72 %) ,4 (5.63 %),4 (5.63%) respectively. total 63 cases had complete resolution with ICDT, among of them, 2(3.17%) cases had recurrent pneumothorax within 3-5 days after removalof ICDT. All that 2 cases were undergone for pleurodesis. 9(11.25%) cases required surgical management. Total 9 cases undergone for surgical managementOut of them 8(88.88%) were improved and 1(11.11%) patient was expired.

4. Discussion

Pneumothorax is well known lung condition since 10th century but data regarding incidence is very less particularly in country like India. In present study, 66(82.5%) cases were SSP, while 14(17.5%) cases were PSP. The reasons behind the high incidence of SSP in our study are follows: (1) High prevalence of underlying lung disease like Pulmonary Koch's. (2) Most of the PSP is managed at secondary health care facility while SSP (more symptomatic) is referred to tertiary health care facility where our study was performed. Our study also had bimodal age distribution in both PSP and SSP. spontaneous pneumothorax was common in male. High incidence of spontaneous pneumothorax in males had been attributed to smoking as a risk factors, different lung function and body stature. The tall stature as risk factor for development of PSP is due to more gradient of pleural pressure at lung base then apex of lung in taller individuals, so there is more distending pressure of alveoli in apex of lung. Over a period of time this high distending alveolar pressure lead to development sub-pleural blebs in taller individuals.This sub pleural blebs may ruptures in to pleural cavity and leads to pneumothorax. Above data indicate that most common symptoms according to our study was breathlessness followed by chest pain. Least common symptoms was haemoptysis which may due to underlying lung disease like Pulmonary Koch's or Lung CA. In larger pneumothorax, breath sounds and tactile vocal fremitus are decreased or absent, and on percussion hyper-resonant note is present. Rapidly evolving hypotension, tachycardia, tachypnea and cyanosis may be due tension pneumothorax. Most common etiology for SSP in India is pulmonary Koch's while in western country common etiology is COPD. This difference in etiology is due to high prevalence of pulmonary tuberculosis in India as compare to other country. According to above data most common side for spontaneous pneumothorax was on right side. The principles of treatment modalities of spontaneous pneumothorax follows: Air elimination, promoting re-expansion of the collapsed lung and Prevention of future recurrences. Treatment modalities of

spontaneous pneumothorax includes high flow oxygen supplementation, needle aspiration, ICDT insertion, and thoracoscopic and surgical interventions. Out of 14 primary spontaneous pneumothorax patients, 6 patents were managed by ICDT insertion. All this 6 patients were symptomatic, hemodynamically stable/unstable, SPO2< 92% and x-rays having >60 % pneumothorax. Complete resolution was achieved in all the 6 patients within 3-15 days of ICDT in situ. SSP patients are more symptomatic then than PSP because of co-existing lung disease. So that almost all patients require active intervention. High flow Oxygen and needle aspiration only indicated in patients who are mildly symptomatic and having less % of pneumothorax on chest x-ray. High flow oxygen and needle aspiration considered to avoid ICDT insertion and shorten the duration of hospital stay. Otherwise, the insertion of ICDT is recommended in SSP.Our study included 66 patients of Secondary spontaneous pneumothorax. Out of them, 65 were managed by ICDT and among of them complete resolution were achieved in 57(87.69%) patients within 3-15 days. 4(6.1%) patients were showed partial resolution of pneumothorax within 15 days. While remaining 4 patients showed no resolution. In our study complete resolution with needle aspiration and high flow oxygen achieved < 3 days and <7 days respectively. Complete resolution with ICDT achieved <15 days. So, we can conclude that needle aspiration and high flow oxygen shorten the duration of hospital stay as compare to ICDT insertion.

5. Conclusion

Pneumothorax is a life-threatening condition, so studying its etiology, clinical profile and treatment outcome is significant for better patient care. In this study, SSP is more common than PSP and has a bimodal age of presentation with male gender dominance. PSP occurs mostly in tall-stature patients, while SSP occurs mostly in lean and thin patients. Smoking is an important risk factor for the development of PSP. The most common symptom of SP is breathlessness, followed by chest pain. A common sign is decreased air entry on chest auscultation. Though SSP is more common than PSP, and within SSP the most common cause is pulmonary Koch's followed by COPD. Right-sided pneumothorax is more common than left-sided. Most of the patients are effectively managed by ICDT, while high flow O2 and needle aspiration are reserved for less severe forms of the disease. Duration of hospital stay is more with ICDT than high flow O2 and needle aspiration. Pleurodesis is required in recurrent cases. Unresolved cases with non-surgical methods managed by surgical approach.

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