

ORIGINAL ARTICLE

A STUDY PROFILE OF LUNG ABSCESS PATIENT COMING TO TERTIARY CARE CENTER AHMEDABAD

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ABSTRACT

Introduction: In the strict sense, all lesions sue to suppuration and necrosis in the substance of the lung should rank as abscess. In this study are abscesses due to tuberculosis, fungal infections, necrosis in malignant tumours and infected cysts. The mortality and morbidity rates for lung abscess decreased significantly with advent of modern antibiotic therapy beginning with discovery and use of penicillin in mid 1940's. Newer antibiotics have extended the armamentarium and further reduced the mortality and morbidity rates.

Material and Methods: 25 patients presenting to the Pulmonary Medicine Department, Smt.N.H.L Municipal Medical College, shardaben hospital saraspur Ahmadabad, who were suffering from lung abscess, were studied. Various parameters considered included age, sex, Occupation and socio-economic status etc.

Results: The peak age incidence of occurrence of lung abscess was between 41-50 years and the major predisposing factor was poor oral hygiene in 68% cases in present study. Alcoholism might have favoured aspiration by altered mentation. Haemoptysis was observed in 24%, Clubbing was observed in 28% and Leucocytosis was present in 36% in present study. Potential pathogens were comprising 60%. Most commonly involved segments were superior segment of lower lobe and posterior segment of the upper lobe. 96% patients required only medical treatment. Surgical intervention was required only in one case.

Conclusion: Medical treatment found very effective, surgical intervention was rarely required. Penicillins alone or in combination with other antimicrobials was found to be very effective. Satisfactory response was achieved in 80% cases. No correlation was observed between anatomical location of abscess and response to medical treatment.

INTRODUCTION

In the strict sense, all lesions sue to suppuration and necrosis in the substance of the lung should rank as abscess. In this study are abscesses due to tuberculosis, fungal infections, necrosis in malignant tumours and infected cysts. With these and other specific conditions excluded the term lung abscess is customarily restricted to necrotic, suppurative and cavitated lesions due to infection by pyogenic organisms.¹

The incidence of lung abscess is steadily falling owing to wider use of antimicrobial drugs, advances in anaesthetic techniques and advances in head and neck surgery with consequent reduction in post operative pulmonary complications- a fruitful cause of lung abscess in the past.^{1,2}

The mortality and morbidity rates for lung abscess decreased significantly with advent of modern an-

tibiotic therapy beginning with discovery and use of penicillin in mid 1940's. Newer antibiotics have extended the armamentarium and further reduced the mortality and morbidity rates.³

AIMS AND OBJECTIVES

The study was undertaken to study predisposing factors responsible for development of lung abscess; to study clinical features and mode of onset in patients with lung abscess; to study bacteriology of expectorated sputum to isolate specific organisms like staphylococcus aureus and pseudomonas by routine aerobic culture; to know anatomical localization of lung abscess by chest X-ray examination- PA and lateral view; and to evaluate response to medical treatment.

MATERIALS & METHODS

Total 25 patients presenting to the Pulmonary Medicine Department of the hospital, who were suffering from lung abscess, were studied. Various parameters considered included age, sex, Occupation and socio-economic status etc.

Patients suspected from clinical history of cough, expectoration, fever, hemoptysis, chest pain, breathlessness and weight loss evaluated with clinical examination, Routine blood investigation, urine examination, sputum microscopy for acid fast bacilli, gram stain, sputum culture for pyogenic organism drug sensitivity, fungus, cytology and radiological investigation including chest X-ray examination PA and lateral view, computerized tomography and bronchoscopy carried out.

RESULTS

Out of 25 cases; 8% belonged to 0-10, 16% to 11-20, 20% to 21-30, 16% to 31-40, 24% to 41-50, 12% to 51-60 and 4% to >61. Out of 25 cases, majority of patients i.e. 76% were males while only 24% were females. This shows male to female ratio is 3.2:1.

More than 1 predisposing factors was responsible in 5 cases. Poor oral hygiene was predisposing factor in majority of patients i.e. 68%. History of alcoholism or unconsciousness was present in 8% patients, in 28% no known predisposing factor was present. Pneumonia, D.M., bronchogenic carcinoma and seizure were present as one of the predisposing factors in 4% of cases. It can be seen that cough with expectoration was commonest symptoms found in all cases. Fever varying from low grade to high grade often associated with rigors was present in 68% cases, putrid sputum in 64%, chest pain, haemoptysis and weight loss in 48%, 24% and 24% of cases respectively. 20% complained of helitosis, 28% had clubbing and 36% had leucocytosis.

Frequency of organisms isolated on aerobic culture of expectorated sputum. Specific organisms like S. Aureus and pseudomonas were found respectively in 28% and 16% of cases. No pathogen was isolated in 24% of cases. Above table shows that mode of onset was insidious in majority of patients i.e. subacute or chronic. Acute onset was found in 2 patients i.e. 8% of cases. In 80% and 12% of cases, onset was subacute and chronic respectively.

It is seen that abscess was solitary in 92% of cases and multiple were found in only 8% of cases. In 64% cases, abscesses were found on right side

which also includes 2 cases in which multiple abscesses were present on right side only. In 36% cases abscesses were found on left side. It shows lobar distribution of abscesses: 16%, 8% and 32% had respectively right upper lobe, middle lobe and lower lobe abscesses. 8% and 28% had respectively left upper and lower lobe abscesses.

Table 1: Predisposing factors

Predisposing factors	Cases (%)
Poor oral hygiene	17 (68.0)
Alcoholism	2 (8.0)
Unconsciousness	2 (8.0)
Pneumonia	1 (4.0)
Bronchogenic carcinoma	1 (4.0)
DM	1 (4.0)
Seizure	1 (4.0)
No known factors	7 (28.0)

Table 2: Bacteriology of expectorated sputum

Organisms isolated	Cases (%)
Alpha haemolytic Streptococci	4 (16.0)
Beta haemolytic Streptococci	1 (4.0)
Streptococcus Pneumonia	1 (4.0)
Haemophilus Influenza	1 (4.0)
Staphylococcus Aureus	7 (28.0)
Pseudomonas	4 (16.0)
E.coli	1 (4.0)
Enterobacter	3 (12.0)
Mixed	3 (12.0)
No pathogen	6 (24.0)

Table 3: Segmental distribution

Segment involved	Cases (%)
Upper lobe- Right Side	
Posterior	3 (12)
Anterior	1 (4)
Middle lobe- Right Side	
Lateral	1 (4)
Medial	1 (4)
Lower lobe- Right Side	
Superior	6 (24)
Medial basal	1 (4)
Anterior basal	1 (4)
Upper lobe- Left Side	
Anterior	1 (4)
Superior lingular	1 (4)
Lower lobe- Left Side	
Superior	4 (16)
Anterior basal	1 (4)
Lateral basal	1 (4)
Posterior basal	1 (4)

Table 4: Types of antimicrobials used

Types of antimicrobial used	No. (%)
Amoxycillin	8 (32.0)
Amoxycillin + Metronidazole	4 (16.0)
Amoxycillin + Azithromycin with or without Metronidazole	9 (36.0)
Antimicrobials other than Amoxycillin	4 (16.0)
Total	25 (100)

Table 5: Anatomical localization of abscess

Anatomical localization of abscess	Cases who completed treatment	Cases with satisfactory response to treatment (%)
Upper lobe	5	4 (80)
Middle lobe	1	1 (100)
Lower lobe		
Superior seg	8	8 (100)
Basal segment	5	5 (100)
Multiple	2	2 (100)
Total	21	20 (96)

Table 6: Outcome of treatment

Outcome of treatment	No. (%)
Satisfactory	20 (80.0)
Cancer detected	1 (4.0)
Improved but died due to other disease	1 (4.0)
Lost to follow up	3 (12.0)

Table 3 shows segmental distribution of lung abscesses. On right side in upper lobe posterior and anterior segments were involved in 12% and 4% cases respectively. In middle lobe, each lateral and medial segment involved 4% cases. On right side in lower lobe, superior segment was involved in 24% cases while medial basal and anterior basal were involved only in 4% cases each. On left side in upper lobe, anterior or superior lingular were involved in 4% cases. In left lower lobe, superior segment was involved in 16% of cases and each anterior basal, lateral basal and posterior basal segment were involved in 4% of cases. 96% cases were treated by medical treatment alone while in 4% cases surgical intervention was needed in form of closed intercoastal drainage for associated emphysema.

Table 4 shows that Amoxycillin were used in 32% cases, metronidazole in 16% cases and in association with other antibiotics in 36% cases. 16% cases were treated with antibiotics other than Amoxycillin. Duration of antimicrobials in patients with satisfactory response Range: 2-8 weeks and Average:

3.7 weeks. Response was considered satisfactory when patient became asymptomatic clinically and radiologically; either there was complete clearing or stable residual lesion in form of linear or small thin walled cystic lesion <2cm in diameter. Among those patients who responded satisfactorily, duration of antimicrobials varies from 2 to 8 weeks with average duration of 3.7 weeks.

Table 5 shows response to medical treatment in relation to anatomical localization of abscess. Among patients who completed treatment, all responded satisfactorily except one patient with abscess in upper lobe. This was due to associated bronchogenic carcinoma which was found on investigation. Out of 25 patients, 4 patients did not take complete treatment. One patient (case no.22) expired during treatment due to associated chronic bronchitis and emphysema; although radiologically there was improvement in lung abscess. The remaining 3 patients improved with treatment, but went home while on treatment and did not return for follow up.

Table 6 shows satisfactory response was obtained in 80% cases. Response was considered satisfactory when patient became asymptomatic clinically and radiologically; either there was complete clearing or stable residual lesion in form of linear or small thin walled cystic lesion <2cm in diameter. Bronchogenic carcinoma was detected in one case (case no.18). 3 patients did not return for follow up after they went home while on treatment. One patient (case no.22) expired while on treatment due to associated chronic bronchitis and emphysema.

DISCUSSION

The peak age incidence of occurrence of lung abscess was between 41-50 years; similar to that found by Rumbaugh and Prior⁴, Abernath⁴, Shafron & Tate¹¹ and Barnet and Hering¹⁰. Weiss¹⁴ noted that 75% of his patients were <50 years of age. In this study, 84% were under 50 yrs of age. Estrera² found maximum incidence in 4th & 5th decade of life. Chidi C.C. et al³ observed 43% between 26-51 years of age. The incidence of lung abscess was in relation to sex with present study of different studies. Males were affected more commonly than females in all studies and also in present series. No reasonable explanation is available for the low incidence in females.

The major predisposing factor was poor oral hygiene in 68% cases in present study. Estrera² and Abernath⁴ observed it in 59.8% and 69% cases respectively. Shafron and Tate¹¹ observed the same

finding in 25% cases. In 2 patients, both alcoholism and poor oral hygiene were responsible. Alcoholism might have favoured aspiration by altered mentation. Chidi³ and Abernathy⁴ have incriminated alcoholism in 36.6% and 12% of their patients respectively. In one patient (case no.8), unconsciousness due to diabetic ketoacidosis was responsible for development of lung abscess. The other contributing factors in this patient were D.M. and poor oral hygiene. Estrera² and Chidi² detected diabetes in 5.7% and 11.1% of their patients respectively. Following post partum eclampsia, one patient (case no.7) developed lung abscess. Both seizure and unconsciousness were considered contributing factors. Seizure were found in 7.4%, 10% and 6.6% of cases in Estrera's², Abernathy's⁴ and Chidi's³ studies respectively. Most cavitating bronchogenic carcinoma have unexplained predilection for upper lobes⁵. Brock⁶ found that incidence of lung abscess secondary to bronchial carcinoma was 17.5% while Strand & Simpson⁷ 19% and Hamer and Wolpaw⁸ 12%. It is estimated that 9-17% of cavitary lung lesions are related to carcinoma⁹. The mechanism of abscess formation in carcinoma is not fully understood. In 28% of cases, no known predisposing factor was observed in present study. Estrera², Chidi³ and Abernathy⁴ did not find any predisposing factor in 24.2%, 15.5% and 50% of their cases respectively.

Duration of symptoms varied from <1 week to 12 weeks. In majority of patients, onset was insidious. Chidi³ noted insidious onset in more than 50% cases. Barlett J.G. The most common symptom was cough with expectoration. Estrera², Barnett¹⁰ and Shafron¹¹ found this symptom in 73.5%, 98% and 80% respectively. Fever with rigors was present in 68% of cases. Barnett¹⁰ and Shafron¹¹ observed it in 70% and 47% respectively. Barlett¹² noted it in 95% cases and Collins¹³ in 60%. Chest pain was present in 48%. It was present in 65% and 42% in studies of Barnett and Hering³ and Shafron and Tate¹¹ respectively. Haemoptysis was observed in 24%. Estrera² observed this symptom in 38.2% cases. Barnett and Hering¹⁰ and Shafron and Tate¹¹ observed it in 43% and 38% respectively. Clubbing was observed in 28% in present study while in 3.8% in study of Estrera². Leucocytosis was present in 36% in present study. Barnett and Hering¹⁰ observed it in 50% cases. Barlett J.G.¹² found it in 87.4% cases but line demarcation was 9000/cu.mm. WBC count in his study. Normal oral flora was found in 16%. Potential pathogens comprised 60%. Isolation of specific organisms helped to consider specific aetiology and treatment was modified according to sensitivity tests. Most

commonly involved segments were superior segment of lower lobe and posterior segment of the upper lobe (see table 20). Estrera² and Weiss¹⁴ observed involvement of superior segment of the lower lobe in 50.3% and 52.9% of their cases respectively. The involvement of these segments has also been illustrated by Brock⁶. This could be explained on basis that dependent segments in recumbent position are posterior segment of upper lobe and superior segment of the lower lobe and are consequently favoured by gravitational flow during periods of compromised consciousness.

96% patients required only medical treatment. Surgical intervention was required only in one case. Closed drainage by intercostal tube was done in that case as she developed empyema during the course of her treatment for multiple lung abscesses. Block¹⁵ also found medical treatment to be more effective in almost all his cases of lung abscess. Ferguson T.B. et al¹⁶ has mentioned that the role of operation in treatment of lung abscess has been relegated to the background since the introduction of penicillin in 1945. It is apparent that among patients who completed treatment, satisfactory treatment was achieved in all patients with abscesses in middle or lower lobe or multiple abscesses. Only one patient with abscess in upper lobe did not respond. But this has been attributed to bronchogenic carcinoma. Thus no correlation has been observed between anatomical localization of abscess and response to treatment. Anderson and McDonald⁸ claimed that basilar lower lobe abscesses have the worst prognosis; primarily due to difficulty in obtaining satisfactory postural drainage. However Estreta et al² have not noticed any difference in therapeutic response of lung abscesses. In their study, all nine lower lobe basilar segmental abscesses responded well to usual medical treatment. satisfactory response was achieved in 80% of patients. One patient responded unsatisfactorily to medical treatment as he was found to have bronchogenic carcinoma. One patient responded well but succumbed to death due to associated disease- chronic bronchitis and emphysema. Three patients left the hospital while on treatment and did not turn for follow up. Among those patients who responded satisfactorily, range of anti microbial treatment varied from 2-8 weeks with average duration of 3.7 weeks. Cure rates of 85-90% have been reported by Fox J.R. et al¹⁸ and Gittens S.A. et al¹⁹. Bartlett J.G.¹² observed cure rate of 92% (24 cases) in 26 cases. The remaining two of his patients died as a result of associated disease- one from Ca. Oesophagus and other due to haemorrhage in glioblastoma

CONCLUSION

From this study it was concluded that most of the patients with lung abscess were under age of 50. Most of them belonged to 2nd to 5th decade. Males were affected more commonly than females. Most important predisposing factor encountered was poor oral hygiene. Cough with putrid sputum and fever were present in more than half cases. Duration of symptoms was >1 week in majority of cases. Routine aerobic culture and sensitivity were helpful in management. Lung abscess was more common on right side and commonly involved segments were superior segment of lower lobe and posterior segment of upper lobe i.e. segments which are dependent in supine position. Medical treatment found very effective, surgical intervention was rarely required. Penicillins alone or in combination with other antimicrobials was found to be very effective. Satisfactory response was achieved in 80% cases. If only those patients who completed treatment are considered; it was 95%. No correlation was observed between anatomical location of abscess and response to medical treatment.

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