
Original Article

Pediatric Lung Abscess: a Retrospective Review of 22 Cases

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ABSTRACT

Background: Lung abscess is a rare and jeopardizing disease. It is still capable of causing substantial mortality in children.

Materials and Methods: We performed a retrospective study on 22 children during a 15-year period in our center. A total of 22 children were identified including 13 boys and 9 girls.

Results: Five of them had primary lung abscess and seventeen had secondary type. Thirteen of the cases (60%) were diagnosed only by CT-scan without any other evaluation. Eighteen cases had been managed by antibiotic and the mean duration of antibiotic therapy was 12 days. Surgical procedure was done in 4 cases.

Conclusion: Gram positive organisms i.e *Streptococcus pneumonia* and *Staphylococcus aureus* were the most prevalent organisms involved in our cases. No complications and mortality were seen in our study.

Key words:

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INTRODUCTION

Lung abscess is a necrotic cavitary lesion that contains inflammatory elements. It has a sharp border and is single or multiple (1,2).

Lung abscess is rare in children and despite of availability of new antimicrobial agents and advanced diagnostic techniques, it is still capable of causing substantial morbidity in children. Early diagnosis of the disease can prevent further complications and delay in diagnosis not only

increases the mortality rate but also can lead to severe complications along with the need for surgical intervention. Abscess can form in areas of pre-existing infection or from hematogenous spread.(2)

The prevalence of disease is 0.7 per 100,000 individuals and is reported to be 1.6 times more prevalent in males. The common clinical signs and symptoms are fever, cough, sputum, chills, malaise, weight loss, dyspnea and hemoptysis. Leukocytosis

with shift to left may be observed in most of the cases. (3, 4)

Lung abscesses are classified into 2 groups:

1) **Primary** lung abscess develops without any underlying disease and occurs in human as a result of pneumonia or aspiration. Incidence of abscess as a result of bacterial pneumonia is higher in spring and winter. (5)

2) **Secondary** lung abscess develops from those with underlying medical condition, such as immuno-compromised states, underlying lung disease, central nervous system disease and congenital heart anomalies. (6)

Table 1. Predisposing factors in lung abscess.

Kind of abscess and factory primary	No.
Upper Respiratory Tract Infection	4
Penetrating wound	1
Secondary	
Recurrent pneumonia	6
Immuno comprimization	5
Loss of consciousness	2
Underlying lung disease	2
Hydatid cyst	2

Aspiration is the most important cause of lung abscess and the conditions that make the person susceptible to aspiration are: alcoholism, esophageal disorders such as achalasia, anesthesia, epilepsy, specific infections as staphylococcus, klebsiella, tuberculosis, amoebiasis and fungal infection in congenital bulla or hydatid cyst, tonsillectomy and infection of mouth and gum. Other reasons for abscess are: spread of infection from below the diaphragm, parenchymal disorders like fibrocystic diseases and pneumonia, agammaglobulinemia, leukopenia, immaturity and chemotherapy for cancers and organ transplantation.

Information of primary childhood lung abscess is limited and a few studies have been done in this regard.

MATERIALS AND METHODS

In this retrospective study, we reviewed cases of lung abscess from 1992 to 2006. Twenty two cases were enrolled into our study, while six patients with incomplete files or wrong diagnosis (empyema or necrotizing pneumonia) were excluded.

In this study, lung abscess was defined as a process of suppuration resulting in the destruction of the lung parenchyma and formation of a cavity containing purulent material that had air-fluid level on chest x-ray or chest CT-scan.

Data were collected and analyzed considering the patients' age, gender, underlying disease, clinical manifestation, laboratory (WBC, PMN, ESR, CRP) and radiological findings and medical or surgical procedures. WBC more than 10000 is considered as leukocytosis while, presentation of band cell in peripheral blood smear, shift to the left, and ESR over 20 were considered abnormal.

RESULTS

Demographic data and associated condition

Twenty two children including 13 boys and 9 girls were studied (fig 1). Among them, 14 children were under 10 and 8 were between 10 and 18 years of age (fig 2).

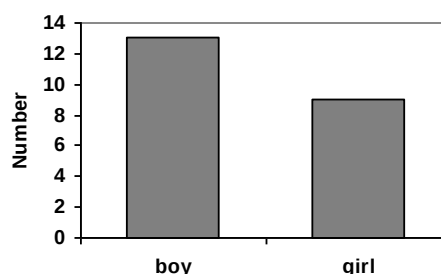


Figure 1. Sex prevalence of lung abscess

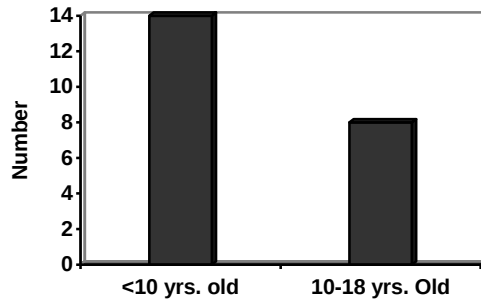


Figure 2. Age prevalence of lung abscess

Clinical manifestation

Table 2 shows the clinical symptoms. The most common symptoms were cough, fever, weight loss, sputum and dyspnea respectively. 20 patients had cough, 17 had fever, 17 had weight loss, 16 sputum, 14 lethargy and 11 had dyspnea (table 2).

Table 2. Clinical manifestations.

Sings and symptoms	Number
Cough	20/22
Fever	17/22
Weight loss	17/22
Sputum	16/22
Malaise	14/22
Dyspnea	11/22
Nausea & vomiting	6/22
Chills	5/22
Chest pain	5/22
Headache	3/22
Sore throat	3/22
Diarrhea	2/22
Dizziness	1/22
Sweating	1/22
Generalized edema	-

Location of abscess:

Figure 3 shows the location of abscess. Right upper lobe was the most frequently involved area (8 cases) followed by left lower lobe (6 cases) (Figure 3).

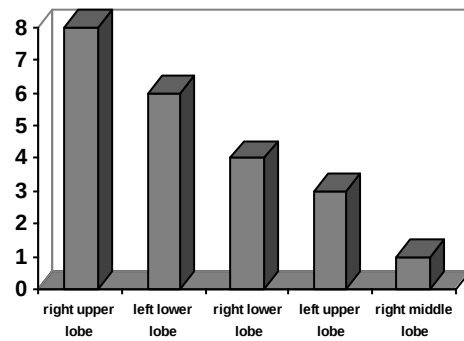


Figure 3. Location of abscess

Diagnostic and Surgical procedures

Five children were diagnosed only by chest x-ray and 13 were detected only by CT-scan. Eighteen patients received antibiotic therapy. Lobectomy was performed in 3 patients and thoracotomy in 1 child. Bilateral chest tube was inserted for 3 patients.

Length of hospitalization

Days of hospitalization was 1-42 days (mean was 15.4)

Follow up

Six cases came back for follow up until 3 months later. In 5 cases, there were not any symptoms of recurrence of infection and only 1 case had recurrent infections who had taken antibiotic but he did not come back after 2 months.

Complications

In these patients, there were not any case of mortality or complications like shock, pneumothorax and osteomyelitis.

DISCUSSION

According to this study, 22 cases were found to have lung abscess during a 15-year period (1.4 cases each year). In a similar study conducted by Tan et al. in 1995 in England, 4 lung abscesses per year was reported and in another study by Sat et al in 2003, the

rate was 1 case per year (7, 8). Sixty percent of our cases were under 10 years of age. In another study in the United Kingdom 50% of the cases were less than 10 years of age (7). The data showed that the majority of the cases were boys (59%). In the study conducted in the United States in 2003, Machado found that 70% were boys. (9)

In most of the studies, fever was recorded in 100% of the primary lung abscesses and in 84% of the secondary types. In the present study fever was detected in 17 cases and the most common symptoms was cough (20 patients). Cough, sputum, malaise, weight loss and dyspnea were reported in more than 50% of the cases. Previous studies also showed the same results. (10)

Leukocytosis was seen in 13 cases with a shift to the left in 12 cases, and raised ESR in 15 cases. Positive CRP was reported in 7 cases.

Other studies also reported rising of white blood cell counts and ESR level (11). Chest x-ray confirmed the diagnosis of lung abscess in 5 cases (23%), meanwhile CT-scan confirmed 13 cases (60%) with a definite diagnosis. So CT-scan was more reliable in diagnosing lung abscess.

Lung abscesses have a tendency to develop in any part of the lung. The most frequent sites of abscess formation are right upper lobe, left lower lobe and upper segments of both lower lobes (12). In this study, the most frequent lobes are right upper and then left lower lobe.

The microbiologic study of lung abscess involves aerobes, anaerobes and fungi. Brook and Finegold conducted a study in 1980 and showed anaerobes were the most prevalent pathogens (11). Another study by Mark in 1968 showed that *Streptococcus pneumonia* and *Staphylococcus aureus* and gram bacilli were more prevalent (13).

Another study in Taiwan in 2001 showed that *Streptococcus pneumonia* and *staphylococcus aureus* were most prevalent in primary lung abscess. (14)

Unfortunately, we could not perform anaerobic culture in this study and as a result in 12 cases, we did not find any pathogen and gram positive cocci (*streptococcus pneumonia* and *staphylococcus aureus*) were the most prevalent organisms in the lesions.

In a 15-year study which conducted by Chan et al. in Taiwan in 2005, mean duration of antibiotic therapy was 28 days in primary lung abscess and 45 days in secondary type (15). In our series, the mean duration of intravenous antibiotic was 12 days which shifted to oral prescription for an additional 2-3 weeks. The duration of antibiotic therapy should be tailored individually according the patient's condition and the clinical response.

Some surgeons recommend that a surgical procedure should be reserved for patient with very large lung abscess, those that do not respond to medical treatment, and patients with anatomic or physiologic underlying disorder. (10, 12, 16)

In a study in Taiwan mortality rate was 18.5% and morbidity was 41% but in our study there was not any case of mortality or morbidity like shock, pneumothorax and osteomyelitis. This could be due to the fact that patients did not come back to this hospital or they did not record their visit in their chart.

CONCLUSION

According to the results of our study the most common clinical pictures of the lung abscess were cough, fever and sputum. Leukocytosis with shift to the left was common in these children. This study showed that CT-scan was very helpful to make the

diagnosis and to prevent complications due to late diagnosis.

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