

## Risk Assessment of Lung Abscess in a Patient with Alcoholism

Nazer Kamangar\*

David Geffen School of Medicine,  
Department of Medicine, Division of  
Pulmonary and Critical Care Medicine,  
Olive View-UCLA Medical Center,  
University of California, Los Angeles.

### Abstract

Lung abscess is a type of liquefactive necrosis of the lung tissue and formation of cavities (more than 2 cm) containing necrotic debris or fluid caused by microbial infection. It can be caused by aspiration, which may occur during altered consciousness and it usually causes a pus-filled cavity. Moreover, alcoholism is the most common condition predisposing to lung abscesses. Lung abscess is considered primary (60%) when it results from existing lung parenchymal process and is termed secondary when it complicates another process, e.g., vascular emboli or follows rupture of extrapulmonary abscess into lung. There are several imaging techniques which can identify the material inside the thorax such as computerized tomography (CT) scan of the thorax and ultrasound of the thorax. Broad spectrum antibiotic to cover mixed flora is the mainstay of treatment. Pulmonary physiotherapy and postural drainage are also important. Surgical procedures are required in selective patients for drainage or pulmonary resection. In the current review we will present all current information from diagnosis to treatment.

**Keywords:** Lung abscess, Antibiotics, Video-assisted Thoracoscopic Surgery (Vats), Thoracoscopy

### \*Corresponding author:

Nazer Kamangar

✉ nazer@kam.123

David Geffen School of Medicine,  
Department of Medicine, Division of  
Pulmonary and Critical Care Medicine, Olive  
View-UCLA Medical Center, University of  
California, Los Angeles.

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### Introduction

Lung abscess is defined as a circumscribed area of pus or necrotic debris in lung parenchyma, which leads to a cavity, and after formation of bronchopulmonary fistula, an air-fluid level inside the cavity.

Lung abscess is in the group of lung infections such as lung gangrene and necrotizing pneumonia which is characterized with multiple abscesses [1].

The clinical signs and therapy of lung abscess was described for the first time by Hippocrates. In pre-antibiotic era, one third of patients with lung abscess would die, the other third of patients would recover fully, and the rest of them would survive with sequels such as chronic lung abscess, pleural empyema or bronchiectasis. In that time, surgery was considered as the only effective therapy, and today most of the patients will be fully recovered only with antibiotic therapy [2].

### Etiology

The abscess can be described as nonspecific if no likely pathogen is recognized in the expectorated sputum or as a putrid abscess if the

cause is presumed to be an anaerobic bacteria. The classification depends on the microorganism causing the abscess. In the majority of cases, it is polymicrobial, which includes anaerobic bacteria like *Bacteroides*, *Prevotella*, *Peptostreptococcus*, *Fusobacterium*, or *streptococci*. Monomicrobial lung abscess is caused by *streptococci*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Streptococcus pyogenes*, *Burkholderia pseudomallei*, *Hemophilus influenzae* type b, *Nocardia*, and *Actinomyces* [3].

In patients with alcohol use disorder, the most common organisms involved in lung abscess include *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Streptococcus pyogenes*, and *Actinomyces*. Poor dental hygiene is an independent risk factor for the development of lung abscess.

### Signs and Symptoms

Early signs and symptoms of lung abscess cannot be differentiate from pneumonia and include fever with shivering, cough, night sweats, dispnea, weight loss and fatigue, chest pain and sometimes anemia. At the beginning cough is non-productive, but when communication with bronchus appears, the productive cough (vomique) is the typical sign. Cough remains productive, sometimes followed by hemoptysis. In patients with chronic

abscess clubbing fingers can appear.

Differential diagnosis includes excavating tuberculosis and mycosis, but seldom can be seen radiological sign of gas-liquid level. Pulmonary cystic lesions, such as intrapulmonary located bronchial cysts, sequestration or secondary infected emphysematous bullae can be difficult to differentiate, but localization of lesion and clinical signs can indicate the appropriate diagnosis. Localized pleural empyema can be distinguished by using CT scan or ultrasound [4].

Excavating bronchial carcinomas such as squamocellular or microcellular carcinoma are usually presented with thicker and irregular wall comparing to infectious lung abscess. Absence of febricity, purulent sputum and leukocytosis can indicate the carcinoma and not the infective disease. Radiological sign of air-fluid level can be seen and in hydatid cyst of lung

### Treatment / Management

Consider empiric antibiotic therapy upon suspicion of a lung abscess. Empiric coverage should target colonized organisms in upper airway and oropharynx like gram-positive cocci, respiratory gram-negative cocci, aerobic, and anaerobic gram-negative bacilli. If the patient exposed to healthcare set three months before the presentation, coverage for MRSA should be considered. Atypical organisms can be found in the setting of an abscess that is not improving with broad-spectrum antibiotic therapy [5].

Poor prognostic factors are old age, severe comorbidities, immunosuppression, bronchial obstruction, and neoplasms. Beta-lactamase inhibitors are the preferred initial empiric

antibiotic therapy followed by Imipenem or Meropenem.

Clindamycin, as empiric treatment for a lung abscess, is no longer recommended given the risk of *Clostridioides difficile* infection but remains an alternative for Penicillin-allergic patients. For Methicillin-Resistant *Staphylococcus aureus* (MRSA), Vancomycin or Linezolid are preferred. Daptomycin has no activity against pulmonary infections. For Methicillin-Sensitive *Staphylococcus aureus* (MSSA) choice is Cefazolin 2 g IV every 8 hours or Nafcillin 2 gm IV every four hours or Oxacillin 2 gm every 4 hours. Dosing adjustment is considered in patients with compromised renal function [6].

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