

# Radiological Findings in Lung Abscess : A Case report

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## Abstract

**Background:** Lung abscess is an infectious disease of the lungs with pus filling the cavity in the lung parenchyma. In the pre-antibiotic era, one-third of patients who experienced lung abscesses died. The use of appropriate radiological equipment is expected to help narrow down the number of differential diagnoses so that an accurate diagnosis is obtained. We report a case of woman who had lung abscess with various imaging modality finding,

**Case Presentation:** A 60 year old woman came to the ER with complaints of fever since 30 days before entering the hospital. Fever is accompanied by coughing and phlegm that is difficult to expel. Patient have a normal vital signs and several abnormalities in laboratory finding. Patients are examined using various radiology modalities. Conventional thoracic imaging examination suspected pleural effusion but after confirmation using a non-contrast Thorax CT Scan there was a hypodens area in the right inferior lobe and right medial lobe of the lung. In CT scan imaging using contrast obtained at the edge of the hypodensities area found enhancement which leads to a picture of lung abscess

**Conclusion :** The use of conventional chest radiographs has not provided maximum results in diagnosing lung abscess. Thorax CT scan is the best choice for diagnosing lung abscess because of its better sensitivity compared to conventional Thorax X-rays.

Keywords : Lung Abscess; CT Scan; Thorax

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## 1. Introduction

Lung abscess is an infectious disease of the lungs with pus filling the cavity in the lung parenchyma. Based on the etiology of pulmonary disease, it is divided into primary and secondary. Primary lung abscesses commonly occur in individuals who are susceptible to aspiration or in healthy individuals. Secondary lung abscess is associated with neoplasms or immunocompromised diseases (A. Marra et al,2015).

In the pre-antibiotic era, one-third of patients who experienced lung abscesses died, another third would recover with sequelae of lung disease such as empyema, bronchiectasis, or recurrent lung abscesses. While the rest will recover completely (Ma'moun et al,2022).

Radiological modalities such as conventional radiography, computed tomography (CT) scan, ultrasonography (USG), magnetic resonance imaging (MRI) can be used to diagnose lung abscess where the best results are obtained on a CT scan. The use of appropriate radiological equipment is expected to help narrow down the number of differential diagnoses so that an accurate diagnosis is obtained (Vina et al,2021)

## 2. Case Report

A 60 year old woman came to the Padangan Regional Public Hospital Emergency Room with complaints of fever since 30 days before entering the hospital. Fever is accompanied by coughing and phlegm that is difficult to expel. Vital

signs examination showed the following results: blood pressure 140/80, temperature 36.5 degrees Celsius, oxygen saturation 97%, respiratory rate 20 and pulse 98. Laboratory examination of complete blood and serum electrolytes showed abnormal results in Hemoglobin 9.00 g/dL, Leukocytes 18,100 pg, Segment 84.1 g/L, Sodium 134 mmol/L, Potassium 3.05 mmol/L, Chloride 88 mmol/L. On plain chest x-ray examination in AP supine position, there was an increase in bronchovascular markings, CTR > 0.56 and visible opacity in the right lung with air bronchogram (-) with a suspicious impression of a lung mass accompanied by pleural effusion and cardiomegaly.

Radiological examination was confirmed again with a non-contrast CT scan and the results showed a hypodense area in the right inferior lobe segment 6 with a thick-walled border measuring 19 cm x 8 cm x 8 cm accompanied by an air fluid level (+). In the middle lobe area, a similar area was found measuring 2.99 cm x 6.84 cm x 4.88 cm with the impression of multifocal abscesses in the right inferior lobe of segment 6 and in the right middle lobe lung accompanied by right pleural effusion. The patient then had a Water Sealed Drainage (WSD). Post WSD installation, the patient underwent an AP/Lateral View thorax examination in the supine position and the examination showed an increase in the bronchovascular pattern of the right lung, blurred with homogeneous opacity with the impression of pleural effusion and cardiomegaly. Post thorax CT scan with contrast post WSD installation showed bronchovascular patterns that looked rough in the bilateral lung, a hypodense area in the inferior lobe of right segment 6 with firm borders and thick walls, area size of around 19 cm x 8 cm x 8 cm, air fluid level (+) and a similar area in the middle lobe with dimensions of approximately 2.99 cm x 6.84 cm, 4.88 cm with the impression of multifocal abscesses in the inferior lobe of the right segment 6 and in the middle lobe of the right lung, minimal right pleural effusion, and cardiomegaly.

### 3. Discussion

Lung abscess is a condition where infection occurs which results from necrosis of the lung parenchyma. The cause of this condition can come from aerobic and anaerobic bacteria at the same time (Sherly Lawrensia,2021). Microbacteria such as staphylococcus aureus, Klebsiella, Pseudomonas aureginosa, Haemophilus influenza types b and c, Burkholderia pseudomallei, Pasteurella multocida, group A streptococci are reported to be the etiologic causes of lung abscesses. Lung abscesses can be classified according to duration, progression and mode of spread. Based on the duration of lung abscess, it can be divided into acute (<6 weeks) and chronic (>6 weeks). Based on the progression, lung abscesses are divided into primary and secondary. Based on the method of spread, lung abscesses can be divided into bronchogenic (oropharyngeal aspiration or inhalation) and hematogenic (spread of infection from other infected sites) (Sherly Lawrensia,2021).

Clinical symptoms of lung abscess include fever, cough with phlegm and malaise which can last for several days to weeks. Infection spreads to the pleura via direct spread or can also occur from a bronchopleural fistula (Ivan Kuhajda et al, 2015). The presence of erosion in this case can cause hemoptysis. Laboratory examination of lung abscess can reveal an increase in the number of leukocytes and anemia of chronic disease. Additional laboratory examinations such as blood culture are important to confirm the bacteria causing lung abscess or suspicion of secondary lung abscess (Sherly Lawrensia, 2021).

Radiological examinations that can be used to confirm the diagnosis can use conventional X-rays or CT scans of the thorax. Conventional chest x-ray examination shows single or multiple cavities in the lung parenchyma. The use of CT scans is more sensitive in cases of lung abscess compared to conventional chest x-rays. The use of CT scans is very useful for viewing small cavities, proving the presence of obstructing endobronchial lesions and differentiating lung abscesses from air fluid levels in the pleural space or empyema (Murtaza Mustafa, 2015). The use of ultrasound is not optimal for cases of lung parenchyma, especially lung abscesses, because sound wave transmission is very poor when passing through

objects that contain a lot of air. The use of MRI for pathological evaluation of the lung is very limited due to the presence of artifacts and relatively low spatial resolution. Vascular structures are also difficult to assess when using MRI without contrast (Vina et al, 2021).

This patient initially underwent a conventional chest x-ray examination in the AP supine position and found cardiomegaly, increased bronchovascular and rough markings, visible opacity in the right lung with an air bronchogram (-), and thickening in the right pleural space (Figure 1). Findings of moderate pleural effusion in the conventional thorax have been reported in cases of empyema. On a new non-contrast CT scan, the classic picture was found in the form of thin walls and a uniform smooth lumen on the coronal section. On the axial section, abscesses were found in the parietal and visceral pleura (Ivan Kuhajda et al, 2015). The patient is suspected of having a right lung mass with pleural effusion.

The patient was confirmed again using a non-contrast Thorax CT scan. A non-contrast Thorax CT scan showed that there was a hypodense area in the inferior lobe of right segment 6 with a thick-walled border measuring 19 cm x 8 cm x 8 cm accompanied by an air fluid level (+). In the middle lobe area, a similar area was found measuring 2.99 cm x 6.84 cm x 4.88cm. In the parenchyma, there was an increase in bronchovascular patterns and a hypodense area in the right pleural cavity and the impression of multifocal abscesses was found in the inferior lobe of the right segment 6 and in the middle lobe of the right lung accompanied by right pleural effusion (figure 2).

This patient then had a WSD installed. Conventional chest x-ray examination was carried out again in the AP and lateral positions after installing the WSD. The results of the examination showed an increase in the bronchovascular pattern of the right lung, blurring with homogeneous opacity with the impression of pleural effusion and cardiomegaly (Figure 3). In another case, it was found in a case of lung abscess with AP and lateral view that there was a cavity filled with fluid level air in the lower lobe of the lung with the same length and accompanied by characteristic thick and irregular walls (Christopher et al, 2014).

The patient underwent a chest CT scan with contrast for evaluation after WSD installation. On a CT scan of the thorax with the patient, the results were the same as before, in the form of a hypodense area in the inferior lobe of right segment 6 with firm, thick-walled borders measuring 19 cm x 8 cm x 8 cm, air fluid level (+) and a similar area appeared in the middle lobe measures approximately 2.99 cm x 6.84 cm x 4.88 cm. In the right pleural cavity, a minimal hypodense area was also found with the impression of multifocal abscesses in the inferior lobe of the right segment 6 and in the right middle lobe, fibrotic fibers in the left lung, cardiomegaly and minimal right pleural effusion (Figure 4).

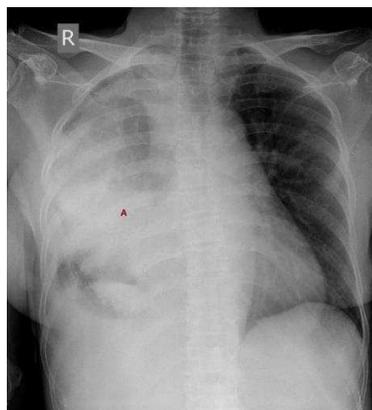


Fig 1. (A) Picture of homogeneous opacity in the right lung



Fig 2.(A) Image of air fluid level ; (B) Minimal pleural effusion in the right lung ; (C) Hypodense area in the right inferior lobe ; (D) Hypodense area in the middle lobe

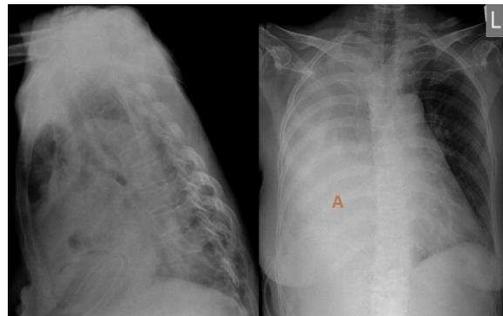


Fig 3. (A) The bronchovascular pattern is blurred with homogeneous opacity

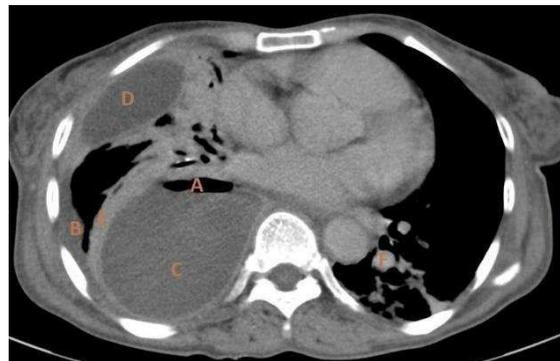


Figure 4. (A) Air fluid level picture ; (B) Minimal pleural effusion in the right inferior lobe ; (C) Hypodense area in the right inferior lobe ; (D) Hypodense area in the middle lobe ; (E) Enhancement of the lesion wall/capsule ; (F) Fibrotic Fibers

#### 4. Conclusion

Various radiological modalities can be used to confirm the diagnosis in cases of lung abscess. The use of conventional chest radiographs has not provided maximum results in diagnosing lung abscess. Thorax CT scan is the best choice for diagnosing lung abscess because of its better sensitivity compared to conventional Thorax X-rays.

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#### 6. References

- A. Marra et al, Management of Lung Abscess, Zentralbl Chir, 2015;140:547-553
- Christopher M. Walker et al, Imaging Pulmonary Infection: Classic Signs and Patterns: AJR, 2014; 202:479-492

- Ivan Kuhajda et al, Lung abscess-etiology, diagnostic and treatment options: Ann Transl Med, 2015;3(13) : 183
- Ma'moun Al-Fawwaris, Noor Mustafa, Lama Al-Masri, Husam Bardan, Lung Abscess: Etiology and Therapy; J Pharma Reports,2022: 6: 6-8
- Murtaza Mustafa, HM. Iftikhar, RK. Muniandy, SA. Hamid, MM. Sien, N. ootha: Lung abscess : Diagnosis, Treatment and Mortality; International Journal of Pharmaceutical Science Invention, 2015
- Sherly Lawrensia, Lung Abscess: Diagnosis and Treatment: CME-2,2021: 48:286-288
- Vina Tri Septiana, Budi Yulhasfi Febrianto, Rahmi Afifi, Gurmee Singh, Radiological Features of Lung Abscess; Eduhealth Journal, 2021: 11: 86-100