



Pulmonary Nocardiosis Mimicking Lung Cancer: A Case Report

Nijmeh Hammoud¹, Muneerah Alrashidi², Yosor Alqudeimat², Walid Kteiche³, Basel Alrajihi², Salah Termos²

¹Department of Pulmonary and Intensive Care Medicine, Dar AlShifa Hospital, Kuwait

²Department of Pulmonary Medicine, Kreiskrankenhaus Rotenburg an der Fulda, Germany

³Department of Surgery, Amiri Hospital, Kuwait.

Correspondence

Nijmeh Hammoud MD,
Pulmonary and ICU Specialist, DASH,
Kuwait.

Abstract

Pulmonary nocardiosis is an uncommon infectious disease affecting either the lungs or whole body. We present a case of a 70-year-old female with diabetes mellitus and hypertension who developed bilateral cavitary lung lesions following exposure to paint fumes. Initial imaging raised concerns for malignancy. Bronchoscopy with bronchoalveolar lavage (BAL) and transbronchial lung biopsy confirmed Nocardia spp. infection. The patient was treated with oral trimethoprim-sulfamethoxazole (TMP-SMX) and achieved complete resolution. We are adding to the literature this case to underscore the importance of considering pulmonary nocardiosis in the differential diagnosis of cavitary lung lesions.

- Received Date: 15 Sep 2025
- Accepted Date: 25 Sep 2025
- Publication Date: 30 Sep 2025

Keywords

Nocardiosis; Nocardia; Lung Cavitary Lesion
Chronic Productive Cough.

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Introduction

Pulmonary nocardiosis is an infrequent but severe opportunistic infection typified by necrotic or cavitary consolidation in an immunocompromised patients.

We report the case of nocardiosis mimicking lung cancer.

Case Presentation

A 70-year-old woman with a history of type 2 diabetes mellitus, hypertension, and a 50-pack-year smoking history presented with a two-month history of productive cough following exposure to paint fumes. Patient reported significant weight loss. She was afebrile (37.1°C), with an oxygen saturation of 97% on room air, and a respiratory rate of 16 breaths per minute. Chest X-ray imaging revealed cavitary lesion in the left upper and lower lobes associated with rounded opacity in the right side (Figure 1), CT chest was done for further assessment showing bilateral lobulated cavitations, the largest one at the left side raising concern for malignancy (Figure 2). Bronchoscopy with bronchoalveolar lavage (BAL) and transbronchial lung biopsy (TBLB) was performed. BAL fluid analysis showed a predominance of neutrophils, with direct Gram staining revealing Gram-positive, branching filamentous organisms. Modified Ziehl–Nelsen staining demonstrated weakly acid-fast organisms. Culture of BAL fluid grew *Nocardia* spp. within 5–7 days, confirming the diagnosis. TBLB specimens exhibited suppurative necrosis with granulomatous inflammation. Special

stains revealed filamentous bacteria consistent with *Nocardia* spp., and cultures from biopsy specimens also yielded the organism. Laboratory investigations revealed a normal complete blood count (CBC) and C-reactive protein (CRP) levels, indicating the absence of significant systemic inflammation. Renal function was assessed with a serum creatinine level of 1.1 mg/dL, which remained stable upon follow-up, suggesting no renal toxicity associated with the infection or its treatment. The patient was initiated on oral trimethoprim-sulfamethoxazole (TMP-SMX) at a dose of 320 mg TMP every 12 hours (2 double-strength tablets), totaling approximately 9 mg/kg/day of TMP. She completed a six-month course without adverse effects, and follow-up imaging showed complete resolution of the pulmonary lesions.

Discussion

Pulmonary nocardiosis is a rare but significant infection that can present with radiological findings mimicking other pulmonary pathologies [1,2]. The differential diagnosis for cavitary lung lesions includes pulmonary tuberculosis, fungal infections such as aspergillosis, lung cancer (particularly squamous cell carcinoma), bacterial lung abscesses, and septic pulmonary embolism [3]. Given these overlapping presentations, microbiological confirmation through bronchoalveolar lavage (BAL) and tissue biopsy is crucial for accurate diagnosis. The cornerstone of therapy for pulmonary nocardiosis is trimethoprim-sulfamethoxazole

Citation: Hammoud N, Alrashidi M, Kodeimat Y, Kteiche W, Alrajihi B, Termos S. Pulmonary Nocardiosis Mimicking Lung Cancer: A Case Report. Arch Pulm Med. 2025;1(1):001.

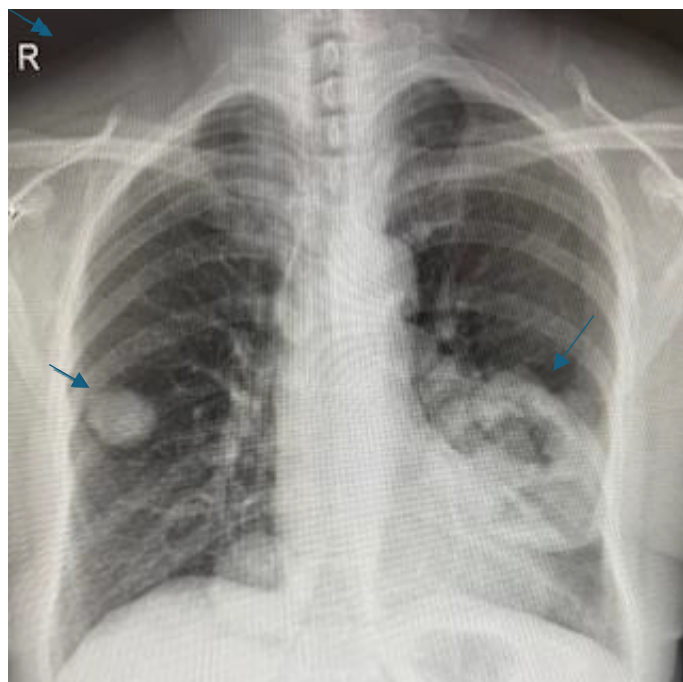


Figure 1: Right middle lobe rounded opacity, Left lower cavitary lesion

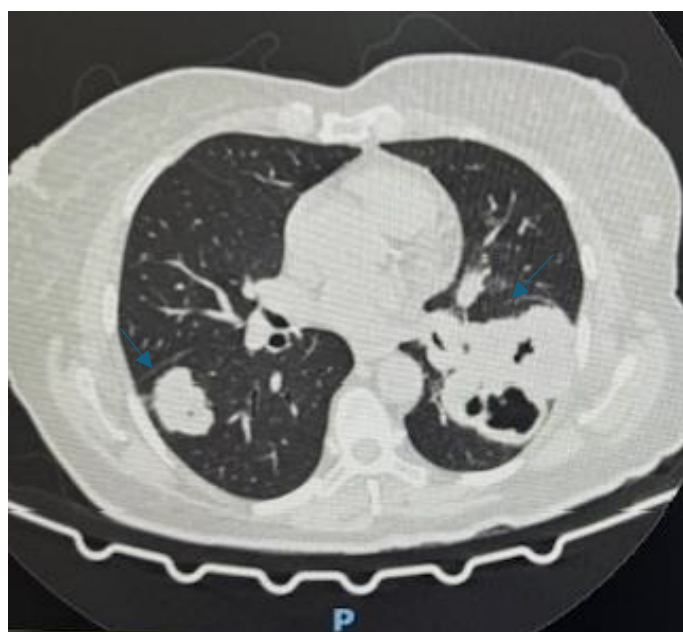


Figure 2: Bilateral cavitary mass lesions with lobulated contour noted at right lower and the left upper/lower lobes.

(TMP-SMX). For patients with severe disease or those who cannot tolerate TMP-SMX, alternative treatments include amikacin or imipenem, often used in combination with TMP-SMX, and linezolid for multidrug-resistant strains [4]. Adjunctive therapies such as corticosteroids may be considered in cases with significant inflammation or central nervous system involvement [5]. Our patient's six month course of oral TMP SMX resulted in clinical and radiologic resolution with no hematologic or renal toxicity, aligning well with published



Figure 3: Complete resolution of the previous pulmonary lesions.

outcomes.

Studies show that 6–12 months of therapy is the preferred duration for pulmonary nocardiosis, particularly in non-disseminated cases, to minimize relapse [6]. Retrospective data from 99 patients treated at multiple centers reported a 92% rate of clinical improvement using various regimens, most commonly TMP SMX monotherapy [7]. In another cohort, patients whose disease was controlled had a significantly longer mean TMP SMX duration (~67.5 days) than those who relapsed or died (~9 days), underscoring the value of prolonged therapy [8]. Importantly, lower and intermediate dose regimens (5–10 mg TMP/kg/day) were associated with lower one-year mortality and fewer dose adjustments compared to high-dose regimens [9] supporting our choice of moderate dosing over the full six months, with excellent tolerability.

Regular follow-up includes clinical assessment, radiological imaging, and monitoring for potential relapse. Our patient demonstrated full clinical recovery and complete radiological resolution. A repeat CXR at six months revealed no residual cavities or pulmonary lesions (Figure 3)

In summary, early recognition and appropriate antimicrobial therapy are essential for the successful management of pulmonary nocardiosis. Clinicians should maintain a high index of suspicion, especially in patients with risk factors such as diabetes mellitus, smoking, and immunosuppression.

Conclusion

This case highlights the importance of considering pulmonary nocardiosis in the differential diagnosis of cavitary lung lesions, particularly in patients with underlying risk factors. Early diagnosis and appropriate antimicrobial therapy are crucial for favorable outcomes.

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