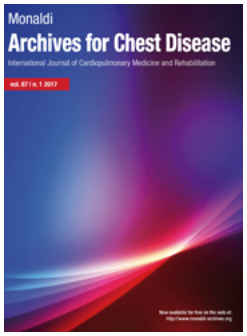

Monaldi Archives for Chest Disease

eISSN 2532-5264 https://www.monaldi-archives.org/

Monaldi Arch Chest Dis 2023 [Online ahead of print]

To cite this Article:
Joseph CG, Mohapatra MM, Rajaram M, et al. **Fungal pneumonia concealing bacterial pneumonia: a diagnostic dilemma** *Monaldi Arch Chest Dis* doi: 10.4081/monaldi.2023.2683

Fungal pneumonia concealing bacterial pneumonia: a diagnostic dilemma

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Conflicts of Interest: None

Availability of data and materials: All data underlying the findings are fully available.

Ethics approval and consent to participate: No ethical committee approval was required for this case report by the Department, because this article does not contain any studies with human participants or animals.

Informed consent was obtained from the patient's relatives.

Consent for publication: The patient's relatives gave their written consent to use his personal data for the publication of this case report and any accompanying images.

Abstract

We describe the case of a 61-year-old diabetic man affected by *Achromobacter denitrificans*. He was immunocompetent and did not have any past history of chronic lung disease. The patient was treated with sensitive antibiotic meropenem 1 g three times daily. To our knowledge, only one case of *A. denitrificans* pneumonia has been reported from the Indian subcontinent, in an individual with underlying lung disease, and none in a healthy person.

Keywords: *Achromobacter denitrificans*, cavity, immunocompetent, pneumonia

Introduction

Achromobacter denitrificans is a gram negative, mobile rod which uncommonly causes clinical symptoms when compared to its clinically significant co-species, *A. xylosoxidans*. Despite an increasing number of published case reports and literature reviews suggesting a global increase in Achromobacterial disease, most clinicians remain uncertain of the organism's significance when clinically isolated [1]. In addition, treatment is often challenging due to its inherent and acquired multidrug resistance patterns. We present a case report of a 61 years old male with diabetes mellitus and bilateral multi-lobar lung cavities with consolidation due to *A. denitrificans*.

Case Report

A 61-year-old male, farmer by occupation, hailing from southern Tamil Nadu, presented to our hospital with productive cough with brownish sputum, shortness of breath and hemoptysis of 2 weeks duration. Haemoptysis was mild with bloodstreaked sputum. He had no complaints of fever or chest pain. He was a reformed alcoholic, and an ex-smoker with a pack year of 10. He was a known case of diabetes mellitus for last 6 years, not on any medications, with no other co-morbidities. He had no history of recurrent pneumonia, sinusitis or foul-smelling greasy stools. He had a pulse rate of 98 beats/minute, BP-110/68 mmHg and RR-16-20rate/minute on admission. His respiratory system examination revealed no abnormality on inspection, palpation and percussion with cavernous bronchial breath sounds in the bilateral axillary and infra-scapular areas on auscultation. His TLC was 13500/cu mm, neutrophil predominant with Hb 12.5 g/dl and platelets 188000/cu mm. Serum electrolytes, renal and liver function tests were within normal limits. Arterial blood gas analysis at admission showed pH 7.48, Pco_2 32.8,

Po_2 64.9. SO_2 93.9. HCO_3 24.9. Chest roentgenograph at admission (Figure 1A) showed bilateral lower zone non homogenous opacities with cavities. Sputum was sent for gram stain and culture, fungal staining with potassium hydroxide (KOH) and culture and acid-fast bacilli staining (AFB). He was empirically started on injection piperacillin-tazobactam. A contrast enhanced CT thorax showed multiple bilateral thick-walled cavities with surrounding consolidation in bilateral apical lobe posterior segments, lingula, right middle lobe and bilateral lower lobe apical segments (Figure 1B). There were no nodules or associated pleural effusion. Radiological features were suggestive of mucormycosis with a background of deranged RBS and Hb1ac of 18. Hence, injectable liposomal amphotericin was started in view of suspected mucormycosis. His RT-PCR for COVID-19 was negative and he did not give any history of admission due to COVID-19 in the recent past. Blood cultures drawn were sterile. KOH and AFB staining, fungal and mycobacterial cultures were negative. Sputum pyogenic culture grew *A.r denitrificans* sensitive to piperacillin-tazobactam, hence the same was continued. However, repeat X-ray and CT thorax on 8th day showed increase in the cavitary lesions (Figure 1 C,D). Therefore, a decision to do fibre-optic bronchoscopy was taken. Bronchoscopy showed whitish purulent secretions in the trachea and the left bronchial tree with no other abnormalities. Bronchoalveolar lavage (BAL) was taken from bilateral lower lobes which showed the growth of *A. denitrificans*, sensitive to meropenem and resistant to piperacillin. BAL fluid was negative for fungus and AFB staining and culture. BAL fluid CBNAAT did not detect MTB. Hence antibiotics were hiked up to meropenem 1g thrice daily and Amphotericin B was stopped However, he continued to have episodes of hemoptysis despite antifibrinolytics and cough suppressants and serial X-rays showed increase in the size of the cavitary lesions. He was not a surgical candidate in view of bilateral cavitary lesions, and received Meropenem for 2 weeks. Following a prolonged course in the hospital, he had an episode of massive hemoptysis with hemodynamic instability and went into cardiac arrest, and could not be revived.

Discussion

Achromobacter denitrificans is a rare clinical isolate compared to its co-species *A. xylosoxidans*. A gram negative, mobile, strictly aerobic, ubiquitous bacterium not fermenting glucose, oxidase and catalase positive, it inhabits soil and aquatic environments, including well water, intravenous fluids and water in humidifiers [2].

There are only around 5 case reports of pulmonary infections by *A. denitrificans* worldwide [3]. In all previous cases of pulmonary infections by *A. denitrificans* except one [3], the presence of pre-existing lung disease has been noted to be a predisposing factor. Whereas *A. xylosoxidans*

is a known pathogen in individuals with cystic fibrosis (CF), bronchiectasis or immunosuppression was the predisposing factor in all cases of *A. denitrificans* reported. The other case reported from India, of a 45-year-old male, had previous history of pulmonary tuberculosis with right upper lobe cavity and bilateral bronchiectasis [4]. He too presented with hemoptysis and two separate samples showed the presence of *A. denitrificans* without any contamination. He was managed with meropenem for 14 days, and showed clinical improvement. Pneumonia and bacteremia are the two most common clinical presentations of *Achromobacter* infections in non-CF hosts In our case, the patient presented with bilateral cavitary consolidation. The usual causes of the same such as pulmonary tuberculosis and fungal infection (in view of uncontrolled diabetes) were worked up for, and came negative. As sputum cultures on two separate occasions and BAL grew *A. denitrificans*, without any contamination, the lung lesions could not be attributed to any other cause. A similar picture of right upper lobe ground glass and cavitary opacities, has been reported with septic arthritis with septic pulmonary emboli [5]. No features of other foci of infection could be identified in our patient.

Achromobacter infections are notorious for antibiotic resistance. In our case too, although the initial sputum culture sensitivity showed piperacillin-tazobactam sensitivity and the injectable drug was continued for 11 days, BAL done in view of radiological worsening isolated the same organism, sensitive to meropenem alone. The response of the organism to carbapenems is well documented in literature [6].

We theorise that the progressive lesions in our patient could have been due to this antibiotic resistance. This is supported by the fact that all *Achromobacter* isolates were of good quality, no other organism was isolated and that he received prophylactic antifungals, and worsened despite the same. *Achromobacter* pneumonia has been reported to have a case fatality rate of -64% [7].

Conclusions

Despite worldwide focus on emerging pathogens following the SARS-CoV-2 pandemic, organisms such as *A. denitrificans*, being an uncommon isolation, are either overlooked or discarded as a contaminant. Given its high fatality rate in serious infections and multi-drug resistance pattern, all such cases need to be documented and studied for better clinical decisions and outcomes.

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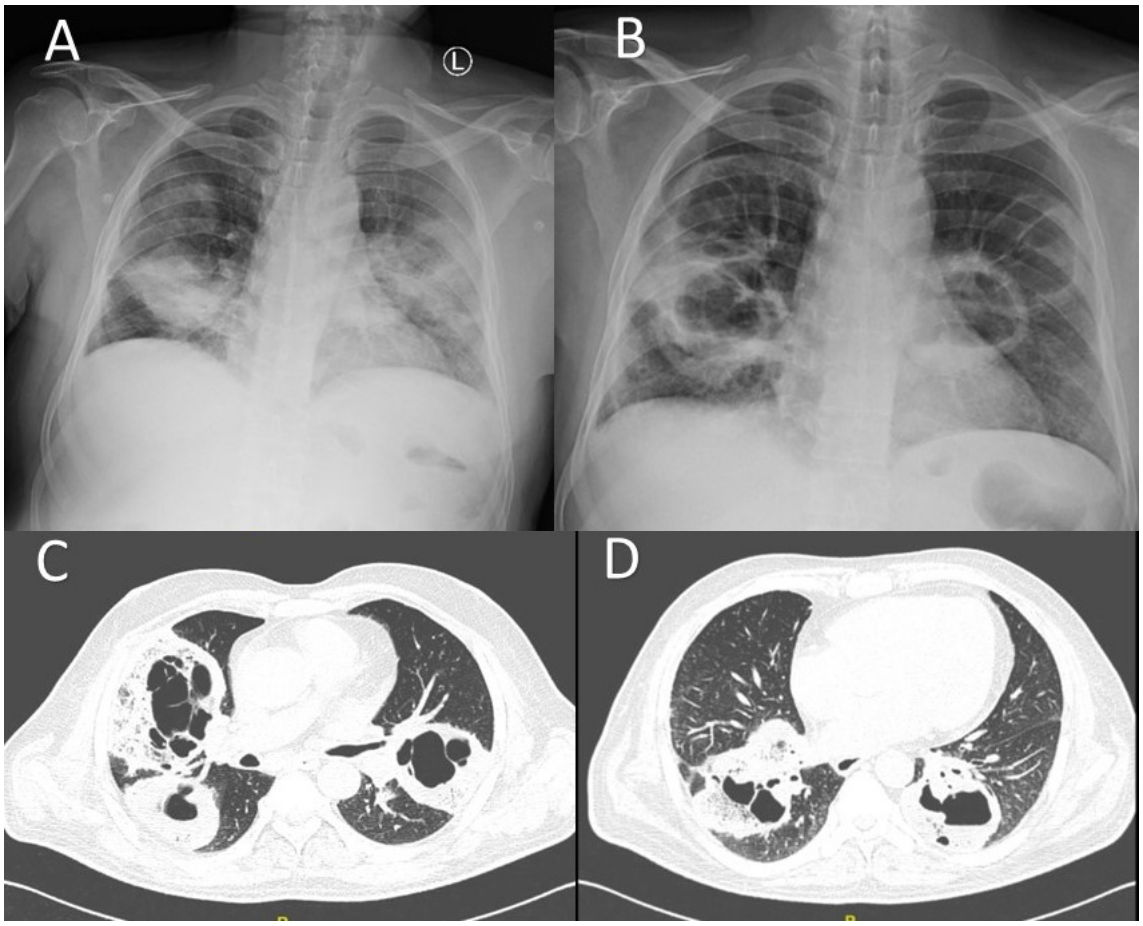

Figure 1. A,B) Chest roentgenograph at admission and 8 days later. C,D) CT thorax showing bilateral cavities with peri-cavitary consolidation.