



Case report

Coinfection by *Nocardia beijingensis* and *Nocardia arthritidis* in an immunocompromised patient diagnosed by endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA)[☆]



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A B S T R A C T

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2 different strains of *Nocardia* were isolated from a lung mass in a post kidney-pancreas transplant patient through convex endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA). TBNA cultures (16S rRNA gene-targeted PCR sequencing) subsequently grew *Nocardia beijingensis* and *Nocardia arthritidis*.

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Case presentation

A 50 year-old immunosuppressed Caucasian female presented to her primary care physician's office with a dry cough. Her past medical history was significant for simultaneous kidney and pancreas transplant in May 2010 for type I diabetes mellitus and end-stage renal disease on hemodialysis. She was placed on tacrolimus, prednisone, and mycophenolate mofetil for immunosuppression. Her post-transplant course was unremarkable except for an episode of acute calculous cholecystitis in October 2010 which was treated with intravenous antibiotics for 6 weeks and then a laparoscopic cholecystectomy.

She developed a nonproductive cough in late March 2011 and was treated with amoxicillin-clavulanate 875 mg twice a day, for a total of 14 days. She denied any fever, chills or hemoptysis. Her cough resolved at day 4 of treatment. A follow-up chest X-ray (CXR) revealed a 3 cm rounded mass in the right upper lobe medially which was new when compared to a prior from October 2010. A computed tomography (CT) of the chest from April 5th showed a 2.6 by 1.5 cm irregularly shaped, medially located mass in the right upper lobe (RUL) medially which corresponded to the abnormality on the CXR. (Picture 1) The CT scan of the chest also showed a noncalcified 10 mm by 6 mm nodule in the right lower lobe along

with multiple calcified nodules in both lungs along with calcified adenopathy.

Due to the high probability of an infectious etiology and the central location of the mass, it was decided to obtain the sample via bronchoscopy. Convex endobronchial ultrasound (EBUS) bronchoscopy was used to locate a retrotracheal necrotic mass 1 cm superior to the carina and multiple transbronchial needle aspiration (TBNA) passes were performed with a 21 gauge needle. In addition, an electromagnetic navigation bronchoscopy was performed but not completed due to lack of definite airway into the lung mass, but transbronchial biopsies, bronchial brushings and a bronchioalveolar lavage were performed in the apical segment of the right upper lobe. Cytology and cultures for acid fast bacilli (AFB), bacteria, fungal, actinomycosis and nocardia were sent from the right retrotracheal site and the apical segment of the right upper lobe. Results from the EBUS-TBNA of the retrotracheal nodule showed slender branching organisms morphologically consistent with filamentous bacteria which were AFB negative (Picture 2). This later was confirmed to be *Nocardia beijingensis* and *Nocardia arthritidis* by 16S rRNA gene-targeted PCR sequencing. The patient was placed on high dose sulfamethoxazole/trimethoprim for 6 months, while her immunosuppressive therapy was reduced. Patient remained asymptomatic on follow-up appointments. Unfortunately, due to insurance issues, a follow-up imaging study could not be completed.

Discussion

Nocardia is a ubiquitous Gram positive aerobic actinomycetes that usually affects immunocompromised patients. Nocardiosis is mainly an opportunistic infection, but can also affect

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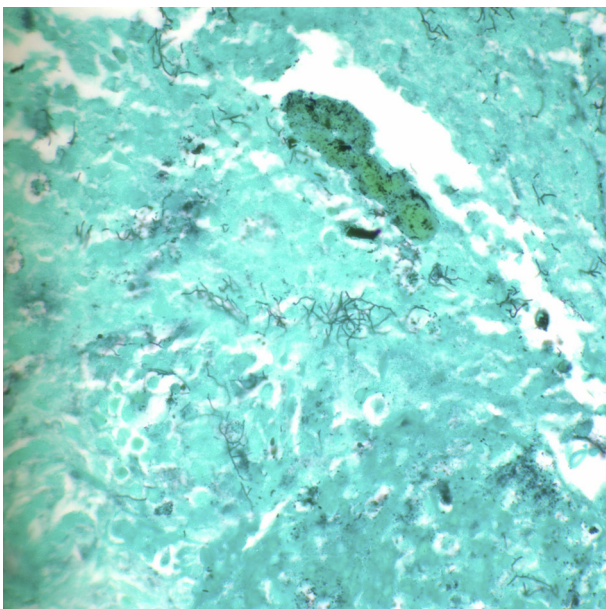


Picture 1. CT of the chest with right upper lobe mass.

immunocompetent hosts [1]. Inoculation occurs via inhalation. The *Nocardia* genus includes a variety of species that are important pathogens in humans. The most common species causing human infection is the *Nocardia asteroides* complex, which includes *N. asteroides sensu stricto* type VI, *Nocardia farcinica*, *Nocardia nova* and recently *Nocardia abscessus*. Other pathogens include *Nocardia brasiliensis*, *Nocardia pseudobrasiliensis*, *Nocardia otitidiscaviarum* and *Nocardia transvalensis* [2,3].

Pulmonary nocardiosis is an infrequent but severe infection that can present as an acute, subacute or chronic suppurative disease, mimicking a lung abscess or carcinoma. Pulmonary nocardiosis is difficult to diagnose based on clinical and radiological findings [4]. As such, microbiological diagnosis is mandatory from lung specimens: sputum, pleural fluid, pleural biopsy, bronchioalveolar lavage (BAL), protected brushings and even abscess puncture sampling has been described [3,4].

Recent publications regarding nocardiosis have described the emergence of new species. *N. beijingensis* was first isolated back in 2001 [5]. The first report of human infection was made by Kageyama et al. [6] back in 2004. Since then, a few other reports of



Picture 2. Gomori methenamine silver (GMS) stain with *Nocardia beijingensis* and *Nocardia arthritidis*.

N. beijingensis infection have been published [7–10]. On the other hand, *N. arthritidis* was also described as a human pathogen back in 2004. In this paper, the authors establish that *N. beijingensis* and *N. arthritidis* are closely related [11]. No other single report of *N. arthritidis* has been published.

Given the paucity of symptoms in this patient and the central location of the pulmonary nodule, bronchoscopy was advised as the preferred diagnostic test. Based on the CT of the chest and the high paratracheal location, EBUS-TBNA was favored over conventional TBNA. Through real time ultrasound evaluation, EBUS-TBNA of the retrotracheal nodule with a 21-gauge needle established coinfection of *N. beijingensis* and *N. arthritidis*. As described in the literature [12], this patient was treated with sulfamethoxazole-trimethoprim with good clinical response.

Numerous publications establish EBUS-TBNA as a useful tool for lung cancer staging through lymph node biopsies [13–15]. But more recently, EBUS-TBNA has been useful for diagnosing benign disease such as sarcoidosis, tuberculosis, histoplasmosis, blastomycosis and nocardiosis [16,17]. As described by Fujikura et al. [16], EBUS-TBNA proved its diagnostic value for this patient in a safe manner.

To our knowledge, this is the second case report of nocardiosis diagnosed by EBUS-TBNA, and the first one to demonstrate coinfection with *N. beijingensis* and *N. arthritidis*.

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