

Atypical presentation of a novel species of disseminated nocardiosis in an immunocompetent host

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Introduction: Nocardia is gram positive branching rod which is found in soil and decaying vegetation and infects predominantly immunocompromised hosts. Common sites of infection include pulmonary, cutaneous and the central nervous system. Infection is rare with an estimated incidence of 500-1000 cases annually. Prognosis largely depends on species, site and extent of infection, ranging from near 100% recovery in isolated cutaneous infections, 90% in pulmonary disease and 50% with nervous system involvement.

Case: In this case report, we describe a 52-year-old immunocompetent male who presented to the emergency department multiple times the month prior to admission with progressively worsening right ankle and wrist pain, generalized myalgia, fatigue and worsening hoarseness of voice. His past medical history was notable for acute lymphoblastic leukemia complicated by aspergillus pneumonia, his leukemia has been in remission for 2 years. On the presentation requiring admission the patient was septic with tachycardia, tachypnea, had a lactate of 2.3 and white blood cell count of 17,000. On presentation patient was fatigued and ashen in color, dermatological findings included multiple subcutaneous nodules of the anterior chest, upper extremities, and thighs bilaterally, additionally erythema and edema of the right lateral ankle. Respiratory exam revealed mild respiratory distress with diminished lung sounds in the lung bases bilaterally, with audible inspiratory and expiratory wheeze, and 5-6 word dyspnea. His clinical course included imaging studies and wound culture which demonstrated disseminated nocardiosis, with involvement of the lungs, brain, skin, as well as several intramuscular areas. Cardiac involvement was ruled out by transesophageal echocardiogram. Acute lymphoblastic leukemia recurrence was ruled out by flow cytometry. His course also included multiple incision and drainage procedures of the right and left lower extremity with placement of vacuum assisted closure dressings. As Nocardia species have varying susceptibility to antibiotics he was empirically started on IV meropenem and IV Bactrim. Culture and sensitivity demonstrated "*Nocardia vulneris*" a rare and newly identified species with resistance to meropenem, all documented strains of *Nocardia vulneris* to date have carbapenem resistance. After clinical improvement, he was discharged on Bactrim DS and ceftriaxone (IV home infusion). As of 4 weeks post discharge his hoarseness continues to abate and tolerance to ambulation has slowly improved.

Discussion: Nocardia frequently infects the immunocompromised, however in this case we observed a disseminated infection in an immunocompetent patient. *Nocardia vulneris* is a novel species of Nocardia initially reported in 2014. 8 Isolates submitted to the special bacteriology reference laboratory were identified by 16S rRNA gene sequencing. Due to various genotypic and phenotypic properties a novel species was proposed. The case was additionally atypical in that frequently Nocardia presents as a pulmonary disease and here presents with hoarseness of voice, joint pain and myalgia.

Public health impact/importance: While Nocardia is unlikely to pose a widespread infectious threat the case does remain interesting. *Nocardia vulneris* cases have been all confined to the US and Canada, all

were in males over the age of 45 and have been resistant to carbapenem antibiotics while many species of Nocardia are susceptible.

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