First case of prosthetic joint infection due to *Nocardia veterana-elegans*

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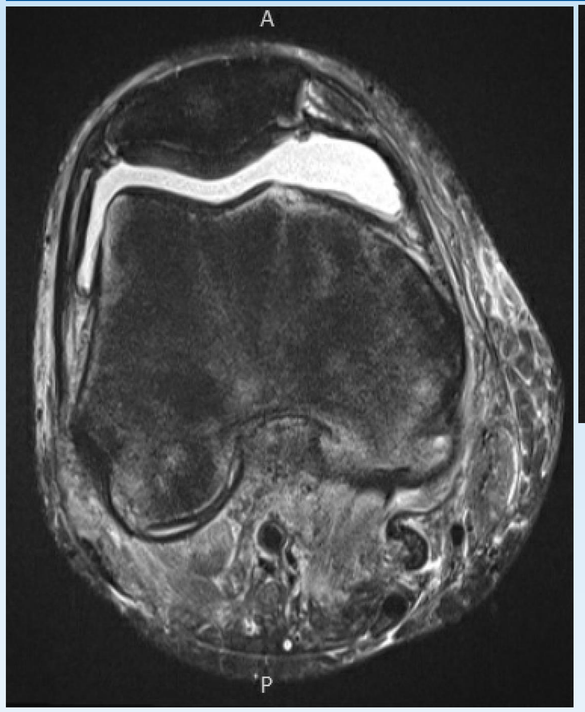
Background

- *Noardia* are ubiquitous, saprophytic, filamentous Gram positive bacilli that belong to the aerobic Actinomycetes group.
- They can appear similar to *Actinomyces* species on Gram's staining. An acid fast bacillus (AFB) stain can usually distinguish the two as *Nocardia* are usually acid fast, due to the mycolic acid content of their cell wall.
- *Noardia* were first isolated in 1888 from cattle suffering from "bovine farcy" by the French veterinarian, Edward Nocard
- The first case in humans was reported by Eppinger in 1890, from a patient with brain abscess, and the isolate was named *Nocardia asteroides.* Molecular diagnostic techniques are now accurately able to identify *Nocardia* to the species level.
- *Nocardia* species are now grouped into the following prominent complexes:

N. nova, N. farcinica, N. cyriacigeorgica, N. transvalensis, N. brevicatena/paucivorans, N. abscessus and N. otitidiscavarium.

- *Nocardia* species are present worldwide in soil, plants and water. The predominant mode of entry of Nocardia in humans is considered to be via inhalation. The other less commonly encountered mode is cutaneous by direct inoculation.
- Nocardia infections are uncommon and the organisms are for the most part opportunistic pathogens in immunocompromised patients.
- The lungs are the main site of infection in humans, being involved in up to seventy-five percent of cases.
- Cutaneous involvement from Nocardia is uncommon and usually presents as a primary infection of the skin.
- Bone and joint disease due to Nocardia is very uncommon. We performed a literature review using Pubmed and found only 37 cases of septic arthritis reported thus far, including our case.
- Only five cases of prosthetic joint infection due to Nocardia have been previously reported.
- We report the first case of prosthetic joint infection due to *Nocardia veterans-elegans.*

MRI knee



Axial and Sagittal view of the knee: Moderate joint effusion. Extensive patchy marrow edema along the femoral condyles, tibial plateau, and fibular head. Extensive edema within the soft tissues circumferentially surrounding the joint.

Discussion

- Prosthetic joint septic arthritis due to *Nocardia spp.* is rare.
- A literature search revealed only six cases, including our case. Three cases were due to *N. nova,* and one each due to *N. asteroides* and *N. farcinica.*
- The presented patient is the first reported case due to *N. veterans-elegans.*
- The joints involved were knee (4 cases) and hip (2 cases).
- All the patients had surgical intervention performed – four had the prosthetic joint removed, while one each had debridement with joint retention and a one-stage exchange.
- The median duration of antibiotic therapy was 11 months, with a favorable outcome in all patients.

Case Presentation

The patient is a 35 year old male with a history of Hodgkin's Lymphoma for which he received chemotherapy in 2017, coronary artery disease, poorly controlled diabetes, tobacco use and motor vehicle accident in 2003 with right open tibial plateau fracture, requiring hardware placement, who was admitted to the hospital earlier this year with a two week history of right knee pain and swelling.

The right knee pain progressively worsened that led to difficulty with ambulation. He denied fevers, chills or sweats. No history of falls or trauma to his right knee. Patient denied any history of STDs and was monogamous. There was no history of recent travel or tick exposure.

Magnetic resonance imaging (MRI) scan of the knee (as shown in pictures) was performed which showed findings concerning for septic arthritis. The knee was aspirated revealing grossly purulent fluid. Synovial fluid analysis showed a white cell count of 22,090 with 78% neutrophils.

The patient underwent right knee arthrotomy and debridement with removal of right tibial hardware. Synovial fluid culture from the initial joint aspirate as well as the culture from the surgical debridement grew Nocardia species, which was subsequently identified as *Nocardia veterans-elegans,* sensitive to trimethoprim/sulfamethoxazole, linezolid, clarithromycin, imipenem and amikacin. He was placed on oral linezolid for four weeks, after which he was switched to oral trimethoprim/sulfamethoxazole, with a plan for at least a six month course of therapy.

The patient has completed 4 months of therapy with trimethoprim/sulfamethoxazole thus far and is doing well at the time of this writing.

Conclusions

Nocardia is an uncommon cause of septic arthritis.

Prosthetic joint infection is extremely rare.

Our patient is the first reported case of prosthetic joint infection due to *N. veterans-elegans.*

Overall prognosis is fair with prolonged antibiotic therapy, and device removal in case of prosthetic joint infection.

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