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REVIEW

Actinomyces meyeri infection: Case report and review of the literature

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Summary *Actinomyces meyeri* is an uncommon cause of actinomycosis. We present a patient with pneumonia and empyema due to *A. meyeri*. The patient underwent open thoracotomy with decortication and was discharged home on a twelve-month course of oral penicillin. Review of the English literature revealed thirty-two cases of infection due to *A. meyeri*. The majority of patients were male, and a significant number had poor dental hygiene and a history of alcoholism. More than other *Actinomyces* species, *A. meyeri* causes pulmonary infection and has a predilection for dissemination. Prognosis is favorable with prolonged penicillin therapy combined with surgical debridement, if needed.

Members of the genus *Actinomyces* were first described in the early nineteenth century.[4] *Actinomyces bovis* was the first of the group now considered to be *Actinomyces*, to be isolated from purulent drainage from "lumpy jaw" in cattle. Although an agent of disease in cattle, *A. bovis* has not been reported as a human pathogen. The first human cases of actinomycosis were reported in the late nineteenth century and *Actinomyces israelii* was identified as the main human pathogen.[4] *Actinomyces meyeri* is an uncommon cause of actinomycosis.

A. meyeri was initially isolated from a patient in the early twentieth century.[3] Since then, this organism has rarely been reported as an agent of human disease, therefore the disease spectrum is somewhat unclear. We report a case of pulmonary actinomycosis due to *A. meyeri* and review the currently available literature.

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Case report

The patient is a 45-year-old male with no significant past medical history who was admitted to the hospital with a four-month history of intermittent fever and a predominantly dry cough. About a month prior to admission, his cough worsened and he developed pleuritic left sided chest pain. There was no history of alcohol use. On admission, the patient appeared chronically ill but non-toxic. His vital signs were stable except for mild tachycardia. Examination of the mouth revealed him to be partly edentulous with poor dental hygiene. There was no evidence of a dental abscess. Chest exam revealed diminished breath sounds in the left infra-axillary area. His labs were significant for mild leukocytosis (WBC 13,000/mm^3) and mild anemia (Hemoglobin 9.0 g/dl). Kidney and liver function tests were within normal limits. A chest radiograph showed a left perihilar infiltrate. A computerized axial tomographic (CT) scan of the chest showed a patchy infiltrate in the posterior upper lung with a central air cavity measuring 2.9 $\times$ 0.7 cm and a small left sided pleural effusion (Fig. 1). The patient was placed on moxifloxacin and clindamycin for presumed community acquired/aspiration pneumonia. His pleural effusion worsened and thoracentesis was performed. Subsequently, open left thoracotomy with decortication and drainage of an empyema was accomplished. Histopathology of the pleura revealed reactive fibroblastic tissue with fibrin and acute inflammation, consistent with empyema. Pleural fluid and lung tissue specimens grew *Actinomyces* species in pure culture (both aerobic and anaerobic), which was identified as *A. meyeri* using the RapID ANA II system (Remel, Lenexa, KS). Gram-stain of the colony growth revealed beaded gram-positive rods. Fungal and acid-fast bacillus cultures remained negative. All his remaining teeth were extracted. The patient's antibiotic regimen was switched to intravenous penicillin for two weeks in the hospital and he was discharged home to complete a twelve-month course of oral penicillin. Unfortunately, he was lost to follow-up after discharge.

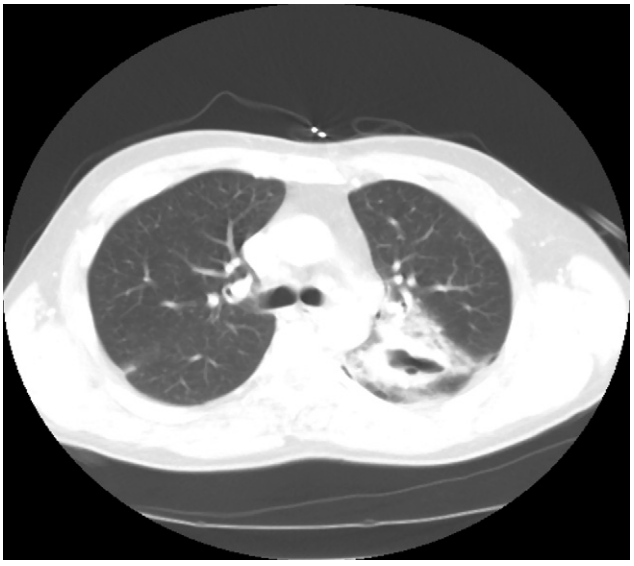

Figure 1 CT scan of chest demonstrating patchy infiltrate and a central cavity.

Results

An English language literature search for reports of infections due to *A. meyeri* identified 32 cases of human infection (Table 1).

The male to female ratio was 2:1. The mean age of the patients was 43.5 years, ranging from 13 to 72 years. Two-thirds of the patients were between 35 and 65 years of age. Documented dental/gingival infection was described in 11 of the 32 patients (34%). A history of alcoholism was reported in 12 patients (37%).

The most frequent site of infection was pulmonary. Fourteen patients (43%) had evidence of pneumonia, with six of them having empyema and seven having disseminated disease of skin, muscle, brain and liver. The gastrointestinal tract was involved in six patients (18%). Of these, four patients had liver abscesses, one patient each had a subphrenic abscess and perianal abscess. The subphrenic abscess was thought to be related to bile spillage from an earlier laparoscopic cholecystectomy. Skin and soft tissue abscesses were found in six patients (18%). Four patients had cutaneous abscesses, all resulting from disseminated disease. Two patients had breast abscesses. Osteomyelitis was present in five patients (15%), three of which had prior trauma or surgery. Brain abscesses were seen in three patients (9%). Two of these patients had pneumonia. Cervicofacial disease was found in three patients (9%). Two patients had endocarditis, while one patient each had postoperative endophthalmitis and funisitis. More than one-half of the patients had polymicrobial infection, with the preponderance being bacteria of the oral flora.

The treatment of *A. meyeri* was medical alone in 23 of the 33 patients (69%), combined medical and surgical in 7 of 33 patients (21%) and surgical alone in 3 of 33 patients (10%). Two of the patients in the combined treatment regimen had percutaneous drainage of their abscesses (involving the liver). The duration of antibiotic therapy ranged from one to seventeen months. The outcome of disease was favorable even in patients with disseminated disease and all but one patient survived.[2]

Discussion

Actinomycosis is a chronic infection caused by organisms in the genus *Actinomyces*, with *A. israelii* being the most common etiologic agent. Other species that have been reported as human pathogens include *A. naeslundii*, *A. viscosus*, *A. odontolyticus*, *A. gerencseriae* and *A. meyeri*. Recent advances in microbiologic identification techniques, especially 16S ribosomal RNA sequencing, have identified new *Actinomyces* species, which are also being reported as human pathogens. These species include *A. europaeus*, *A. neuii*, *A. radingae*, *A. graevenitzii*, *A. turicensis*, *A. georgiae*, *A. funkei*, *A. lingnae*, *A. houstonesis* and *A. cardiffensis*.[31]

Actinomyces are part of the normal flora of the oral, gastrointestinal and genital tract. They normally act as commensal organisms and become pathogenic only in the setting of mucosal breakdown. Resultant infections involve the oral/cervicofacial, intraabdominal and genitourinary regions. Pulmonary infections are believed to occur due