Nocardia asteroides osteomyelitis

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Summary: *Nocardia asteroides* osteomyelitis has previously been described only in acutely ill patients. It may occur as an isolated event or part of the disease spectrum of disseminated nocardiosis.

An 84 year old immune competent man with *N. asteroides* right tibial osteomyelitis had an unusual presentation, presumed mechanism of disease and outcome. His course affords an opportunity to review the literature on *N. asteroides* osteomyelitis and to discuss the unique features of his case.

Introduction

Nocardia asteroides has been viewed with new interest by many authors (Beaman *et al.*, 1976; Bujak *et al.*, 1973; Curry, 1980; Frazier *et al.*, 1975; LeFrock & Molavi, 1982; Newman & Burdick, 1973; Young *et al.*, 1971). Documentation is mounting with regard to disease caused by this aerobic, Gram positive, weakly acid-fast, filamentous bacterium. Although its predilection to cause disseminated disease in the immune compromised host and varied pulmonary involvement from infiltrates to necrotizing pneumonitis is well known, much less has been written on disease in extrapulmonary sites in normal hosts (Yanoff & Church, 1983).

Nocardiosis in these sites, such as kidney, brain and bone, is considered to be the result of haematogenous dissemination or direct inoculation of the skin during trauma (Beaman *et al.*, 1976). Cases of culture documented *N. asteroides* osteomyelitis have followed this pattern (Bianco *et al.*, 1957; Cruz & Clancy, 1952; Dolan *et al.*, 1960; Frazier *et al.*, 1975; Martin *et al.*, 1972; Yanoff & Church, 1983). All these patients were acutely ill on presentation.

An immune competent 84 year old man with right tibial *N. asteroides* osteomyelitis had an unusual presentation, presumed mechanism of disease, and outcome. His course forms the basis of this report.

Case report

The patient was admitted for pain and tenderness in the right lower leg of 4 days duration. The pain was

described as non-radiating and dull. His range of motion at the right knee joint was markedly decreased. An indurated, tender 1 × 2 cm area of cellulitis with central fluctuance was present 8 cm below the right knee, anterolateral aspect. Regional lymphadenopathy was absent.

Past medical history included a history of hypertension and L4–L5 laminectomy. Two months before admission, he sustained a puncture wound to the right foot while wading in a beach in Florida. He was treated locally without initial sequelae.

At the time of admission, the clinical impression was cellulitis. Initial laboratory data showed a normal white cell count and haemoglobin 7.8 g/dl. Chest X-ray only showed change compatible with chronic obstructive pulmonary disease.

The cellulitic area was aspirated and 3 ml of pus were removed. Gram stain of this specimen showed many white cells and no bacteria. The knee joint was subsequently aspirated and had normal synovial fluid. Gram and acid-fast smears of this specimen were negative. He was started on parenteral cefazolin pending these culture results. No systemic signs of infection were present; however, swelling and tenderness increased in the affected area over the next 4 days. All cultures remained negative at this time.

A ⁹⁹Tc bone scan at this time showed increased uptake in the right tibial metaphysis although the initial and follow-up X-rays of the knee were normal.

On the following day, open biopsy and debridement were done.

Work-up for immune competence showed increased serum IgA and IgG. Simultaneous intermediate strength PPD and mumps skin tests were applied, the former remaining negative and the latter becoming positive at 48 hours.

On the 16th day of hospitalization, the initial

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aspirates of tissue and bone grew *N. asteroides* on regular cultures. Repeat chest X-ray showed a right lower lobe infiltrate. Three sets of blood cultures, also taken on this day, were positive for the same organism.

He was started on intravenous trimethoprim/sulphamethoxazole and this was continued for a total of 3 months. The infiltrate persisted for 4 weeks. The cellulitis and osteomyelitis had both resolved at the end of therapy. No residua or evidence of recurrence were present when he was seen 12 months after discharge.

Discussion

Nocard originally described nocardiosis in cattle in 1888. Two years later Eppinger (1890) reported the first human infection, a brain abscess. Human disease is now known to involve almost every major organ system, including lung, brain, kidney, pericardium, eye (LeFrock & Molavi, 1982) and bone.

Two species, *N. asteroides* and *N. brasiliensis* account for most cases. The former is endemic in the United States. Immune compromised hosts are at special risk for disseminated disease (Beaman *et al.*, 1976; Young *et al.*, 1971). The most common presentation is that of pulmonary infiltrates with haematogenous dissemination to subcutaneous tissue and brain (Curry, 1980).

Six culture documented cases of *N. asteroides* osteomyelitis have been described (Bianco *et al.*, 1957; Cruz & Clancy, 1952; Dolan *et al.*, 1960; Frazier *et al.*, 1975; Martin *et al.*, 1972; Yanoff & Church, 1983). A seventh case based on appearance and staining of the

organism has been reported (Newman & Burdick, 1973). All patients with culture documented infection were acutely ill on presentation. Five of the six had no underlying predisposing condition. Multiple organ involvement occurred in one of three cases. Prognosis was better than the overall mortality of 85% reported in patients with disseminated nocardiosis (Frazier *et al.*, 1975).

Our case followed an atypical course. He was never acutely ill and response to a 3 month course of trimethoprim/sulphamethoxazole was complete. Disease did not recur up to one year after discharge.

Although *N. asteroides* was not initially isolated from the site of trauma, we feel this provided the portal of entry. The respiratory route is unlikely because no pulmonary symptoms or infiltrate were present at the time the cellulitis occurred.

In view of these findings, a small nidus of subclinical infection probably existed in the foot which spread presumably by a lymphatic/haematogenous route to the metaphysis of the right tibia and overlying tissue. Pulmonary involvement occurred later, presumably by haematogenous route from this focus.

Two important findings were obtained when a possible tuberculous aetiology was investigated. Tuberculosis was excluded because of the negative skin reactivity and cultures, but more important was the determination of immune competence by virtue of the positive mumps skin test and elevated serum IgA and IgG.

This case provides an intriguing mechanism for *N. asteroides* osteomyelitis as well as an apparently unique presentation in an immune competent host.

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