

ACTINOMYCETOMA DUE TO NOCARDIA BRASILIENSIS IN TAMIL NADU

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Summary

Two cases of actinomycetoma caused by *Nocardia brasiliensis* in Tamilians are reported. Both presented with multiple sinuses discharging serosanguinous material without any granules. In the first case, the lesion was located in the thigh and leg and the specific diagnosis was made by histopathology and isolation of *N. brasiliensis*. In the other, in addition to thigh and leg, the foot was also affected and the causative agent was isolated in pure culture.

The geographic distribution of the organism and its incidence and prevalence are discussed.

Introduction

Actinomycetoma caused by *Nocardia brasiliensis* are common in Mexico, Central and South America and Africa^{1,2}. The first authenticated report of this disease caused by *N. brasiliensis* in India was by Klokke in 1964³. Subsequently 9 cases were reported from Bombay⁴, 13 from Calcutta^{5,6} and one from Madras⁷.

In this paper we present two cases of mycetoma involving the thigh and leg caused by *N. brasiliensis* from Tamil Nadu. In both, the causative agent was isolated by routine culture as well as by paraffin baiting.

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Case Reports

Case 1

A 50 year old agricultural labourer from Vellore, North Arcot district was admitted for multiple sinuses over the left thigh, knee and leg of 4 years duration. There was no history of trauma. The lesion had started as a small swelling in the middle of the left thigh an year earlier and it was incised at the local hospital. The wound failed to heal and multiple nodules slowly developed on the thigh and leg, ulcerated and drained through sinus tracts which remained open for sometime, healed and subsequently opened in other areas discharging seropurulent to purulent material.

Clinical examination revealed extensive ulcerations near the openings of the sinus tracts with flexion contracture of the knee. X-ray of the thigh and leg showed multiple, small periosteal reaction without any evidence of osteomyelitis.

Case 2

A 35 year old Tamilian farmer from Chenglepet district was admitted for swelling of the right thigh, leg and foot with multiple sinuses discharging sero-sanguinous material of 3 years' duration. He gave a history of having injured his right thigh with a wooden stick 6 months earlier to the onset of the lesion which started as a small nodule at the site of the injury, softened and formed a sinus discharging purulent material. Gradually multiple nodules developed which used to ulcerate and discharge pus.

Examination disclosed swelling of the right foot, leg and thigh with multiple nodules ulcerating and discharging serosanguinous fluid. Roentgenogram of the lesion showed soft tissue swelling with no bony involvement.

Histopathology

Histological sections of the biopsy material from both the cases showed sinus tracts lined by non specific granulation tissue, subcutaneous abscesses and small granules characteristic of *Nocardia* spp. (Fig 1). The granules were composed of tangled masses of Gram positive, delicate, branching filaments breaking up into bacillary and coccoid forms which were partially acid fast by Kinyoun's acid fast method.

Mycology

Direct examination of the serosanguinous fluid and biopsy material from both the patients did not reveal the presence of any granules. In addition to routine culture on Sabouraud's dextrose agar and beef-infusion-glucose blood agar at 26°C and 37°C, the specimens were inoculated into 2 tubes of Mc-Clung's carbon free broth with a paraffin coated glass rod and incubated at 37°C.

Growth was fast; the isolates appearing in a few days' time both on the routine culture media as well as on the paraffin coated glass rods. Subcultures were made on Sabouraud's dextrose agar slants and pure culture was subjected to morphological, cultural, biochemical and animal pathogenicity tests and identification was made accordingly.

The colonies were irregularly folded and orange yellow in colour. Microscopic examination revealed Gram positive branched filaments fragmenting into bacillary and coccoid forms and partially acid fast by Kinyoun's acid fast method. The organisms hydrolysed casein, decomposed crystals of tyrosine, liquefied gelatin, coagulated milk, showed good growth in 0.4% gelatin and was urease positive. Organisms failed to decompose xanthine, hydrolyse starch;

**Fig. 1**

Biopsy of case 1 showing small granules of *N. brasiliensis* in abscess. Haematoxylin and Eosin $\times 450$.

and acid was produced with glucose, glycerol, mannitol, mannose and inositol but not with lactose, sucrose, maltose, arabinose, xylose, rhamnose, raffinose, adonitol, dulcitol and sorbitol.

The isolates were pathogenic to white mice on intra peritoneal inoculation. Multiple nodules were seen in the liver, spleen, kidney and omentum. Histopathological examination of the infected tissues revealed acute inflammatory reaction with "loose granule" formation. With special stains the granules were found to consist of delicate, Gram positive, partially acid fast branching filaments (Fig. 2).

The isolates were identified as *N. brasiliensis*.

Discussion

The first case of mycetoma due to *N. brasiliensis* was described by Lindenberg in 1909⁸. Cases have since been reported mainly from Mexico, where it is responsible for 90-95% of mycetomas in contrast to *N. asteroides* which accounts for less than 1% of cases, and Brazil⁹, but the organism has been encountered in other regions also^{10,11}. The first case to be reported from Asia was that of Klokke from Ludhiana, India in 1964³.

Apart from mycetoma cases, *N. brasiliensis* had been isolated twice from 320 sputum samples investigated for the presence of nocardiosis in bronchopulmonary diseases¹². The organisms had also been isolated from the soil of Madhya Pradesh¹³ and West Bengal¹⁴ in India.

Nocardia spp. have been reported as the commonest causal agent of mycetoma from Calcutta¹⁵, Bombay⁴ and Pondicherry¹⁶ and based on histopathological studies it has been shown to be the second largest group of actinomycetes causing mycetoma in South India^{17,18}. However, species identification was not possible as the small granules caused by *N. asteroides*, *N. brasiliensis* and *N. caviae* were indistinguishable in tissue sections. Hence the actual prevalence of the disease due to *N. brasiliensis* is not known.

Nocardia spp. is more commonly seen in wet forest countries where the rainfall ranges from 1000 mm to 2000 mm per annum. *N. asteroides* and *N. brasiliensis* were found to exist both in semiarid zones and in the hot humid regions of Africa, America and Asia. The subtropical climate of the centre of Mexico with a rainfall of 500 - 1000 mm is perfectly suited to *N. brasiliensis*¹⁹. The tropical monsoon, wet and dry climate of Tamil Nadu with its

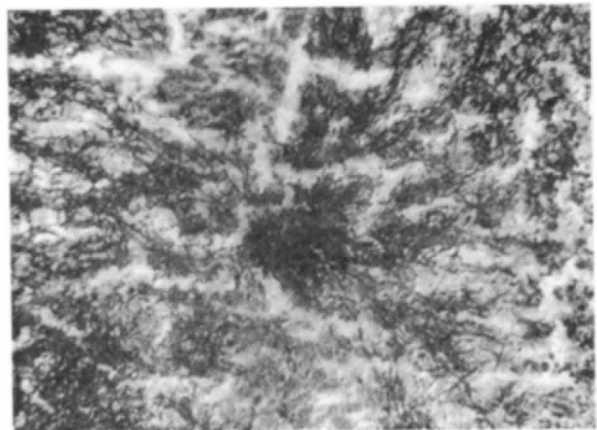


Fig. 2

Section of the mouse tissue showing the granule composed of delicate, branching filaments.

Gram \times 450.

annual rainfall ranging from 600 to 1300 mm may account for the occurrence of Nocardia infection in a considerable percentage of cases based on the tissue morphology of the granules. But cultural identification was undertaken only in a few cases and 5 cases of *N. asteroides*, 3 of *Nocardia spp.*²⁰, and one of *N. brasiliensis*⁷ have been reported so far from Tamilnadu. This is the second time that the causal agent *N. brasiliensis* had been isolated from two Tamilians.

Though mycetoma is usually localized, infections due to *N. brasiliensis* very seldom remain without invading. This tendency makes them particularly severe because of the frequent localisation on the back in Mexico due to the custom among the labourers of carrying soil contaminated fiber sacks on their backs and the potential invasion of the spine, meninges, spinal cord and thoracic cavity^{9,21}. In the case previously reported from Madras also, the lesion was seen in the back and neck with the involvement of Central Nervous System⁷. In the present two cases, the lesions which had originated in the thigh had spread extensively into the subcutaneous tissue to the knee and leg and in the second case to the foot also.

Bone involvement is a late sequelae of the disease and its degree and extent varies with the species of infecting agent, site of lesion, stage of development and intensity of infection. Certain anatomical parts are more susceptible. The bones of the foot and the distal epiphyses of the radius and ulna are easily implicated but, the femur has been observed to be more resistant to infection²². This may explain the absence of bone lesions in case 2 and occurrence of periosteal reaction only in case 1 in spite of the presence of extensive lesions.

The patients were treated initially with tetracycline and once the diagnosis

of Nocardial infection was made, treatment was changed to Sulphamethoxazole-trimethoprim with advise to continue therapy for one year after clinical cure.

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