

Primary Cutaneous Nocardial Infection Presenting as Mycetoma: A Case Report with a Short Review of Primary Cutaneous Nocardial Infections in India

MANE PRATIBHA M., KOLTE SACHIN S., BASAWARAJU ANURADHA

ABSTRACT

Primary cutaneous nocardiosis remains a diagnostic challenge. Here, we are reporting a case of primary cutaneous nocardiosis which was caused by *N. brasiliensis* and have reviewed the cases of primary cutaneous nocardiosis which have been published in the Indian literature. A 65-year old male patient, a farmer by occupation, came with a history of multiple draining sinuses over the medial aspect of the upper thigh. Gram staining

of the discharge showed gram positive branching filamentous bacteria and modified Ziehl-Neelsen's staining showed acid fast filamentous bacilli. The colonies were small, wrinkled, and dry and they produced an orange yellow coloured pigment. The isolate was identified as *N. brasiliensis*. The microbiologist as well as treating physician should also have a suspicion of nocardiosis for the early detection of this lesion.

Key Words: Mycetoma, Nocardia, Primary Cutaneous

INTRODUCTION

Primary nocardiosis remains a diagnostic challenge. A majority of the acute nocardial abscesses and lymphocutaneous infections go unsuspected and undiagnosed because of their non-specific clinical picture and the difficulty in isolating the organism. A high index of clinical suspicion is needed for the diagnosis of this condition, along with the stringent efforts of microbiologists, for the isolation this organism [1].

The genus, *Nocardia* comprises of gram positive, aerobic, acid fast and filamentous bacteria. They are found worldwide and are saprophytes of soil, decaying wood, water and air. *Nocardia asteroides complex*, *N. brasiliensis*, *N. farcinica*, and *N. nova* are commonly implicated for infections in humans. Mycetoma, with the clinical triad of tumefaction, draining sinuses, and granules in the discharging pus, is the characteristic and the most common presentation [2]. The incidence and the prevalence of primary cutaneous nocardiosis have not been adequately documented, even in areas where the infection is prevalent [3].

Here, we are reporting a case of primary cutaneous nocardiosis which is caused by *Nocardia brasiliensis* (*N. brasiliensis*) and have reviewed the cases of primary cutaneous nocardial infections which have been reported from India.

CASE REPORT

A 65-year old male patient, a farmer by occupation, came to the surgical department with a history of skin lesions over the right thigh since one year. There was diffuse enlargement of the right thigh and multiple draining sinuses over the medial aspect of the upper thigh. These were small nodules to start with, which had become ulcerated [Table/Fig-1]. The swelling was tender and warm to touch and there were few puckered scar marks. There was no inguinal lymphadenopathy or bony involvement. A serous discharge was seen to be coming out from some of these lesions. Granules were not seen. The systemic examination was normal.

The routine haematological investigations and the chest X-ray were within normal limits. Plasma glucose, serum bilirubin, liver enzymes, blood urea and serum creatinine were normal.

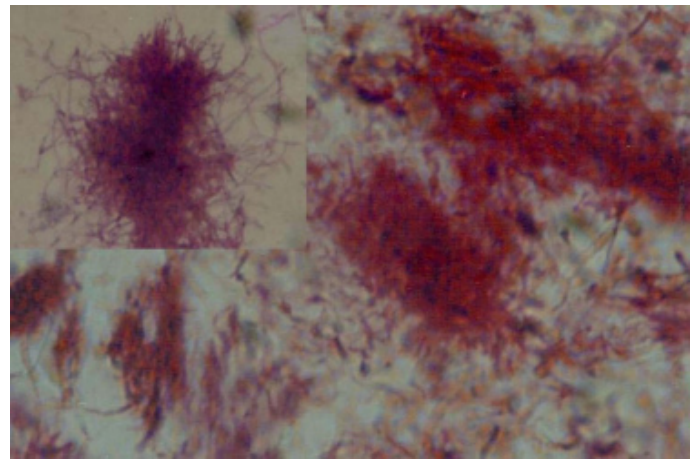
The discharging pus was collected with two clean and sterile swabs. Gram staining of the discharge was done, which showed gram positive branching filamentous bacteria. Considering the possibility of *Nocardia*, the slides were stained by Ziehl-Neelsen's staining and 1% sulfuric acid was used to decolourize the slides; which showed acid fast filamentous bacilli. Another sterile swab with the discharge was inoculated onto blood agar and Sabouraud's dextrose agar (with and without chloramphenicol) and these media were incubated at 37°C aerobically. Additionally, another blood agar plate was inoculated anaerobically by using the gas pack method, which showed no growth. Growth was seen over blood agar and Sabouraud's dextrose agar after incubation for 72 hours. The colonies were small, wrinkled, and dry and they produced an orange yellow coloured pigment [Table/Fig-2]. We did gram staining and modified acid staining of the isolate [Table/Fig-3]. By performing a battery of biochemical tests (urea hydrolysis, hydrolysis of casein, xanthine and tyrosine, growth at 42°C and gelatin hydrolysis), we identified the isolate as *N. brasiliensis*. The isolates were sensitive to co-trimazole, streptomycin, and amikacin. The patient was treated with co-trimazole for three months and he showed complete regression of the lesions.

DISCUSSION

Nocardial infections occur worldwide, particularly in the tropical/sub-tropical environments [2]. Although the lungs are the primary organs which are affected by the *Nocardia* species, cutaneous nocardiosis can also occur as the primary disease in apparently immunocompetent hosts [4]. A traumatic inoculation in the skin is the typical mode for acquisition of the primary infection in immunocompetent hosts, resulting in an acute inflammatory response, terminating in necrosis and abscess formation. The cutaneous



[Table/Fig-1]: Multiple draining sinuses over medial aspect of right upper thigh



[Table/Fig-3]: Ziehl-Neelsen's stain showing acid fast and [inset] showing Gram positive branching filamentous bacteria in Gram stain



[Table/Fig-2]: The colonies over Sabouraud's dextrose agar are small, wrinkled, and dry and showing orange yellow colored pigment

disease may manifest clinically as 1) an acute superficial infection with abscesses or cellulitis, 2) mycetoma 3) a lymphocutaneous (sporotrichoid) infection, or 4) a disseminated infection with skin involvement [2].

In India, the first report on the *N. brasiliensis* infection appeared in 1964 [2]. After that, very few cases of cutaneous nocardiosis were

reported from India [5]. The incidence of Nocardial mycetoma was found to vary from 5.2% to 35% in the Indian literature. The exact incidence of primary cutaneous nocardiosis is not clear, as many of these studies have not reported whether these were primary or secondary cases. The data regarding the overall incidence of this infection in India is not available [1-3,5].

We have analyzed the cases of primary cutaneous nocardiosis that were reported from India in [Table/Fig-4] [5-14].

Mycetoma is a chronic, localized infection of the dermis and the sub-cutaneous tissue, with indolent swelling and draining sinuses. The granules which were discharged were less than 1mm in size and they were yellowish – white [3]. The granules in the discharge were actually aggregates of the microcolonies of the organism. More than 20 species of fungi and bacteria have been implicated as the aetiologic agents of mycetoma. *N. brasiliensis* and *N. asteroides* account for the infection in a majority of the cases which are caused by Nocardia species and follow the mostly forgotten, traumatic implantation or contamination of a wound which involves the lower limb and the hands in a majority of the cases [2,3]. The other unusual sites of involvement are the scalp, shoulder, and the upper back, which correspond to the usual sites of load carrying in agricultural workers [3]. The involvement of the thigh (as is in our case) is not reported frequently. Unlike eumycetoma, these lesions are acute in onset (incubation period of about 2 weeks) and more inflammatory and they are associated with tenderness. Mycetoma, especially when it is caused by *N. Brasiliensis*, has a propensity to involve the underlying bone, and osteolytic changes are frequently observed radiologically [3,4].

DIAGNOSIS

Despite the characteristic presenting clinical features, many patients remain undiagnosed for long periods, perhaps for want of clinical suspicion [2]. The demonstration of this organism from clinical specimens like granules, pus or aspirated fluid from an unruptured nodule by gram staining and modified Kinyoun staining is the mainstay of the diagnosis. Gram positive and acid fast, thin, beaded, branching filaments are the characteristic appearances of this organism. Identification of the Nocardia species by culture is a tedious process. The organism is slow growing and it may take up to 2-3 weeks for its isolation from a clinical specimen. The small Nocardial colonies are overgrown by other rapidly growing organisms, resulting in an initial negative culture report [3].

The role of histopathological examination in its diagnosis is arguable, as many of the studies could not identify the organism

Sl. No.	Name of author and study year	Age in Years/Sex	H/O Trauma	Clinical pattern of presentation	Site of involvement	Histopathology diagnosis	Organism isolated
1.	Mohanty et al [5] 1982	20/ Female	Present	Mycetoma	Left arm	Done Organism identified	<i>N. brasiliensis</i>
2.	Ramani et al [8] 1993	22/Male	Not mentioned	Sporotrichoid	Right leg	Done Organisms not identified	<i>N. brasiliensis</i>
3.	Ingole et al [13] 1995	41/Male	Absent	Mycetoma	Abdomen	Not mentioned	<i>N.asteroides</i>
4.	Das S [14] 1994	24/Female	Present	Mycetoma	Right hand	Done organism identified	<i>N.asteroides</i>
5.	Lakshmi V et al [4] 2002	20/Female	Present	Mycetoma	Back	Not mentioned	<i>N. brasiliensis</i>
6.	Inamdar AC and Palit A [3] 2003	16 / Male	Present	Sporotrichoid	Right lower extremity	Done Organisms not identified	Not identified
7.		30/Male	Present	Mycetoma	Foot	Not mentioned	<i>N. brasiliensis</i>
8.		35/Male	Present	Mycetoma	Foot	Not mentioned	<i>N. brasiliensis</i>
9.		16/Male	Present	Mycetoma	Scalp	Not mentioned	<i>N. brasiliensis</i>
10.		23/Male	Present	Mycetoma	Back	Not mentioned	Not done
11.		60/Male	Present	Abscess	Leg	Not mentioned	Not done
12.		60/Female	Present	Mycetoma	Sole	Not mentioned	<i>N. brasiliensis</i>
13.		25 /Male	Present	Abscess	Foot	Not mentioned	Not done
14.		28/Male	Present	Abscess	Hand	Not mentioned	<i>N. brasiliensis</i>
15.		30/Male	Present	Lymphacutaneous	Hand and forearm	Not mentioned	<i>N.nova.</i>
16.	Belliappa et al [9] 2003	19 /Male	Present	Lymphacutaneous	Right inguinal lymph nodes	Done organism identified	Not identified
17.	Baradkar VP et al [1] 2008	26/ Male	Absent	Lymphacutaneous	Right leg	Organisms identified.	<i>N.asteroides</i>
18.	Sharma NL et al [2] 2008	32 /Male	Present	Mycetoma	Right ankle	Organisms not seen	<i>N. brasiliensis</i>
19.		29/Female	Absent	Mycetoma	Right leg	Organisms not seen	Not identified
20.		71/Male	Present	Mycetoma	Left hand	Organisms not seen	<i>N. brasiliensis</i>
21.		31/Female	Present	Mycetoma	Gluteal and lumbosacral region	Organisms seen.	Not identified
22.	Patil SP et al [6] 2009	26/Male	Present	Mycetoma	Scalp	Done organism identified	<i>N. brasiliensis</i>
23.	Adhikari L et al [7] 2010	60/Female	Present	Mycetoma	Right foot	Organisms seen.	<i>N. farcinica</i>
24.	Bosamiya et al [12] 2011	37 /Male	Absent	Mycetoma	Left foot	Done Organisms not identified	Not identified
25.	Agarwal et al [10] 2010	40/Male	Absent	Mycetoma	Left leg	Organisms not seen	<i>N.asteroides</i>
26.	Vijay kumar et al [11] 2011	35/Female	Not mentioned	Mycetoma	Left infraauricular region	Not mentioned	<i>N.asteroides</i>
27.	Present case	65 /Male	Absent	Mycetoma	Right thigh	Not done	<i>N. brasiliensis</i>

[Table/Fig-4]: Showing presentation of reported cases of primary nocardiosis from India

in the biopsies, except for the presence of the granulomatous reaction.

Rapid and reliable molecular methods, though they are available, are beyond the reach of many investigating laboratories [1]. Hence, a good microbiological examination, coupled with culture studies, are helpful for establishing a definitive diagnosis. The timely initiation of an effective treatment is imperative for a favourable outcome. An antibiogram is suggested for all the species which are isolated because of their varied antibiotic sensitivity pattern [3].

To conclude, a high degree of clinical suspicion is needed for the diagnosis of Nocardiosis, along with stringent efforts of the microbiologist for isolating the causative organism. The microbiologist as well as treating physician should also have a suspicion of nocardiosis for the early detection of this lesion.

REFERENCES

- [1] Baradkar VP, Mathur M, Kulkarni SD, Kumar S. The sporotrichoid pattern of cutaneous *Nocardia asteroides*. *Indian J Pathol Microbiol* 2008;51:432-34.
- [2] Sharma NL, Mahajan VK, Agarwal S, Katoch VM, Das R, Kashyap M, et al. Nocardial mycetoma : Diverse clinical presentations. *Indian J Dermatol Venereol Leprol* 2008;74:635-40.
- [3] Inamadar AC, Palit A. Primary cutaneous nocardiosis: A case study and review. *Indian J Dermatol Venereol Leprol* 2003;69:386-91.
- [4] Lakshmi V , Sundaram C, Meena AK, Murthy JM. Primary cutaneous nocardiosis with an epidural abscess which was caused by *Nocardia brasiliensis*: A case report. *Neurol India* 2002;50:90-92.
- [5] Mohanty PK, Ambekar VA, Deodhar LP, Ranade R, Mehta VR. *Nocardia brasiliensis* – mycetoma – (a case report). *J Postgrad Med* 1982;28:179.
- [6] Patil SP, Gautam MM, Sodha AA, Khan KJ. Primary cutaneous nocardiosis with craniocerebral extension: a case report. *Dermatol Online J* 2009;15:8.
- [7] Adhikari L, Dey S, Pal R. Mycetoma due to *Nocardia farcinica*. *J Global Infectious Diseases* 2010;2:194-95.
- [8] Ramani R, Kumari G. Spontaneous remission of primary cutaneous Nocardiosis. *Indian J Dermatol Venereol Leprol* 1993;59:37-38.
- [9] Belliappa AD, Sukumar D, Shetty JN, Nandkishore B. Lympho-cutaneous nocardiosis presenting as inguinal bubo. *Indian J Dermatol* 2003;48:164-66.
- [10] Agrawal SM, Raut SS. Primary cutaneous disease due to *Nocardia asteroides* in an immunocompetent host. *Indian J Pathol Microbiol* 2011;54:185-86.

- [11] Vijay Kumar GS, Mahale RP, Rajeshwari KG, Rajani R, Shankaregowda R. Primary facial cutaneous nocardiosis in an HIV patient and a review on cutaneous nocardiosis in India. *Indian J Sex Transm Dis* 2011;32:40-43.
- [12] Bosamiya SS, Vaishnani JB, Momin AM. Sporotrichoid nocardiosis with cutaneous dissemination. *Indian J Dermatol Venereol Leprol* 2011;77:535-38.
- [13] Ingole KV, Fule RP, Jalgaonkar SV. Primary cutaneous disease due to nocardia asteroides: A case report. *Indian J Med Sci* 1995;49: 231-32.
- [14] Das S. Cutaneous nocardiosis in East Delhi-a case report. *Indian J Med Sci* 2001;55:337-39.

AUTHOR(S):

1. Dr. Mane Pratibha M.
2. Dr. Kolte Sachin S.
3. Dr. Basawaraju Anuradha

PARTICULARS OF CONTRIBUTORS:

1. M.D. (Microbiology) Department of Microbiology, Mamata Medical College, Khammam, AP, India.
2. M.D. (Pathology) Department of Pathology, Mamata Medical College, Khammam, AP, India.
3. M.D. (Microbiology) Department of Microbiology, Mamata Medical College, Khammam, AP, India.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mane Pratibha
Department of Microbiology,
Mamata Medical College,
Khammam, 507002.
Andhra Pradesh, India.
E-mail: drsachinkolte@sify.com

FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date of Submission: **Jul 19, 2011**
Date of Peer Review: **Nov 18, 2011**
Date of Acceptance: **Dec 22, 2011**
Date of Publishing: **May 01, 2012**