

Case 26

A 25-year old Thai man from Bangkok

Chief complaint: A painful red plaque on left sole for 8 months



(Fig. 26.1)

Present illness:

The patient noticed an indurated, painful, dull-red papule on his left plantar surface that gradually enlarged in the past 8 months with some extruded whitish grains and punctums.

He was afebrile and otherwise healthy.

Past history:

- He had no any underlying diseases.

- He had a previous history of penetrating wound on the affected foot.

Physical examination:

V/S: T 36.8°C, P 90/min, RR 20/min, BP 121/74 mmHg

HEENT: no pale conjunctivae, anicteric sclerae

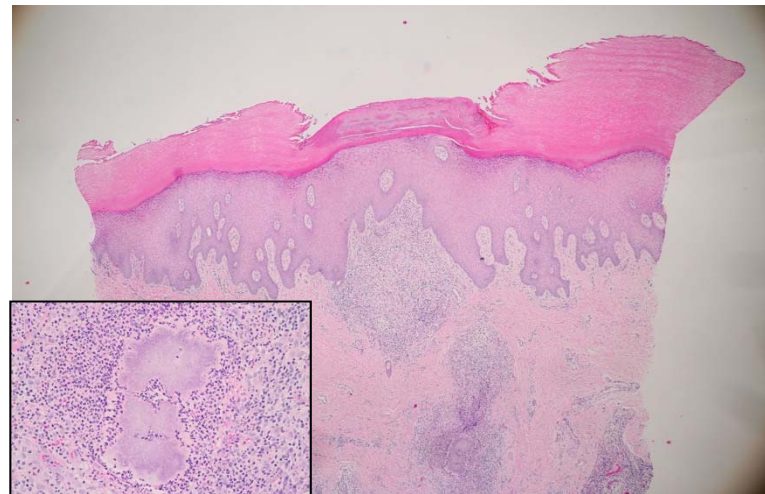
Lymph node: no lymph node enlargement

Other systems: unremarkable

Dermatological examination: (Fig. 26.1)

Solitary ill-defined purplish indurated plaque on left sole with some whitish papules and sinuses

Histopathology: (S17-27643A, Left sole) (Fig. 26.2)



(Fig.26.2)

- Pseudocarcinomatous epidermal hyperplasia associated with

nodular cell infiltrate of lymphocytes, histiocytes, plasma cells, and numerous neutrophils forming microabscess with central grain-like material

- Brown-Brenn and Fite stain reveal gram positive filamentous bacteria

Laboratory investigations:

- CBC: Hb 14.1 g/dL, Hct 43.6%, WBC 5,000 cells/ μ L (N 54%, L 30%, Mo 9%, Eo 6%, B 1%), Platelets 137,000 cells/ μ L
- Tissue imprint for gram stain, AFB, mAFB, GMS: no organisms
- Tissue PCR for 16s RNA: *Nocardia nova* complex
- Tissue culture for aerobe: *Nocardia nova* complex
- Tissue PCR for 18s RNA, TB: negative
- Tissue culture for TB and fungus: no growth
- Film Lt foot AP: no osteolytic lesion on the adjacent bone

Diagnosis: Nocardial mycetoma

Treatment: Trimethoprim-sulfamethoxazole (80/400) 1 tab PO bid

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Discussion:

Mycetoma is a chronic suppurative infection affecting skin, subcutaneous tissue, and bones prevalent in tropical and subtropical regions.¹ Mycetoma is caused by several true fungi and bacteria, and hence it is classified as eumycetoma and actinomycetoma, respectively.² The predilection site is mainly foot. The typical clinical manifestation is a triad of localized swelling, underlying sinus tracts, and production of grains or granules¹ that could grossly characterize

the causative organisms (Table 1).²

Actinomycotic mycetoma is caused by aerobic species of actinomycetes belonging to the genera *Nocardia*, *Streptomyces* and *Actinomadura* with *Nocardia brasiliensis*, *Actinomadura madurae*, *Actinomadura pelletieri*, and *Streptomyces somaliensis* being most common.¹

Nocardiosis is an infection caused by different species of *Nocardia* spp. *Nocardia asteroides* complex, *N. brasiliensis*, *N. farcinica*, and *N. nova* are commonly implicated for infection in humans. They are gram-positive, aerobic, acid-fast, filamentous saprophytic bacteria found in soil, decaying wood, water, and air.³ Cutaneous nocardiosis may present as primary infection in immunocompetent individuals with history of trauma or may present as a part of disseminated infection secondary to pulmonary focus in immunocompromised individuals. Primary cutaneous nocardiosis clinically presents as acute infection (abscess or cellulitis), sporotrichoid infection or mycetoma⁴ which bone involvement occurs infrequently. Notable bony changes include periosteal thickening, osteoporosis and osteolysis.³

Table 1. The common different mycetoma causative organisms.

Grain color	Causative organisms
Eumycetoma	
Black grains	<i>Madurella</i> spp. <i>Leptosphaeria</i> spp. <i>Curvularia</i> spp. <i>Exophiala</i> spp. <i>Phaeoacremonium</i> spp. <i>Phialophora verrucosa</i> <i>Pyrenochaeta mackinnonii</i> <i>P. romeroi</i>
Pale, white, yellow grains	<i>Pseudallescheria boydii</i> (<i>Scedosporium apiospermum</i>) <i>Acremonium</i> spp. <i>Aspergillus</i> spp.
Actinomycetoma	
Pale, white, yellow grains	<i>Actinomadura madurae</i> , <i>Nocardia</i> spp.
Yellow to brown grains	<i>Streptomyces</i> spp.
Red to pink grains	<i>A. pelletieri</i>

Adapted from Ahmed AA et al. Mycetoma laboratory diagnosis: Review article. PLoS Negl Trop Dis 2017;11:e0005638

The hallmark for diagnosis is based on microbiological evidence. *Nocardia* spp. can be stained with gram stain, modified Kinyoun stain, the Ziehl-Nielsen stain, and Brown-Brenn stain in tissue section.⁵ Histopathology shows abscess (collection of neutrophils) and granules (grains). Grains are closely aggregated with a peripheral radial deposition of intensely eosinophilic material – a Splendore-Hoeppli reaction.⁶ Selective media including Thayer-Martin media, and charcoal-buffered yeast extract media may be necessary to enhance recovery of *Nocardia* spp. and minimize the growth of contaminating organisms. Genus identification could be performed by biochemical, chemotaxonomic, serological, and molecular methods in which DNA sequencing provides rapid and usually reliable identifications for most *Nocardia* spp. isolates.⁷

Drug susceptibility test for *Nocardia* spp. are showed in Table 2.

Table 2 Comparison of the antimicrobial susceptibility of *Nocardia* species isolated from patients with different infection sites.

		Susceptible percentage of isolates (%)			
		Skin	Lung	Disseminated	Lung+disseminated
Amikacin	97	100	94	86	92
TMP/SMZ	94	97	95	75	89
Minocycline	79	81	78	71	76
Cefotaxime	79	86	67	75	70
Gentamicin	80	97	57	63	59
Ampicillin	17	17	16	22	18
Ciprofloxacin	12	8	20	11	17
Erythromycin	0	0	0	0	0

Adapted from Wang HK et al. Clinical characteristics, microbiology, and outcomes for patients with lung and disseminated nocardiosis in a tertiary hospital. J Formos Med Assoc 2015;114:742-9.

The treatment of choice for actinomycetoma is a combination of

dapsone 100 to 200 mg once daily and trimethoprim-sulfamethoxazole (TMP-SMX) 80/400 to 160/800 mg once daily for 2 to 3 years. Intramuscular amikacin 15 mg/kg or 500 mg twice daily for 3 weeks is recommended only in disseminated nocardiosis or resistant cases, because of its high cost and toxicity (nephrotoxicity and ototoxicity).⁸ Surgical treatment is indicated for small, limited lesions and in cases with bone destruction. Amputation is indicated in cases lacking a satisfactory antimicrobial response associated with severe bone destruction of the affected segment.⁹

For this patient's treatment; according to drug susceptibility test results, Trimethoprim-sulfamethoxazole was prescribed at dose of 160/800 mg daily. After one month pain and size of the indurated area decreased.

References:

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