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Case Report

Dermatology Section

Amoxicillin-clavulanic Acid and Trimethoprim/Sulphamethoxazole Combination Therapy for Actinomycetoma in an Elderly Farmer: A Case Report

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ABSTRACT

Actinomycetoma is a chronic, localised, progressive granulomatous infection of the skin and subcutaneous tissues, typically affecting the lower extremities. It is caused by Actinomycetes bacteria, which are commonly found in soil and water. The infection usually results from minor trauma, such as walking barefoot or exposure to thorny vegetation. Upon inoculation, the bacteria form grains that help evade the host immune response, facilitating the establishment of infection. It is characterised by discharging sinuses and the presence of granules. This condition predominantly affects individuals in rural, resource-limited areas with limited access to healthcare. Although it affects both men and women, men are more commonly affected due to occupational exposure. The disease progresses slowly, often leading to severe complications, including tissue destruction and sinus tract formation, with amputation being the only option in advanced cases. Authors hereby report a case of Actinomycetoma in an 86-year-old male farmer who presented with painful erythematous nodules and purulent discharge from lesions on his left leg for the past four years. The diagnosis was established through clinical, histopathological and microbiological investigations, including Gram stain, Gomori Methenamine Silver (GMS), and Periodic Acid-Schiff (PAS) stain. Treatment with a combination of amoxicillin-clavulanic acid and trimethoprim/sulphamethoxazole was initiated. This led to a complete resolution of the condition within three weeks, demonstrating the efficacy of this treatment as a safe and cost-effective option. This case highlights the importance of early diagnosis and appropriate treatment for Actinomycetoma, emphasising the value of affordable therapeutic interventions.

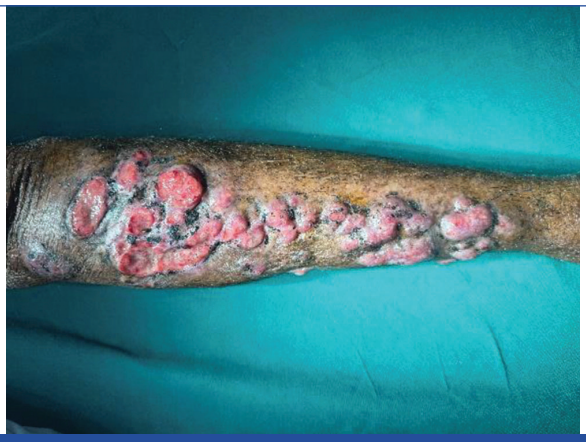
Keywords: Chronic granulomatous infection, Sinus tracts, Subcutaneous nodules

CASE REPORT

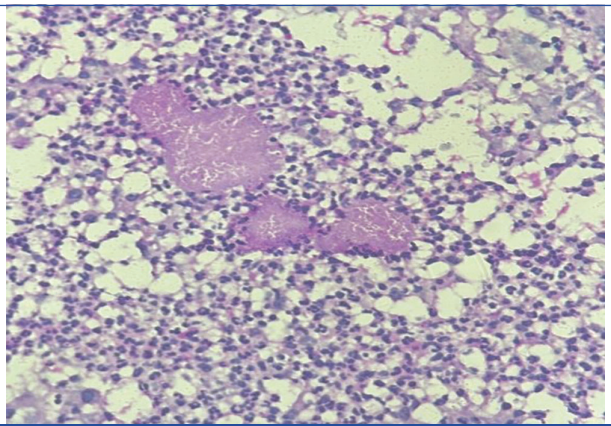
An 86-year-old male farmer, with a known history of hypertension for 40 years, presented to the Dermatology Outpatient Department (OPD) with a four-year history of painful, erythematous nodules on the left lower leg, associated with sanguineous and purulent discharge. The patient reported dull, aching pain that was moderate in intensity and persistent throughout the course of the disease. He provided a history indicating that the lesions appeared following a thorn prick injury. The patient had visited multiple local practitioners for the same issue, where he was administered unknown injectables and oral medications, which led to no relief of the symptoms. Subsequently, he was referred to this centre.

On examination, multiple well-demarcated erythematous indurated, firm ulcerated nodules with a moist surface, yellow crusting and red granulation tissue were noted along the tibial side of the left leg. The largest nodule measured 8×6 cm, while the smallest measured 0.5×0.5 cm. Active sanguineous and purulent discharge was observed, along with a firm, non tender, enlarged left inguinal lymph node (1.5×2 cm) [Table/Fig-1]. Based on the cutaneous examination, a provisional diagnosis of Actinomycetoma was made. The differential diagnosis included sporotrichosis, chromoblastomycosis, eumycetoma and squamous cell carcinoma.

A 4 mm punch biopsy was taken from the lesion, which revealed dense inflammatory infiltrates containing neutrophils, eosinophils, lymphocytes and giant cells in a necrotic background. Colonies of Actinomycetes were identified in the abscess. Gram staining confirmed the presence of filamentous bacteria, while GMS and PAS stains were negative for fungal elements [Table/Fig-2]. Radiological imaging showed subcutaneous calcifications without evidence of osteomyelitis, consistent with phleboliths or soft-tissue injury sequelae [Table/Fig-3]. Dermoscopic evaluation revealed

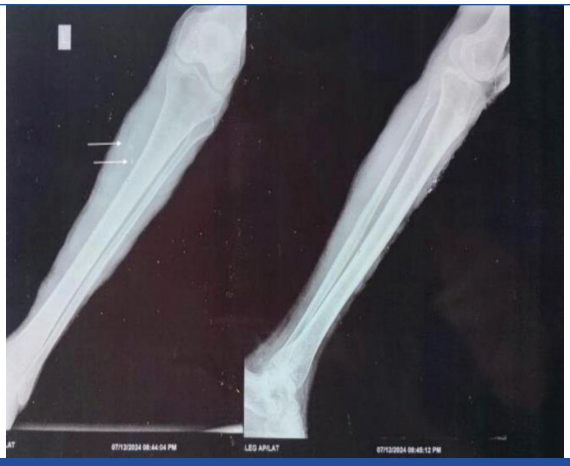


[Table/Fig-1]: Clinical image of the patient: Pre-treatment.

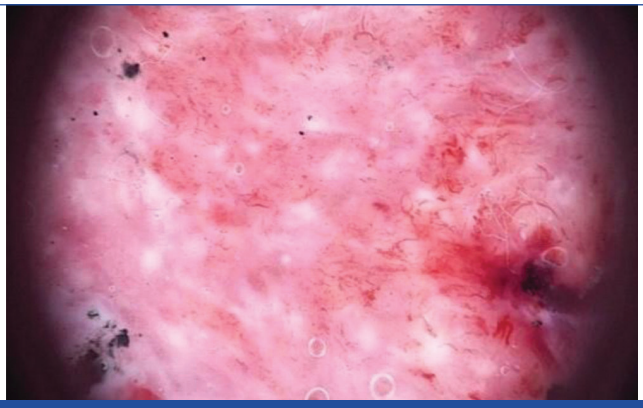


[Table/Fig-2]: Histopathology of actinomycetoma using Periodic Acid Schiff stain showing the Splendore-Hoeppli phenomenon (PAS, 40x).

background erythema with defocused vessels, red dotted vessels, red haemorrhage, well-defined white dots and clods in a four-leaf clover pattern, white ill-defined structureless areas and yellowish serous fluid with yellow globules [Table/Fig-4]. Pus culture identified *Pseudomonas* species, which were sensitive to multiple antibiotics including ceftazidime, ciprofloxacin, levofloxacin and piperacillin-tazobactam, while fungal cultures showed no significant growth.

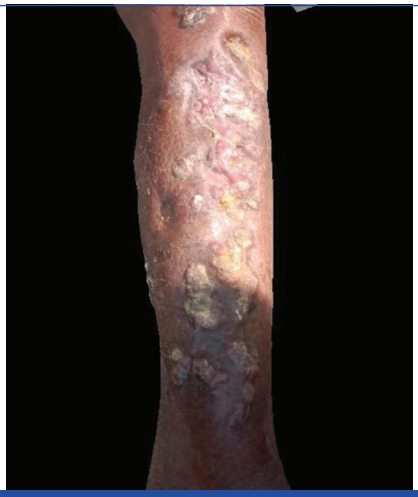


[Table/Fig-3]: AP/Lateral X-ray of left lower limb showing subcutaneous calcifications without evidence of osteomyelitis, consistent with phleboliths or soft-tissue injury sequelae.



[Table/Fig-4]: Dermoscopy- evaluation revealed background erythema with defocused vessels, red dotted vessels, red haemorrhage, well defined white dots and clods in four leaf clover, white ill-defined structureless areas, yellowish serous fluid, yellow globule.

A diagnosis of Actinomycetoma was established, and treatment with amoxicillin-clavulanic acid (625 mg twice daily) and co-trimoxazole (trimethoprim/sulfamethoxazole, TMP/SMX) (160/800 mg once daily according to the patient's weight) was initiated. By the third week, the discharge ceased and the nodules began to heal. Substantial resolution was achieved by six weeks [Table/Fig-5].



[Table/Fig-5]: Post-treatment clinical image of the patient: shows decreased discharge and healed nodules.

The patient was monitored monthly for three months and quarterly thereafter, with no recurrence. He was found to be anaemic, hypoproteinaemic and exhibiting electrolyte imbalances in February 2024. The patient was started on iron supplements, protein powder, and saline infusion for hyponatraemia. All other routine blood tests, including liver and renal function assessments, remained normal throughout the treatment.

DISCUSSION

Actinomycetoma (caused by bacteria) constitutes 60% of global mycetoma cases, while eumycetoma (caused by fungi) accounts for 40%. Aerobic bacteria, which cause actinomycetoma, are mistakenly categorised as fungi [1]. The most common organisms causing actinomycetoma worldwide are *Nocardia* species, *Streptomyces* species, and *Actinomadura* species [1]. The cause of actinomycetoma is overlying skin traumatic microbial implantation [1]. There is a distinctive clinical triad for mycetoma: grain discharge that may be bacterial or fungal, draining sinuses and firm swelling in the affected area [2]. The primary affected areas are the lower limbs—foot (76.5%) and leg (8.5%); only a small percentage of cases occur in the upper limbs or trunk (2.1%) [3].

Histopathological evaluation reveals abscesses with granulomatous inflammation. A hallmark feature is the Splendore-Hoeppli phenomenon, characterised by eosinophilic material encasing microorganisms, which aids in diagnosis. The tissue reaction is mainly neutrophilic [4]. Bony changes are quite specific and helpful in distinguishing actinomycetoma from eumycetoma, as more severe and extensive bone involvement is seen in actinomycetoma [4].

The treatment aims to eradicate the infection while minimising complications. Co-trimoxazole forms an integral part of actinomycetoma management and is considered the gold standard [5]. The Welsh regimen (consisting of co-trimoxazole with amikacin for three weeks, followed by only co-trimoxazole for two weeks) is used for one to four cycles, and the modified Ramam's two-step regimen (an "intensive phase" of co-trimoxazole and gentamicin for four weeks followed by a "maintenance phase" of co-trimoxazole and doxycycline) are the commonly used therapeutic regimens [6].

Other drugs tried in conjunction with co-trimoxazole include dapsone, netilmycin, linezolid (600 mg twice a day) and amoxicillin-clavulanate [5]. Additional treatment options include streptomycin and amikacin. Both drugs, however, carry risks of hearing impairment and renal complications. Additionally, the requirement for intramuscular administration may impact treatment adherence [7].

Patra S et al., reported actinomycetoma in a 14-year-old girl who was started on a regimen of intravenous injection amikacin at a dose of 15 mg/kg daily and co-trimoxazole DS tablets (2 tablets twice daily). After one month on this regimen, the lesions did not show any significant improvement. According to the maintenance phase of the treatment, injection amikacin was stopped, and doxycycline (100 mg twice daily) was added to co-trimoxazole. Over the next two months, the lesions became more inflammatory and increased in size. Due to the lack of response, both co-trimoxazole and doxycycline were stopped, and the patient was started on linezolid tablets (600 mg twice daily). The lesion began to respond within two weeks, with complete resolution observed after two months of this therapy [6].

In the present case, early improvement was noted within three weeks, with cessation of discharge and healing of the nodules following treatment with amoxicillin-clavulanic acid (625 mg twice daily) and co-trimoxazole (trimethoprim/sulfamethoxazole). By six weeks, substantial resolution had been achieved, suggesting that the infection was responsive to first-line therapy and did not require any escalation of treatment. This comparison underscores the importance of individualised treatment approaches in actinomycetoma, particularly for recalcitrant or resistant cases where alternative antibiotics, such as linezolid, may be necessary.

Cárdenas-de la Garza JA et al., conducted a study involving 31 participants that reported various antibiotic combinations for the treatment of actinomycetoma. Treatment selection was based on factors such as lesion size, location, involvement of bones or internal organs, recurrence, adverse events, co-morbidities and response to prior therapies. Patients with lesions smaller than 5 cm received TMP/SMX monotherapy. For larger lesions without bone or internal organ involvement, TMP/SMX was combined with amoxicillin/clavulanic acid. Cases involving recalcitrant lesions affecting multiple body regions, with internal organ or bone involvement, or located in critical areas (such as the head and neck) were treated with TMP/SMX and amikacin. Patients resistant to TMP/SMX and amoxicillin/clavulanic acid received an additional third agent, amikacin. For cases with adverse reactions, drug allergies, recurrence, or extensive abdominal organ involvement, treatment regimens included combinations with moxifloxacin, carbapenems, fosfomycin, or rifampicin, tailored to inpatient or outpatient care, drug availability, co-morbidities and cost considerations. Cure was defined as complete lesion remission, absence of inflammation and exudate, and negative follow-up skin biopsies [8].

The major difference between the two cases is the degree of treatment individualisation. In the presented case, the patient responded well to a fixed dual-drug regimen, demonstrating improvement within six weeks without requiring additional antibiotics. However, the study by Cárdenas-de la Garza JA et al., highlighted the importance of tailoring therapy based on disease severity and patient-specific factors, recognising that not all cases respond uniformly. The study's approach aimed to optimise outcomes for patients with more complex or treatment-resistant infections, ensuring that severe or recurrent cases received appropriate escalation in therapy [8].

Actinomycetoma is a relatively rare but serious disease, most often affecting individuals in rural, resource-constrained regions. Similar cases reported in the literature underscore the importance of early diagnosis and individualised treatment for successful outcomes. In this case, combination therapy with amoxicillin and co-trimoxazole proved highly effective, resulting in significant clinical improvement, reduced hospital stays and lower healthcare costs, thereby enhancing the patient's quality of life. This suggests that it could serve as a viable first-line treatment, particularly in resource-constrained settings. This case emphasises the need for early diagnosis and individualised treatment to prevent complications associated with actinomycetoma. Continuous monitoring during prolonged therapy is essential to ensure patient safety and successful outcomes.

CONCLUSION(S)

Actinomycetoma, a rare tropical disease, requires accurate diagnosis for effective treatment. This case underscores the importance of early identification and adherence to therapy, with significant improvement achieved using amoxicillin and co-trimoxazole. The outcome demonstrates the potential of this regimen in resource-limited settings, highlighting the need for ongoing follow-up to ensure recovery and prevent recurrence.

Patient consent declaration: The authors confirm that informed consent was obtained from the patient for the use of clinical details and images in this report, with assurances that personal identifiers would remain undisclosed and that anonymity would be maintained to the extent possible, recognising that absolute confidentiality cannot be guaranteed.

REFERENCES

[1] Argentina F, Rusmawardiana, Nopriyati, Karim PL. Extensive actinomycetoma clinical manifestations and histopathology: A case report. Bioscientia Medicina: Journal of Biomedicine and Translational Research. 2022;6(15):2705-12.
[2] Hung YT, Wu TS, Hsueh YH, Wang HN, Sun PL. Actinomycetoma caused by *Nocardia brasiliensis* successfully treated with antibiotics: A case report. Dermatologica Sinica. 2021;39(3):139.
[3] Bonifaz A, Tirado-Sánchez A, Vázquez-González D, Fierro-Arias L, Araiza J, González GM. Actinomycetoma by *Actinomadura madurae*. Clinical and therapeutic characteristics of 18 cases with two treatment modalities. J Dermatolog Treat. 2022;33(2):954-58.
[4] Khatri ML, Kubati SASA, Gaffer IA, Majeed SMA. Mycetoma in north-western Yemen: Clinico-epidemiological and histopathological study. Indian J Dermatol Venereol Leprol. 2022;88(5):615-22.
[5] Agarwal P, Jagati A, Rathod SP, Kalra K, Patel S, Chaudhari M. Clinical features of mycetoma and the appropriate treatment options. Res Rep Trop Med. 2021;12:173-79.
[6] Patra S, Senthilnathan G, Ramam M, Arava S, Bhari N. Linezolid: A novel treatment option for the treatment of a non-responsive case of actinomycotic mycetoma. Indian J Dermatol Venereol Leprol. 2021;87(3):455-55.
[7] Mathur M, Thakur N, Jaiswal S, Regmi S, Paudel S. Unravelling the challenges of mycetoma: A case series highlighting diagnostic dilemmas and therapeutic triumphs. Skin Health Dis. 2025;5(1):61-65.
[8] Cárdenas-de la Garza JA, Welsh O, Cuéllar-Barboza A, Suarez-Sánchez KP, De la Cruz-Valadez E, Cruz-Gómez LG, et al. Clinical characteristics and treatment of actinomycetoma in northeast Mexico: A case series. PLoS Negl Trop Dis. 2020;14(2):e0008123.

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