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"A CASE OF FUNGAL GRANULOMATOUS INFECTION – EUMYCETOMA – IN A DIABETIC PATIENT"

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ABSTRACT **Background:** Mycetoma is characterized by a progressive and chronic granulomatous infection affecting the skin and subcutaneous tissue. Called as "eumycetoma" when it is caused by fungi. Eumycetoma is characterized by a deep granulomatous inflammation, resulting in the formation of grains, which destroy tissues. The foot is often prone to fungal infections due to exposure to fungi in the soil via skin trauma. **Case History:** A 38-year-old female patient was apparently alright 2 years back when she developed a wound over left foot after trauma. As the wound was not healing, she was admitted in a hospital with complaints of diabetic nephropathy with eumycetoma. Now patient came with exacerbation of same wound associated with pale discharge. **Material & Methods:** The pus discharge, along with the dressing material was sent to Department of Microbiology, JNMC which were subjected to microscopy and culture. Primary smears were made for Gram's stain and ZN Stain and sample was inoculated on Blood agar MacConkey agar and SDA Slope. **Results:** Growth on SDA: Surface showed white and cottony growth while reverse showed light brown coloured growth. Microscopy after LPCB staining showed septate hyphae with unbranched or branched conidiophores that produce sickle-or canoe-shaped macroconidia. *Fusarium species* was isolated. Pathology reports of tissue stain were also corelated clinically to arrive at the diagnosis. **Conclusion:** Fusarium spp. are cosmopolitan fungi, which are thought to be inoculated into the skin by penetrating trauma. Pale stained (or unstained) grains are characteristic of infections due to *Fusarium spp*. is an example that, in areas of high endemic mycetoma, all types of manifestations can be present.

KEYWORDS : Eumycetoma, *Fusarium spp*, granulation tissue

INTRODUCTION:

Mycetoma is a progressive, chronic granulomatous infection affecting the skin and subcutaneous tissue. When caused by fungi, it is termed "eumycetoma". Eumycetoma is marked by deep granulomatous inflammation that forms grains and destroys tissues. The foot is particularly susceptible to fungal infections due to exposure to soil fungi through skin trauma.

CASE REPORT:

A 38-year-old woman came to the outpatient department with discharge from wound since few days. The patient was apparently alright 2 years back when she developed wound over left foot after trauma from a stone, while working. The wound was around 2 cm x 2 cm in size, accompanied with serous discharge, and was not healing. Patient was consulting a local doctor for the same, but which she found no relief. Three months back the patient was admitted in Dr. Prabhakar Kore Charitable hospital with diagnosis of diabetic nephropathy and was treated for the same. Patient was given was also treated for the non-healing wound. The treatment provided temporary relief. Tests were carried out to rule out any chronic infection, like tuberculosis. The patient has returned with worsening symptoms, including the original wound showing bloody discharge and black granular material, along with associated pain. Additionally, the patient reports experiencing itching all over the body at night. She is a known case of Type-II diabetes mellites, since the last 10 years, for which she has been taking regular medication. She belonged from Belagavi, Karnataka.

On local examination, there was diffuse swelling over the left foot, with erythema, multiple pus discharges and few ulcers over the swelling, with unhealthy granulation over the base with irregular margins. Swelling was soft on touch, with pale serous discharge on pressing.

After thorough clinical examination, laboratory diagnosis, culture evaluation and histopathological examination, it was diagnosed as a chronic case of fungal granulomatous infection – eumycetoma.

Surgical removal of the infected tissue was done, where the infection was localized and well-defined. Oral Itraconazole 200 mg twice daily, for 12 months was given, with good prognosis. Proper wound care was advised to prevent secondary bacterial infections and promote healing.

MATERIALS & METHODS:

The pus discharge, along with the dressing material were sent to Department of Microbiology, JNMC which were subjected to microscopy after doing Gram's stain and Ziehl-Neelsen stain. Samples were inoculated onto different culture medias following standard protocols and guidelines. Dressing material was sent in view of finding any granules, to rule out other diagnosis. Once growth was seen in culture media, they were further identified, using standard positive and negative controls, to validate the tests. Pathology reports of tissue stain with PAS stain were also corelated clinically to arrive at the diagnosis.

RESULTS:

Table 1: Table Showing Observation Of Different Tests/ Growths

Sl. No	Test performed / Growth seen	Observation
1.	Primary smear: *Gram's stain*	Pus cells (++), epithelial cells (+), fungal hyphae were seen
2.	Primary smear: Ziehl-Neelsen *stain*	*Negative for acid fast bacilli*
3.	Blood agar	Large whitish cottony were seen after 48 hours of incubation
4.	MacConkey agar	No growth seen on culture
5.	Sabouraud dextrose agar (SDA)	Obverse Surface showed white and cottony growth Reverse showed light brown colour.
6.	Microscopy after Lactophenol Cotton Blue staining (LPCB):	Septate hyphae, with branched conidiophores, with canoe-shaped septate (3-4 septa) macroconidia (2-3 X 15-16 µm) was seen along with singly arranged microconidia (2-3 X 4-5 µm)
7.	Periodic Acid Schiff's staining of the tissue	Shows radiating sunburst appearance of septate hyphae surrounded by eosinophils, foreign body giant cells and other inflammatory cells

The microbiological examination and culture growth of the pus sample revealed *Fusarium species* as the causative organism. Gram's staining showed fungal elements in the sample. Ziehl-Neelsen stain was done

to rule out other differential diagnosis like nocardiosis, actinomycetal or non-tubercular mycobacterial infection. The culture on blood agar displayed fungal colonies. Growth on SDA after 48 hours showed cottony white growth on obverse side and light brown colour on reverse (Fig. 1). Microscopy after LPCB staining of the growth was observed to confirm the diagnosis (Fig. 2). Histopathological findings were corelated to come to a diagnosis.

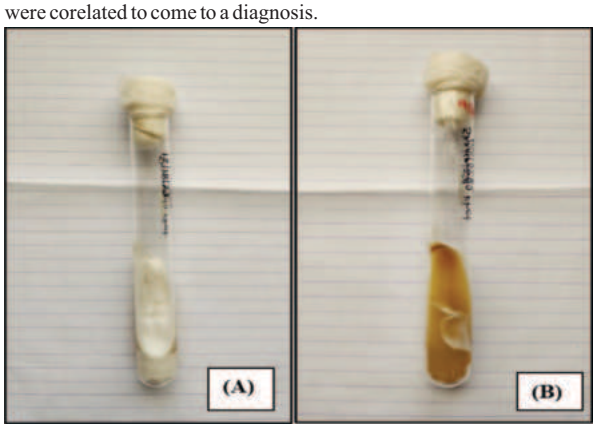

Figure 1: Obverse Surface showed white and cottony growth (A); Reverse showed light brown colour (B)

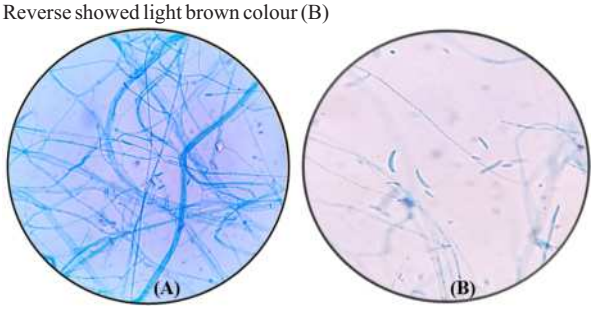

Figure 2: Septate hyphae, with branched conidiophores (A); Canoe-shaped septate (3-4 septa) macroconidia (2-3 X 15-16 µm) (B)

DISCUSSION

Eumycetoma is a chronic granulomatous fungal infection that typically occurs following traumatic inoculation of environmental fungi into subcutaneous tissues, particularly in tropical regions. In the present case, the causative organism was identified as *Fusarium* spp., a genus increasingly recognized in human infections.

Fusarium species have emerged as significant human pathogens, especially in immunocompromised individuals. Campos-Macías et al. first reported *Fusarium subglutinans* as a novel etiological agent in eumycetoma, reinforcing the genus's pathogenic potential in subcutaneous infections (1).

The patient's history of long-standing diabetes mellitus likely contributed to delayed healing and increased susceptibility to deep fungal invasion. Yadlapati et al. emphasized that systemic illnesses such as diabetes are known risk factors that can accelerate disease progression and complicate treatment outcomes (9).

Clinically, the presence of nodules, discharging sinuses, and granules—hallmarks of eumycetoma—help distinguish it from actinomycetoma, though overlapping symptoms often necessitate confirmatory diagnostics. Relhan et al. highlighted the essential role of integrating clinical, microbiological, and histopathological findings to arrive at a definitive diagnosis (2).

In this case, microscopy of the discharge and subsequent culture on Sabouraud Dextrose Agar (SDA) revealed growth characteristic of *Fusarium* spp., confirmed by the observation of canoe-shaped macroconidia under Lactophenol Cotton Blue staining. These findings mirror the dual infections reported by Bonifaz et al., where both *Fusarium verticillioides* and *Madurella mycetomatis* produced distinctive growth on culture media (3).

Management of eumycetoma is complex and often requires a combination of surgical and pharmacological approaches. Lalchandani et al. documented successful limb salvage using surgical debridement along with local amphotericin B therapy, demonstrating the efficacy of combined modalities in advanced cases (4). Similarly, in this case, surgical excision followed by prolonged oral itraconazole therapy resulted in a favourable clinical outcome.

Histopathology revealed hyphal structures radiating from granules surrounded by chronic inflammatory cells, consistent with deep fungal infections. Sonone and Hiwale noted that such histological findings, especially with PAS staining, are crucial in confirming eumycetoma when culture results are delayed or ambiguous (6).

Fungal speciation plays an essential role in guiding treatment. Siddig et al. reported the first case of *Fusarium falciforme* eumycetoma in Sudan and stressed the importance of accurate identification to tailor antifungal therapy effectively (7). This growing diversity of causative agents necessitates detailed fungal analysis in every suspected case.

Olenski et al. described a unique case of *Falciformispora lignatilis* eumycetoma in a renal transplant recipient, further highlighting the risk in immunocompromised individuals and the need for high clinical suspicion in atypical scenarios (5).

Finally, the differential diagnosis should include other chronic granulomatous infections like actinomycosis, especially in endemic regions. Boushabi et al. discussed such a rare case of Madura foot due to actinomycosis, emphasizing the need for microbiological confirmation before initiating treatment (8).

CONCLUSION

This case reinforces the diagnostic and therapeutic challenges posed by eumycetoma, particularly when caused by emerging fungal pathogens like *Fusarium* spp. A high index of suspicion, comprehensive diagnostic workup including fungal culture and histopathology, and prompt initiation of combined surgical and antifungal therapy are essential to achieving positive outcomes. Accurate fungal identification not only ensures targeted treatment but also contributes to the growing body of knowledge on the etiological spectrum of eumycetoma.

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Conflict Of Interest Statement

All authors declare that they have no competing interests.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author.

Consent

Verbal informed consent was obtained from the patient

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