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Deep mycosis mimicking cutaneous squamous cell carcinoma

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Abstract

Deep cutaneous mycoses are fungal infections that affect the skin and its deeper layers, leading to significant morbidity if not promptly diagnosed and treated. While dermatophytes, particularly *Trichophyton rubrum* and *Trichophyton mentagrophytes*, are the most common causative agents, other fungi such as *Candida* spp., *Aspergillus* spp., and *Fusarium* spp. can also cause these infections, especially in immunocompromised individuals. The clinical presentation varies depending on the depth and extent of the infection, ranging from superficial erythematous lesions to firm subcutaneous nodules, ulcers, abscesses, or sinus tracts. In advanced cases, deep cutaneous mycoses can lead to osteomyelitis and bone destruction. Mycetoma, a chronic infectious disease affecting the skin, subcutaneous tissues, and bones, is considered a deep skin mycosis. It is endemic in certain regions and can mimic other conditions such as cutaneous tuberculosis or cancerous lesions, making accurate diagnosis challenging. Diagnosis typically involves clinical presentation, radiological findings, and microbiological culture, with molecular methods aiding in culture-negative cases. Treatment is challenging and may involve surgical debridement, antifungal/antibiotic therapy, and sometimes amputation. Prevention strategies include improving hygiene, raising awareness, and early diagnosis. We present a case of an immunocompetent farmer with a wrist lesion initially suspected as cutaneous squamous cell carcinoma but histologically diagnosed as eumycetoma, emphasizing the importance of considering deep mycoses in high-risk individuals and highlighting the heterogeneous clinical presentation of these infections.

Introduction

Deep cutaneous mycoses are fungal infections that affect the skin and its deeper layers, including subcutaneous tissue, muscles, and bones. While relatively rare, they can cause significant morbidity if not promptly diagnosed and treated. The most common cause of deep cutaneous mycoses is dermatophytes, with *Trichophyton rubrum* and *Trichophyton mentagrophytes* being the most common causative agents. Other fungi, including *Candida* spp., *Aspergillus* spp., and *Fusarium* spp., can also cause deep cutaneous mycoses, particularly in immunocompromised patients. The clinical presentation of deep cutaneous mycoses can vary widely depending on the depth and extent of the infection. Superficial infections typically present as erythematous, scaly lesions that may be pruritic. In contrast, deep cutaneous mycoses can cause firm, subcutaneous nodules, ulcers, abscesses, or sinus tracts. The skin overlying the infected area may be warm, tender, and erythematous.¹

In advanced cases, the infection can spread to the bones and cause osteomyelitis, which can lead to bone destruction and deformity. Deep skin mycoses include the so-called “mycetoma,” a rare chronic infectious disease of the skin and subcutis caused by fungi (eu-mycetoma) or bacteria (actin-mycetoma).

Mycetoma is a chronic and disabling infectious disease that affects the skin, subcutaneous tissues, and bones and it is endemic in regions of the “mycetel belt,” including Africa, South America, and South Asia, while it is rare in the United States of America (USA) and in our latitudes.² Mycetoma presents clinically as a painful, often suppurated swelling that usually affects the distal extremities of the lower limbs and rarely may affect the upper limbs and face. Infection can often develop following penetrating trauma caused, for example, by plant thorns, wood splinters, animal bites, or contaminated organic material.³ The complex nature of the disease and the lack of diagnostic tools often make it difficult to distinguish mycetoma from other diseases that may present similar symptoms and the differential diagnosis of mycetoma includes cutaneous tuberculosis or cutaneous sarcoidosis; sometimes it may mimic cancerous lesions such as basal cell carcinoma, squamous cell carcinoma, amelanotic melanoma, or cutaneous metastases.⁴ Mycetoma is typically diagnosed based on clinical presentation, radiological findings, and microbiological culture. Definitive diagnosis requires the help of granulometric examination, microscopy, imaging (radiography, ultrasound, MRI) and culture

and, in some cases, new molecular methods such as PCR and molecular sequencing. Molecular sequencing for fungi and bacteria is important for rapid and correct diagnosis, especially in culture-negative cases. Treatment of mycetoma is challenging and requires prolonged and aggressive therapy, which may involve surgical debridement, antifungal and/or antibiotic therapy, and sometimes, amputation, and rehabilitation.⁵ However, the success of treatment depends on various factors, including the duration of the disease, the extent of tissue involvement, and the causative agent. Prevention of mycetoma involves improving hygiene and living conditions, as well as raising awareness among communities about the disease and its risk factors. In addition, early diagnosis is crucial in preventing disease progression and reducing the risk of complications and it is important to take preventive measures such as wearing protective clothing and shoes especially during risky activities.⁶

Case Report

A 77-year-old immunocompetent man, a farmer and rancher in close contact with livestock, came to our hospital complaining of a left wrist injury of about 4×5 cm that arose several months ago. Clinical examination revealed a painful, erythematous, crusted plaque with central ulcerated areas on the dorsal side of the distal third of the left forearm (Figure 1). Dermoscopy revealed irregular linear vessels, hairpin vessels, and developed glomerular vessels on a whitish background with ulcerated central area.

On history, hypertension was reported, and no previous dermatologic diseases were reported. The clinical and dermoscopic picture and personal history of significant sun exposure placed the diagnosis suspect of cutaneous squamous cell carcinoma.⁷ The size of the skin lesion would have required demolition surgery; therefore, it was decided to perform an incisional biopsy to ascertain the malignant nature of the lesion. Surprisingly, the outcome of the skin biopsy showed a picture of hyperkeratosis, dyselastosis, and pseudoepitheliomatous hyperplasia with focally ascending chronic and acute inflammation at the dermis level in the presence of fungal spores. Therefore, the diagnosis of eumycetoma was placed. Topical antifungal therapy was imposed with eosin to be applied twice daily and oral therapy with itraconazole 100 mg tablets to be taken twice daily for two weeks.⁸ The patient returned for follow-up after one month with substantial improvement in the skin picture.

Discussion and Conclusions

The clinical and dermoscopic appearance depicted the diagnosis of cutaneous squamous cell carcinoma; however, histologic examination revealed that the skin disease was characterized by thickening of the outer layer of the skin (hyperkeratosis), damage to the elastic fibers of the skin (dyselastosis), and abnormal growth of skin cancer-like tissue (pseudoepitheliomatous hyperplasia) with atypical cells that are probably due to chronic and acute inflammation with abscess formation in the deeper layer of the skin (dermis) (Figure 2).

However, the presence of fungal spores in the deeper layer of the skin allowed us to make the correct diagnosis of mycetoma and direct the course of treatment in the correct way (Figure 3). The described clinical case highlights the heterogeneous clinical presentation of deep mycoses, the importance of correct collection of the patient's medical history, and the need to consider deep mycoses among the possible differential diagnoses in immunocompetent patients performing risky jobs or activities.

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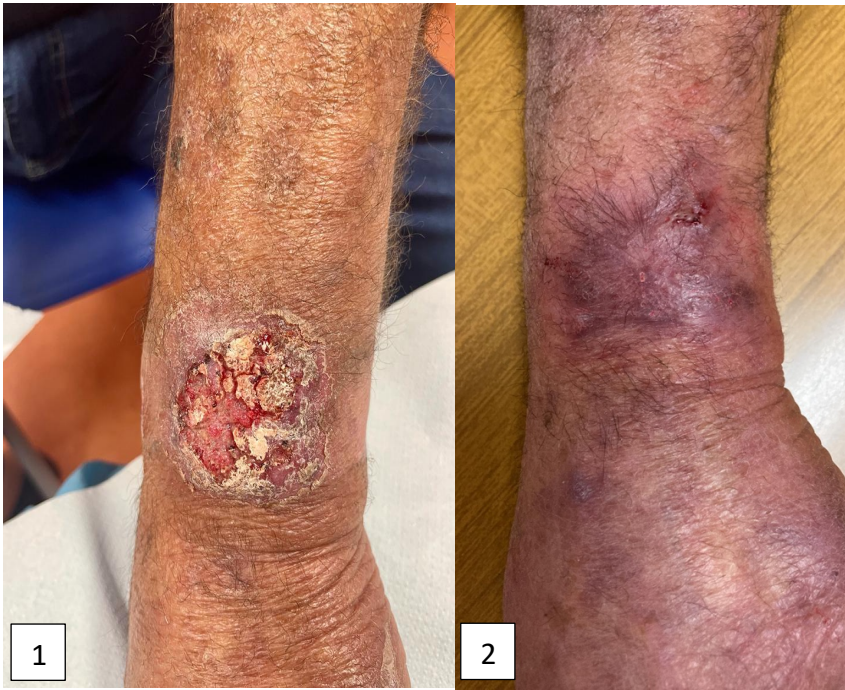


Figure 1. Erythematous, crusted plaque with central ulcerated areas before (1) and after (2) treatment.

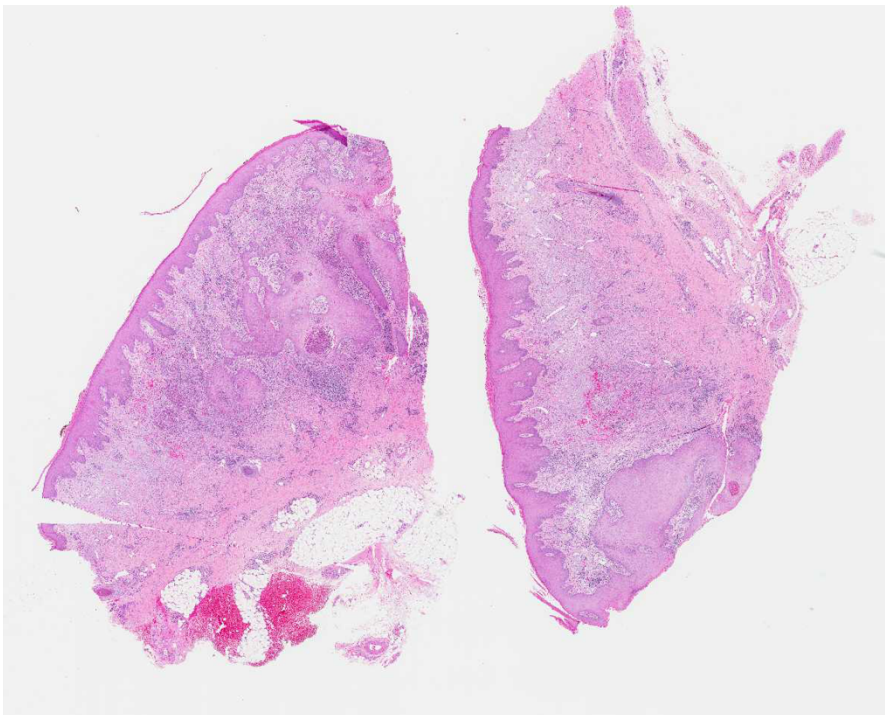


Figure 2. The skin condition is characterized by thickening of the outer layer of the skin (hyperkeratosis), damage to the elastic fibers of the skin (dyselastosis), and abnormal growth of tissue resembling skin cancer (pseudoepitheliomatous hyperplasia) with atypical cells that are likely due to chronic and acute inflammation resulting in abscess formation in the deeper layer of the skin (dermis) where fungal spores are present. This is likely a reactive response to the fungal infection.

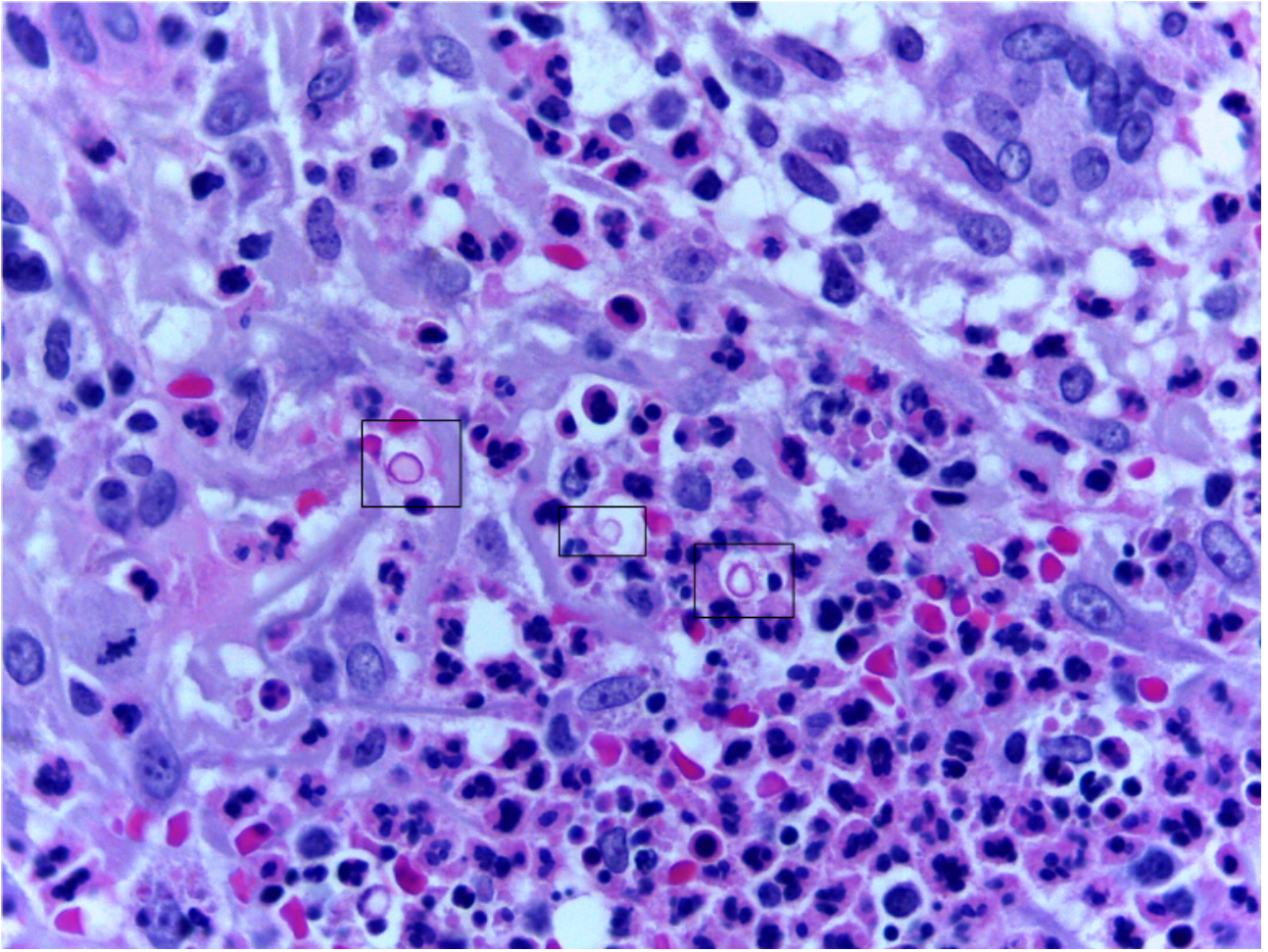


Figure 3. PAS staining 60× magnification: three deep spores are evident (circled)