BRIEF ARTICLES

Dysmorphic *Trichophyton rubrum* Mimicking Blastomycosis

Landon Hope MBA[1], Sidra Ibad BA[2], Etan Marks DO[3], Richard Hope MD[4], Clay J. Cockerell MD[3]

[1]Texas Tech University Health Sciences Center Lubbock, TX
[2]Icahn School of Medicine at Mount Sinai, New York, NY
[3]University of Texas Medical Center/ Cockerell Dermatopathology Dallas, TX
[4]Lubbokc Dermatology and Skin Cancer Center, Lubbock, TX

ABSTRACT

We describe a 62 year old immunocompromised, diabetic, male patient who presented with well-defined erythematous plaques on his right calf, a papule on his upper left chest, and several nodules along the arch of his right foot. The patient was 4 years post-nephrectomy due to renal cell carcinoma and 6 months post-renal transplantation at the time of presentation. Initial clinical impression was thought to be deep fungal infection or metastatic carcinoma. Trichophyton rubrum with a dysmorphic morphology simulating blastomycosis was ultimately diagnosed.

INTRODUCTION

Trichophyton rubrum is the most common fungal organism causing cutaneous dermatophyte infections worldwide. Traditionally, infections are limited to the epidermal layer of the skin causing common dermatophytosis. *T. rubrum* has been reported to be an invasive organism in immunocompromised hosts.[1] Blastomycosis is a deep fungal infection that is more prevalent in immunocompromised hosts than *T. rubrum*. It is typically a soil organism that may be inhaled leading to systemic disease with skin manifestations.[2] Immunosuppression required for transplant patients puts them at an increased risk for severe systemic infections from otherwise non or minimally pathogenic organisms.

CASE REPORT

A 60 year old male patient with a history of a renal cell carcinoma, renal transplant, diabetes and hypertension presented with several erythematous papules, plaques and nodules on his right calf, his upper left chest, and along the arch of his right foot. The patient's medications included tacrolimus (0.5 mg), prednisone (10mg), nifedipine (90mg), metoprolol (100mg), simvastatin (10mg), sulfamethoxazole/trimethoprim, insulin (100units/ml), furosemide (20mg), mycophenolic acid (360 mg), valganciclovir (450mg), cinacalcet (60mg), and glipizide (5mg) for control of the respective conditions. The patient was diagnosed and treated for renal cell carcinoma 4 years prior to his transplant. He had the renal transplant 6 months prior to the dermatology consultation.

The nodules and plaques appeared soon after transplant and then began enlarging which prompted a dermatology referral. Examination showed a well-defined erythematous papule on the upper left chest (Figure 1). Scaly plaques were observed on the right calf and several erythematous firm nodules were noted on the right arch and ankle (Figure 2). Additionally, onychomycosis was observed on both great toenails. Biopsies for histopathology and cultures were obtained from the right ankle and left chest. The initial impression of the clinician was a deep fungal infection versus metastatic cancer.

Biopsy specimens using hematoxylin and eosin stains showed suppurative granulomatous dermatitis, pseudocarcinomatous hyperplasia, multinucleated histiocytes and what appeared to be broad-based budding yeast. A periodic acid-Schiff stain highlighted and confirmed numerous spores in the dermis, many of which were broad based budding yeast-like organisms. A Fite stain was negative for microorganisms. These findings were consistent with blastomycoses due to the morphology of the organisms; therefore, the patient was started on itraconazole 200 mg to be taken twice daily for thirteen months. Additional tests were done to monitor liver function including monthly Aspartate Aminotransferase (AST) and Alanine Aminotransferase (ALT) for the first 3-4 months and then every other month thereafter.

At four weeks, the cultures had failed to grow bacteria, mycobacteria or deep fungal organisms. Specifically, *Blastomycosis spp.* did not grow, but *T. rubrum* was identified. This unexpected result was communicated with the dermatopathologist who subsequently suspected *T. rubrum* with a dysmorphic morphology simulating blastomycosis. The specimens were sent to the Centers for Disease Control, and they failed to identify blastomycosis DNA. Diagnosis of dysmorphic *Trichophyton rubrum* was confirmed with positive cultures and when a DNA probe failed to identify blastomycoses markers.

The patient continued to show clinical response to itraconazole, and after 13 months repeat biopsies of the resolving lesions showed only hypertrophic scar tissue with a negative periodic acid-Schiff stain. There was no evidence of the *T. rubrum* cutaneous infection. Both great toenails had been cleared of onychomycosis. Three months after cessation of treatment (at the time of this report) there has been no recurrence of infection.

Figure 1. Erythematous papules on the chest.

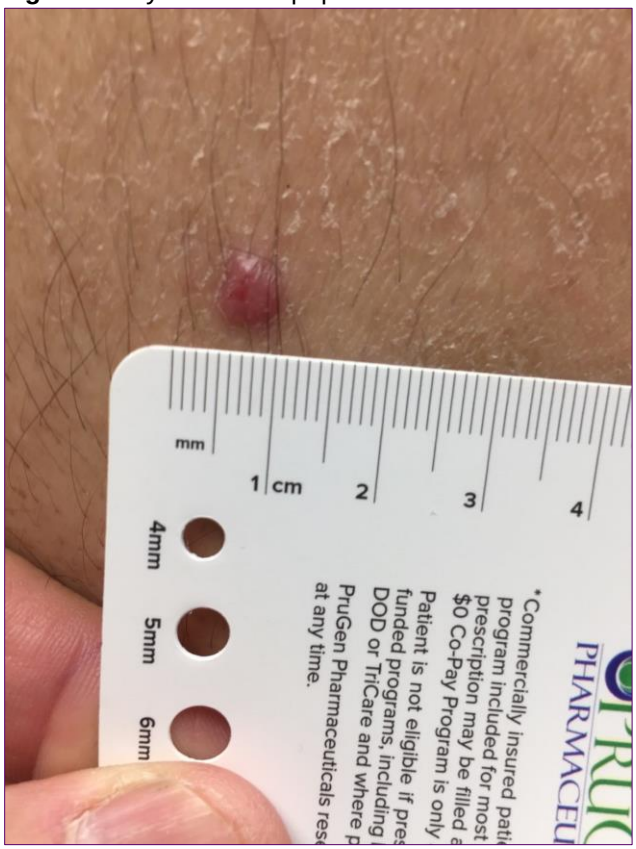


Figure 2. Erythematous papules on right ankle & foot.

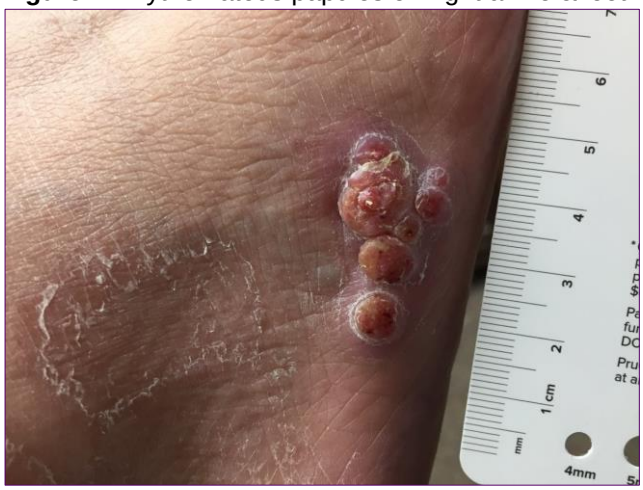


Figure 3-5. Suppurative granulomatous dermatitis with pseudoepitheliomatous hyperplasia, and broad-based budding yeast.

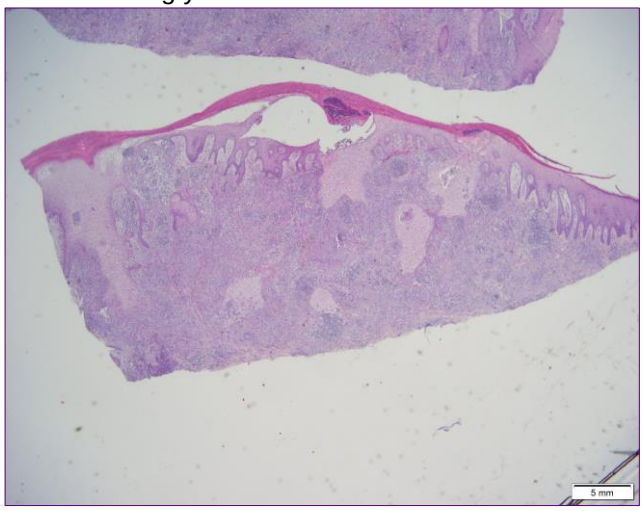


Figure 4.

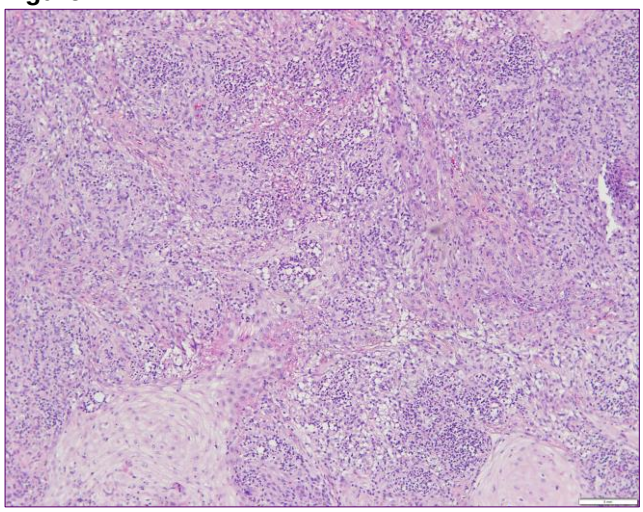


Figure 5.

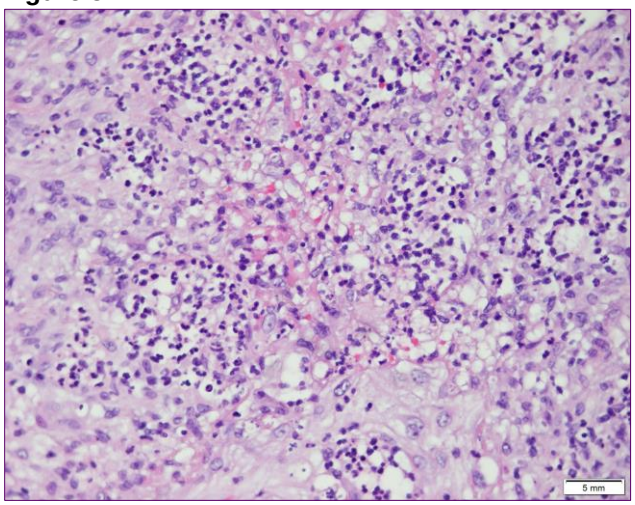
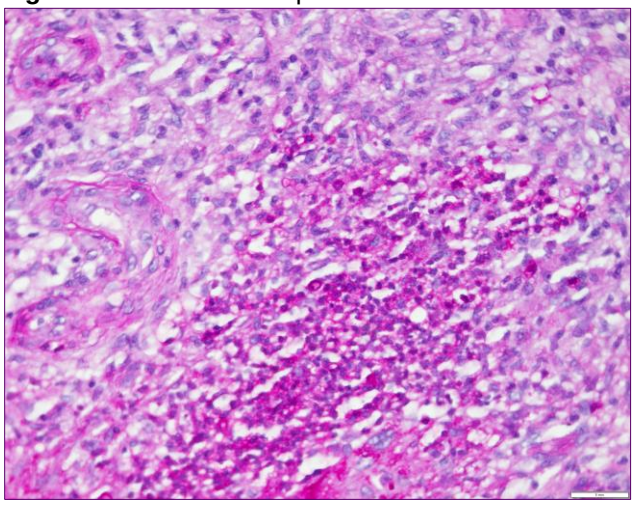


Figure 6. A PAS stain is positive.



DISCUSSION

T. rubrum commonly causes onychomycosis, tinea pedis, tinea cruis, tinea corporis, and tinea capitis.[3] Additionally, it is more common in immunocompromised patients. Rarely, as in the case presented, it can become an invasive organism. In cases of invasive *T. rubrum,* onychomycosis is commonly observed. Terbinafine is the preferred treatment of *T. rubrum.*[4] However, our patient was having a clinical response to itraconazole 200mg twice daily and was

tolerating it well. Therefore, this therapeutic regiment was continued until final biopsies showed total resolution of the infection.

The findings of the periodic acid-Schiff and Fite stains were consistent with blastomycoses; however, cultures and DNA probes showed the growth of T. rubrum and the absence of blastomycoses. Both blastomycosis and T. rubrum are characterized by increased risk in immunocompromised/immunosuppressed individuals and granulomatous nodule presentations.

This presents a unique challenge for dermatopathologists because the dysmorphic morphology of T. rubrum resembles that of blastomycoses, yielding incorrect initial diagnoses if no further tests are conducted. Incorrect initial diagnoses lead to the prescription of medications that are less than ideal in treating the underlying disease. Additional tests would include immunostaining using anti-mycobacterium and anti-Trichophyton antibodies, PCR confirmation, and testing on Sabouraud dextrose agar. Especially because T. rubrum is not particularly invasive, the initial diagnosis is usually not questioned.

Conflict of Interest Disclosures: None

Funding: None

Corresponding Author:
Etan Marks, DO
Phone:847-951-8359
E-mail: cjcconsults@gmail.com

References:

1. Wolfson JS, Sober AJ, Rubin RH. Dermatologic manifestations of infections in immunocompromised patients. Medicine 1985;64:115-31.
2. Kwon-Chung, K. J. (K. June) and Bennett, John E. (John Eugene), 1933- *Medical mycology*. Lea & Febiger, Philadelphia, 1992.
3. Venkatesan, P. , Perfect, J. R. and Myers, S. A. Evaluation and management of Fungal infections in Immunocompromised patients. Dermatologic Therapy 2005;18: 44-57.
4. Zaias N, Serrano L. The successful treatment of finger Trichophyton rubromonychomycosis with oral terbafine. Clinical and Experimental Dermatology;1989; 14: 120-123