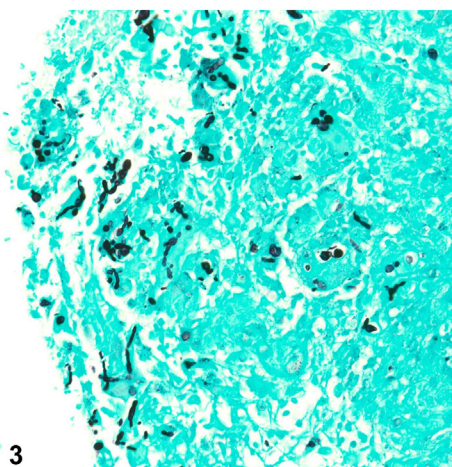
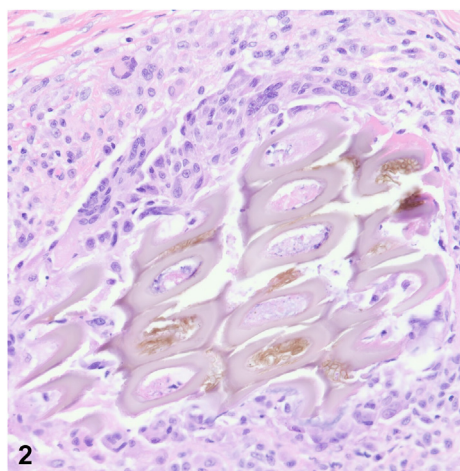


Tender violaceous nodule on the palm



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CASE PRESENTATION

A 71-year-old man presented with a 2-month history of a tender nodule on the left palm during a total-body skin examination (Fig 1). The patient carried a diagnosis of *JAK2* VA617F intermediate-risk essential thrombocytosis with secondary myelofibrosis and had been started on ruxolitinib 3 months prior to the

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presentation. The patient was an avid gardener. The examination revealed a well-appearing male with a multiloculated, nonulcerated, red-violaceous nodule on the left palm. Laboratory studies revealed lymphocytosis with normal platelets. A skin biopsy and tissue culture were obtained. Hematoxylin-eosin staining (Fig 2) and Gomori methenamine silver staining (Fig 3) were performed on the biopsy sample.

Question 1: What is the most likely diagnosis?

- A. Sporotrichosis
- B. Noninfectious foreign body granuloma
- C. Coccidioidomycosis
- D. Phaeohyphomycosis
- E. Bacillary angiomatosis

Answers:

A. Sporotrichosis — Incorrect. Sporotrichosis is caused by *Sporothrix schenckii*, a dimorphic fungus. Cutaneous infection usually results from traumatic inoculation and most commonly presents with a lymphangitic pattern. The presence of pigmented fungi on histology would not be expected.

B. Noninfectious foreign body granuloma — Incorrect. Foreign body granulomas develop from inflammatory reactions to the introduction of exogenous material and may appear as nodules. In this case, the biopsy showed a wood splinter (Fig 2) but also revealed fungal spores and hyphae (Fig 3). The foreign body may serve as a source of infection.

C. Coccidioidomycosis — Incorrect. Coccidioidomycosis is caused by 2 dimorphic fungi, *Coccidioides immitis* and *C. posadasii*. It occurs predominantly in the southwestern United States, and characteristic endospore-containing spherules are present on histology.

D. Phaeohyphomycosis — Correct. Phaeohyphomycosis describes infections with dematiaceous or phaeoid fungi that most commonly affect immunosuppressed patients.¹⁻³ Dissemination can occur.⁴ Gomori methenamine silver staining showed numerous pigmented fungal spores and hyphae (Fig 3). The histology of phaeohyphomycosis is distinct from those of mycetoma and chromoblastomycosis. Here, a phaeoid fungus of the genus *Exophiala* was identified by fungal culture and polymerase chain reaction.

E. Bacillary angiomatosis — Incorrect. Bacillary angiomatosis is caused by infection with *Bartonella* genus bacteria and typically presents with bright red papules and nodules in immunocompromised patients.

Question 2: What is the most common mode of transmission?

- A. Inhalation of spores
- B. Inoculation injury with exposure to soil
- C. Cat scratch
- D. Exposure to contaminated fish tanks
- E. Handling of infected animal tissues

Answers:

A. Inhalation of spores — Incorrect. Aspergillosis and infection with dimorphic fungi (blastomycosis, histoplasmosis, and coccidioidomycosis) can be caused by spore inhalation. An infection with these organisms would not be expected to present as a solitary cutaneous nodule with no other findings; systemic symptoms, including pneumonia, would be expected.

B. Inoculation injury with exposure to soil — Correct. Phaeohyphomycosis usually follows an inoculation injury, and the causative fungi are frequently found in soil.³ The patient did not recall any trauma in this case, but the biopsy revealed a wood splinter within the nodule (Fig 2); the most common sources of cutaneous inoculation of sporotrichosis include exposure to plants such as rose bushes.

C. Cat scratch — Incorrect. Cat scratch disease is caused by *Bartonella henselae*, can sometimes present as a solitary subcutaneous nodule, and is classically observed in the context of infection stemming from a cat scratch. Fungi would not be expected in the lesion.

D. Exposure to contaminated fish tanks — Incorrect. *Mycobacterium marinum* often presents as a cutaneous infection and can be found in fresh water and salt water. Exposure frequently arises from swimming or cleaning aquariums (fish tank granuloma), and fungi would not be expected in the lesion.

E. Handling of infected animal tissues — Incorrect. Tularemia, caused by *Francisella tularensis*, can be acquired by handling infected animal tissues (most commonly rabbit tissues). It has variable presentations and can present as a tender, pink

papule at the site of inoculation that may enlarge and evolve into an ulcer.

Question 3: What is the appropriate treatment for this patient?

- A. Amphotericin B
- B. Combination surgical excision and voriconazole
- C. Fluconazole
- D. Incision and drainage
- E. Surgical excision alone

Answers:

A. Amphotericin B — Incorrect. Amphotericin B has a poor minimum inhibitory concentration 50% against infections with phaeoid organisms. Systemic antifungal treatment alone is also insufficient to treat cutaneous phaeoid fungi infections.

B. Combination surgical excision and voriconazole — Correct. A combination of systemic antifungal treatment and surgical removal is recommended for the definitive treatment of a cutaneous phaeohyphomycosis infection in the context of immunosuppression.^{1,3,5} The treatment of phaeohyphomycosis cellulitis in a patient undergoing treatment with ruxolitinib has been reported with voriconazole and surgical management.⁶ Similarly, voriconazole was used for treatment in this patient, followed by surgical excision.

C. Fluconazole — Incorrect. Fluconazole has minimal antimycotic activity against phaeoid fungal

organisms, and systemic antifungal treatment with this agent alone is insufficient to treat cutaneous phaeohyphomycosis.¹

D. Incision and drainage — Incorrect. Incision and drainage does not provide a definitive treatment for phaeoid fungal infection given immunosuppression because there is a high likelihood of recurrence.⁵

E. Surgical excision alone — Incorrect. Surgical excision alone is not recommended given the possibility of disseminated infection in an immunosuppressed patient.

Conflicts of interest

None disclosed.

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