Case Report

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Subcutaneous Basidiobolomycosis Presenting as Soft Tissue Sarcoma Mimicker: A Case Report

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Abstract:

A 20-year-old Thai woman from Takfa, Nakhonsawan, presented with a painful, progressively enlarging, erythematous mass on the right thigh over 2 months; initially suspected to be soft tissue sarcoma, she was later diagnosed with subcutaneous *Basidiobolomycosis* based on histopathology and fungal culture. She responded well to oral itraconazole and potassium iodide solution.

Keywords: *Basidiobolomycosis*, *Basidiobolus*, Entomophthoramycosis, Sarcoma

Introduction

Entomophthoramycosis is a rare fungal infection caused by entomophthoralean fungi, primarily *Conidiobolus* spp. and *Basidiobolus* spp. *Basidiobolomycosis*, which is attributed to *Basidiobolus* spp. infection, typically presents as a painless or mildly painful, firm subcutaneous mass involving the limbs or trunk. Visceral involvement, particularly of the gastrointestinal tract, is less common and occurs via ingestion of fungal spores. The chronic, indolent course of infection often resembles cellulitis or soft tissue sarcoma, posing diagnostic challenges[1]. Delayed or misdiagnosis as sarcoma may result in unnecessary radical surgery and associated morbidity. Diagnosis requires a high index of suspicion and is confirmed by histopathology and fungal culture. Effective treatment includes antifungal agents such as itraconazole, with potassium iodide commonly used as adjunctive therapy[2,3]. With appropriate management, prognosis is favorable, and surgery is generally avoidable. In Thailand, at least 18 cases of *Basidiobolus* infection have been reported since 1997, predominantly in the

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western and northern regions[4–7]. This case report presents a case of subcutaneous *basidiobolomycosis* mimicking soft tissue sarcoma in order to highlight the importance of early recognition, accurate diagnosis, and treatment of this rare infection.

Case report

A 20-year-old Thai woman from Takfa district, Nakhonsawan, presented with a painful, swollen, and reddened mass on the medial right thigh, which progressively enlarged over 2 months. She denied trauma or underlying illness. She is unemployed and living in a rural area. She had no known exposure to soil or decaying matter but reported handling a toad in her bathroom. Initial examination revealed a firm, tender, well-defined 8×8 cm mass with a flattened, irregular surface on the right thigh. The mass was mobile relative to the overlying erythematous skin, with no fluctuation, ulceration, or palpable regional lymphadenopathy. She was initially diagnosed with cellulitis and treated with amoxicillin-clavulanate 875/125 mg twice daily for 2 weeks. Follow-up showed a slight reduction in mass size and resolution of skin redness and warmth. However, the mass enlarged again 2 weeks later, prompting reevaluation. Given her clinical course and age, soft tissue sarcoma was suspected, and an incisional biopsy was performed. Histopathological examination revealed necrotizing granulomatous dermatitis with fungal elements surrounded by the Splendore-Höeppli reaction—an intensely eosinophilic, hyaline-like material deposited around the fungal structures—raising suspicion of entomophthoramycosis (Figure 1). A second incisional biopsy was performed for fungal culture and molecular testing. Fungal culture showed growth, and microscopy revealed large, irregular, non-septate hyphae with numerous smooth, round, thick-walled zygospores with beak-like appendages—features characteristic of *Basidiobolus* spp. (Figure 2). However, 18S rRNA was not detected in the infected tissue by molecular testing. She was treated with itraconazole 200 mg twice daily and potassium iodide, starting at 2.5 mg/kg/day and titrated to

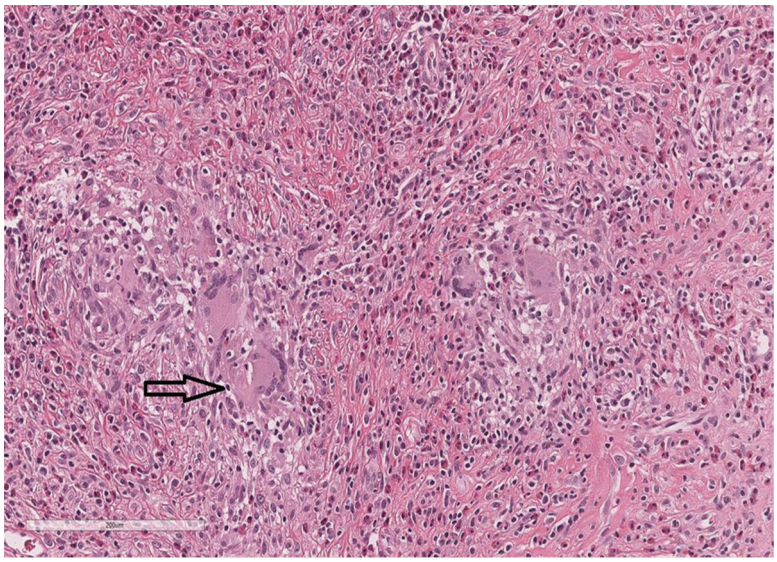

Figure 1 H&E stain of biopsied thigh mass showing fungal elements surrounded by Splendore–Hoeppli reaction

5 mg/kg/day. Baseline labs, including CBC, liver, kidney, and thyroid function, were normal. She tolerated the treatment well without major side effects. After one week, the mass was reduced from 8×8 cm to 5×5 cm. At the one-month follow-up, all laboratory values remained normal. The mass gradually decreased in size and completely resolved after 12 weeks of treatment, with no clinical relapse after discontinuation.

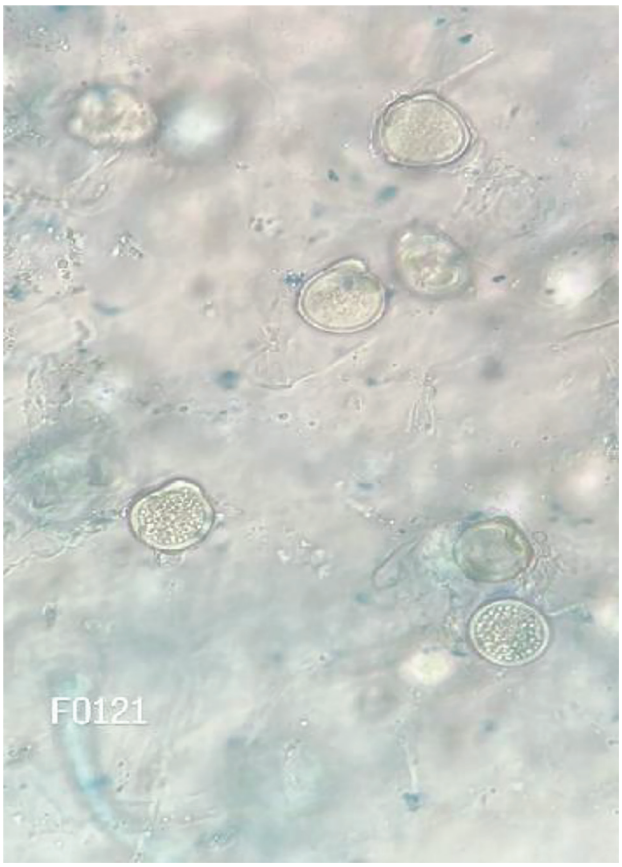

Figure 2 Microscopic examination shows large, irregular, non-septate hyphae with numerous smooth, round, thick-walled zygospores exhibiting a distinct beak-like appendage

Discussion

Entomophthoromycosis is a rare fungal infection with 2 main forms. *Basidiobolomycosis* typically affects children and presents as a firm, mobile subcutaneous mass on the limbs, trunk, buttocks, or gastrointestinal tract. *Conidiobolomycosis* mainly affects adults, causing disfiguring rhinofacial swelling. Infection occurs through skin trauma, inhalation, or ingestion of spores[8].

Basidiobolus spp. is an environmental fungus found in soil, decaying matter, and the GI tracts of amphibians and reptiles. Human infection is rare but typically occurs in tropical regions, especially in children and young adults[8]. *Basidiobolomycosis* presents primarily in the subcutaneous form and, rarely, in the gastrointestinal form[9]. In the subcutaneous form, patients typically present with a slowly enlarging, painless mass that develops over weeks to years. They are usually afebrile unless a secondary bacterial infection occurs. These clinical features make diagnosis challenging.

The differential diagnosis between chronic infection and soft tissue malignancy should be carefully considered. Subcutaneous *Basidiobolomycosis* can closely mimic soft tissue sarcoma, especially in children. Clinically, *Basidiobolomycosis* presents as a firm, painless, discoid subcutaneous mass, typically on the lower trunk or limbs. A helpful sign is the "doughnut-lifting sign," where the lesion lifts easily from deeper tissues while remaining attached to the skin. In contrast, sarcomas are often irregular, tender, and fixed to deeper planes. Histopathologically, *Basidiobolomycosis* shows granulomatous inflammation with eosinophils and broad, infrequently septate hyphae surrounded by the Splendore–Hoeppli phenomenon, whereas sarcomas show monomorphic atypical cells with frequent mitoses and lack fungal elements. Radiologically, *Basidiobolomycosis* appears well-circumscribed with minimal deep invasion, while sarcomas are typically ill-

defined, invasive, and heterogeneous, often with necrosis or calcification[10].

The infection mechanism depends on the site of fungal entry. In the subcutaneous form, it typically occurs through minor skin wounds from contact with contaminated surfaces like soil. In the gastrointestinal form, infection results from ingesting food contaminated with fungal spores, such as raw or undercooked reptiles. The disease can affect both immunocompetent and immunocompromised individuals[11]. After entering the body, *Basidiobolus* spp. triggers a Th2-mediated immune response, with IL-4, IL-5, and IL-13 release, IgE expression, and recruitment of mast cells, basophils, and eosinophils. The immune system fails to clear the fungi, resulting in encapsulation and the characteristic Splendore-Höeppli phenomenon, which may be absent in immunocompromised hosts.

Diagnosis requires identifying *Basidiobolus* spp. in tissue. Histopathology typically shows subcutaneous fungal confinement with eosinophilic inflammation and Splendore-Höeppli formation around hyphae. Acute stages show neutrophils and eosinophils; chronic stages involve histiocytes, lymphocytes, and occasional giant cells. For culture, biopsy specimens should be transported at room temperature, sectioned into 2 mm blocks, and inoculated onto 2% Sabouraud dextrose or blood agar, then incubated at 37 °C and room temperature. Colonies usually appear within 24–48 hours at 37 °C, or 2–4 days at room temperature[11]. Molecular studies on *Basidiobolus* spp. isolates have used specific primers, such as BasF611 and BasR1340, to amplify a ~730 bp region of the 18S rRNA gene. PCR conditions typically include 35 cycles of denaturation at 94 °C for 30 seconds, annealing at 62 °C for 45 seconds, and extension at 72 °C for 60 seconds[12]. In our case, 18S rRNA was not detected in the infected tissue despite a positive culture for *Basidiobolus* spp. Possible causes include low fungal burden, poor RNA extraction due to the thick cell wall, RNA degradation, or primer mismatch. The assay may also lack sensitivity for rare fungi like *Basidiobolus* spp. A negative 18S rRNA result does not rule out infection; thus, histopathology and culture remain essential for diagnosis. Molecular tests may require species-specific primers or pan-fungal ITS/28S rRNA targets. Further studies are needed to evaluate the diagnostic performance of 18S rRNA in these fungi.

The primary treatment for subcutaneous *Basidiobolomycosis* is itraconazole, often combined with potassium iodide at 20–30 mg/kg/day[2,4,5,13]. Literature reviews show that treatments have included ketoconazole, itraconazole, fluconazole, voriconazole, and cotrimoxazole, with some cases using amphotericin B plus itraconazole. However, no standard treatment protocol has been established[1,3,6,8]. Potassium iodide, particularly as a saturated solution (SSKI), is used as an effective adjunct in subcutaneous *Basidiobolomycosis* due to its immunomodulatory and possible direct antifungal effects. Though the exact mechanism is unclear, potassium iodide may enhance host immunity by boosting neutrophil activity and aiding granulomatous inflammation resolution[8,11]. Due to relative antifungal resistance, prolonged combination therapy is recommended. Treatment duration depends on disease extent and clinical response[6,7].

In our case, the patient was treated with itraconazole 200 mg twice daily and potassium iodide at 5 mg/kg/day, achieving disease remission at 12 weeks without adverse effects or thyroid dysfunction. Monitoring thyroid function during potassium iodide therapy is important due to the risk of iodine-induced hypo- or hyperthyroidism via Wolff-Chaikoff effect. Regular TSH and free T4 assessments ensure safe, effective treatment. Further studies are needed to determine the optimal potassium iodide dosage.

Surgical intervention is generally not recommended as a first-line treatment for subcutaneous *Basidiobolomycosis*,

which often responds well to prolonged antifungal therapy, particularly itraconazole or potassium iodide. Current expert opinion and case-based evidence suggest that surgery should be reserved for diagnostic biopsy or the management of complications, rather than routine treatment[6,14].

Subcutaneous *Basidiobolomycosis* has an excellent prognosis when diagnosed early and treated with antifungal therapy. Most patients recover without recurrence or need for surgery[6,14].

Conclusion

This case highlights the importance of clinical suspicion and awareness of fungal infections as a cause of chronic subcutaneous masses mimicking soft tissue sarcoma. Early, accurate diagnosis is crucial to prevent morbidity from misdiagnosis. It also underscores the value of histopathology and conventional microbiology in confirming the diagnosis. The patient was effectively treated with itraconazole and low-dose potassium iodide, with a favorable outcome.

Ethical approval

The patient's consent was obtained.

Author contributions

All the authors had a role in taking care of this patient and proofing the final version of the manuscript.

Conflict of interest

The authors have no competing interests to declare.

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