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FUNGAL INFECTIONS MASQUERADING AS OTHER SURGICAL CONDITIONS: A CASE SERIES

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Abstract

Background: Fungal infections may present with signs and symptoms similar to more common surgical conditions, leading to diagnostic delays and inappropriate management.

Objective: To enhance clinical and therapeutic awareness of fungal infections mimicking surgical conditions and to highlight diagnostic challenges.

Methods: This case series presents seven patients with fungal infections initially misdiagnosed as other surgical conditions. Clinical presentation, investigations, treatment, and outcomes were documented.

Results: Cases ranged from localized subcutaneous swellings to necrotizing fasciitis and gangrene. Etiologies included *Basidiobolus ranarum*, *Apophysomyces elegans*, *Rhizopus arrhizus*, *Aspergillus nidulans*, eumycetoma coexisting with tuberculosis, and phaeohyphomycosis. Three patients died despite aggressive management.

Conclusion: Fungal infections should be considered in atypical, non-responding surgical cases, especially in immunocompromised individuals. Early diagnosis with targeted antifungal therapy is critical.

Keywords: Fungal infections, Surgical mimics, Mucormycosis, Antifungal therapy, Case series

INTRODUCTION

Fungal infections are often insidious in onset and elusive in presentation, yet can closely mimic the clinical features of more common surgical pathologies such as abscesses, neoplasms, or inflammatory lesions. Their presentation is frequently non-specific—characterized by swelling, pain, discoloration, or mass-like lesions—leading to diagnostic ambiguity and potential misdirection toward conditions like tumors, bacterial infections, or ischemic processes.

This diagnostic uncertainty often results in delayed or inappropriate management. In the case of invasive mucormycosis, for example, a delay in initiating amphotericin B–based therapy beyond 16 days after symptom onset was associated with a more than 12-fold increase in mortality among patients with hematological malignancies (1). Even histopathological identification of fungi within tissue is not infallible; one retrospective study reported a 21% discrepancy between histopathology and culture results when classifying molds and yeasts, with some misclassifications contributing to adverse clinical outcomes (2).

Traditional diagnostic methods such as cultures and histopathology, remain the gold standard but have inherent limitations. Blood cultures often yield false-negative results in invasive fungal disease, and while non–culture-based diagnostics—including antigen detection assays (e.g., galactomannan, β-D-glucan) and molecular techniques—have improved sensitivity, their performance is variable and they are yet to become universally reliable (3).

Fungal infections may also masquerade as other serious conditions, leading to inappropriate treatment. Gastrointestinal mucormycosis, for instance, has been mistaken for inflammatory bowel disease, where treatment with corticosteroids can worsen the fungal infection and lead to fatal outcomes (4). Similarly, fungal scleritis following cataract surgery has been initially mismanaged as surgically induced necrotizing scleritis, delaying effective antifungal therapy (5). Other reports include palatal mucormycosis mimicking osteomyelitis of the

maxilla (6) and rhino-orbito-cerebral mucormycosis presenting like sinonasal malignancy (7). Colonic mucormycosis has even been reported in an immunocompetent patient as a lesion clinically indistinguishable from colorectal carcinoma (8).

Overall, fungal infections that masquerade as surgical illnesses create significant challenges by complicating diagnostic pathways, confounding clinical management, and worsening patient outcomes. Rapid, accurate diagnosis—through multidisciplinary collaboration, optimized tissue sampling, and the application of advanced diagnostic tools—is essential to improve prognosis in these potentially fatal cases.

Objectives

1. To highlight diagnostic challenges in fungal infections mimicking surgical conditions.
2. To present varied case profiles across surgical specialties.
3. To suggest optimized diagnostic strategies using fungal cultures, molecular assays, and imaging.

MATERIALS AND METHODS

This study involved a retrospective analysis of seven cases where fungal infections were misdiagnosed as common surgical conditions. Detailed patient histories and thorough physical examinations were conducted to assess symptoms and identify predisposing factors. Core and incisional biopsies, alongside histopathological examinations, were critical in diagnosing fungal infections. Fungal cultures and KOH mount preparations were employed to identify specific fungal pathogens. Advanced imaging techniques, particularly CT scans, were used to visualize internal lesions. Treatment protocols included antifungal medications such as Amphotericin B, Itraconazole, and Terbinafine, and necessary surgical interventions like debridement and excision. Postoperative care involved regular follow-ups to monitor treatment response and manage complications. Data on patient outcomes, diagnostic challenges, and treatment effectiveness were systematically collected and analyzed. Ethical guidelines were strictly followed, ensuring patient confidentiality and informed consent throughout the study.

Case Series

Case 1 – Subcutaneous Phycomycosis

- 72-year-old immunocompetent male with a three-month history of diffuse swelling on the dorsal aspect of his right forearm.
- Initially suspected to be **a soft tissue sarcoma**, owing to the size of the swelling and the acute duration.
- Subsequent investigations, including MRI, and core biopsy, revealed a granulomatous inflammation with the possibility of a mycotic lesion.
- The clinical presentation included a 15x11 cm swelling, hyperpigmented skin, and normal forearm movements except for a 30-degree flexion deformity. Laboratory tests ruled out tuberculosis and other infections.
- Excision and biopsy of the swelling was done, intra operative and post operative period was uneventful.
- Histopathological examination confirmed granulomatous inflammation with fungal elements, leading to a diagnosis of subcutaneous phycomycosis, likely caused by Basidiobolus ranarum.
- The patient was treated with oral itraconazole and potassium iodide solution, which resulted in a significant reduction in the size and consistency of the swelling over several weeks.
- No evidence of recurrence was noted in the region

Figure 1: Post operative pictures of abscess caused by Basidiobolus ranarum

Case 2 – Mucormycosis Presenting as Necrotizing Fasciitis

- A 45-year-old diabetic with c/o left thigh swelling and discoloration for 10 days.
- H/o Workplace thorn prick +

- L/E- Skin 15x15 cm blackish discoloration and induration. A central lesion had a draining sinus with firm, non fluctuant, warm pus discharge.
- Provisional diagnosis - **necrotizing fasciitis**, wound debrided.
- POD-2, fungal moulds+ □ started antifungal therapy (Amphotericin B injection).
- Serial wound debridements performed.
- Fungal culture - Apophysomyceselegans
- HPE - Mucormycosis was found on Histopathological analysis
- Unfortunately, patient's general condition deteriorated rapidly leading to his demise.

Figure 2: Left thigh abscess due to Apophysomyceselegans

Case 3 – Incidental *Rhizopus arrhizus* in Diabetic Foot Ulcer

- A 75-year-old diabetic man on irregular dialysis developed an ulcer on the dorsal part of his left fifth toe over two weeks, with no recent trauma.
- The ulcer measured 2x2 cm, had a foul-smelling discharge, and was associated with patchy gangrene.
- Initial diagnosis was **wet gangrene of left fifth toe**, and was disarticulated, with adequate debridement of the wound
- KOH mount and fungal culture detected fungal hyphae in the specimen sent for culture and sensitivity
- The patient was started on Amphotericin B, and fungal culture identified Rhizopus arrhizus.
- Despite the initiation of effective treatment, with antifungals and serial debridement the patient died the next day.
- This case underscores the rapid progression and high mortality associated with fungal infections in immunocompromised individuals.

Figure 3: Wet gangrene of Left 2nd to 5th toes due to Rhizopus arrhizus

Case 4 – Recurrent Abdominal Wall Abscess due to *Aspergillus nidulans*

- 58-year-old male with Type 2 Diabetes Mellitus on OHAs .
- Came with complaints of Right-sided abdominal pain and swelling over the anterior abdominal wall for 10 days with occasional low-grade fever
- No recent trauma, accidental pricks, or injections with no significant past surgical history
- On examination- Palpable firm mass (15×10 cm) in the right hypochondrium and lumbar regions, extending into the parietal wall.
- Initially patient was treated with Incision and drainage and Pus was drained
- Initial fungal culture was sent and no growth was appreciated.

- Follow-up after 5 months, patient came with Recurrent swelling in the right lumbar region, located 2 cm inferior to the right chest wall
- Incision and drainage performed, fungal c/s was done identified Aspergillus nidulans
- Patient was Started on Itraconazole for 2 months, swelling decreased in size
- Patient remained asymptomatic on antifungal therapy, no recurrent lesion was noted on 1year follow up.

Case 5 – Coexistence of Eumycetoma and Tuberculosis

- 35-year-old woman from a rural area in Tamil Nadu, India.
- Presented with a lesion on the posterolateral aspect of the right thigh with multiple discharging sinuses for three years associated with mild fever intermittent fever.
- On examination a Lesion on the posterolateral aspect of the right thigh measuring 18x15 cm, mobile, tender, firm, with hyperpigmented overlying skin.
- Diagnosis: Eumycetoma based on clinical and laboratory parameters.
- Treatment: Antifungal medication (Terbinafine and Itraconazole).
- Despite antifungal treatment, no improvement in healing of the sinus was observed even after 12 months.
- Further on clinical suspicion of tuberculosis, Histopathological examination done, revealed features diagnostic of tuberculoid granuloma.
- Mantoux test positive, X-ray chest normal, ESR 60 mm/hr, no significant lymphadenopathy.
- Final Diagnosis of Co-existence of eumycetoma and tuberculosis in the same lesion.
- Treated with Antitubercular therapy (Rifampicin, Isoniazid, Ethambutol, Pyrazinamide).
- Monthly follow-up showed signs of improvement.
- Complete healing of the wound was observed.
- No recurrent lesion was noted in the local area or anywhere else in the body

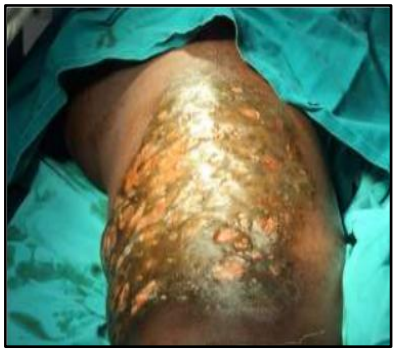

Figure 4: Abscess on posterolateral aspect of right thigh with multiple discharging sinuses

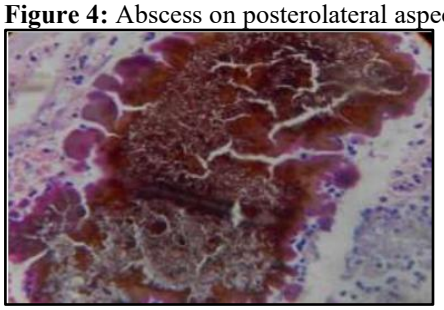

Figure 5: Fungal hyphae surrounded by splendor hopple phenomenon

Case 6 – Fungal Carbuncle by *Apophysomyces elegans*

- 50-year-old male, daily wage worker from Thiruvallur district, Tamil Nadu.
- Presented with pain and swelling in the upper back for 10 days, With history of a minor trauma (thorn prick) and fever for 2-3 days.
- Patient was Febrile but haemodynamically stable at admission.
- Local examination showed a 12×8 cm indurated area with a discharging sinus- diagnosed as a **Carbuncle of the back**
- Started on IV Cefotaxim and IV Metronidazole.
- Labs showed raised total leucocyte count (19,900/mm³) and high random blood sugar (206 mg/dl).
- No improvement with antibiotics; total leucocyte count increased to 26,000/mm³.
- Emergency deroofing of the carbuncle revealed necrotic tissue and granular exudate.
- Fungal etiology suspected; KOH mount confirmed fungal hyphae.
- Empirical IV Amphotericin B started.

- Experimental local therapy with fluconazole ointment showed better results than candid powder.
- Patient required repeated transfusions and ICU care due to severe bleeding and infection.
- Despite aggressive treatment, the patient succumbed on the 14th postoperative day.

Figure 6: Carbuncle of the upper back

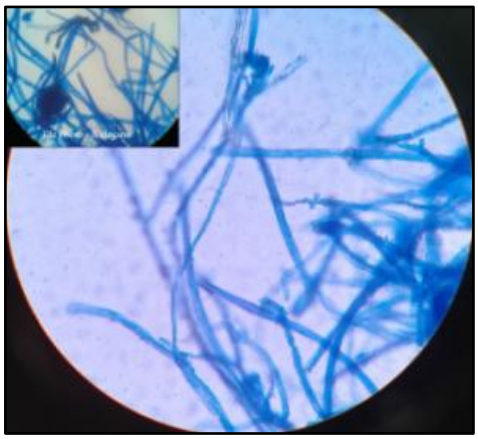

Figure 7: Fungal hyphae seen on KOH mount

Case 7 – Phaeohyphomycotic Cyst of the Hand

- 71-year-old female with systemic hypertension and coronary artery disease.
- Presented with a 4 x 3 cm swelling on the dorsal aspect of the right hand, present for 2 months.
- No history of trauma or similar swellings elsewhere.
- The swelling was tensely cystic, transilluminant, and had a smooth surface.
- Digital X-ray revealed no bony involvement.
- Initial differential diagnoses included **ganglion and implantation dermoid.**
- Excision of the cyst was performed with primary closure.
- The postoperative period was uneventful with no complications.
- Thickened fibrocollagenous wall with lymphoplasmacytic infiltration, granulation tissue, necrosis, and foreign body giant cell reaction.
- PAS stain showed branched fungal septate hyphae, indicating phaeohyphomycosis.
- Patient was started on Itraconazole for 5 days.
- Follow-up at 1 week, 1 month, 3 months, and 6 months showed no signs of residual disease or recurrence.

Figure 8: swelling over dorsal aspect of 4th metatarso-phalangeal joint

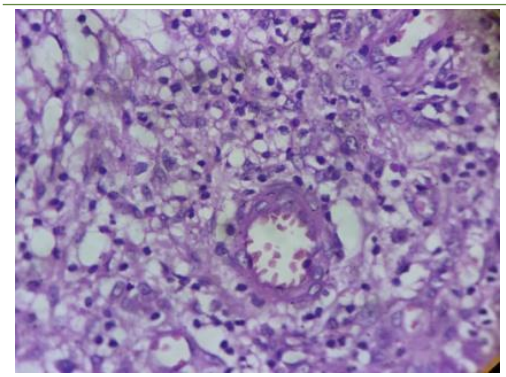

Figure 9: Foreign giant cell reaction under miscroscope

DISCUSSION

Fungal infections masquerading as surgical conditions present a unique diagnostic challenge, as illustrated in this series of seven diverse cases. The clinical features were frequently non-specific, often mimicking common surgical pathologies such as soft tissue sarcomas, necrotizing fasciitis, bacterial abscesses, or ganglions. This aligns with previous reports that fungal infections can closely resemble other infective, inflammatory, or neoplastic processes, leading to misdiagnosis and inappropriate early management (1,2).

The majority of patients in this series had identifiable predisposing factors—most notably, diabetes mellitus and history of local trauma—both of which are well-recognized risk factors for invasive fungal infections (9,10). However, the occurrence of subcutaneous phycomycosis in an immunocompetent individual (Case 1) underscores that such infections are not confined to immunocompromised hosts. Similar observations have been reported in literature, where *Basidiobolus ranarum* infection presented as a localized tumor-like swelling in otherwise healthy individuals (11).

Delayed diagnosis was a recurring theme in our series, especially in cases where initial histopathology and cultures failed to detect fungal elements, as in the recurrent *Aspergillus nidulans* abdominal wall abscess (Case 4). This limitation is well-documented; histopathological identification of fungi can be misinterpreted, and culture yield may be poor if sampling is inadequate or if prior antimicrobial therapy has been given (2,12). Advanced molecular assays, though not performed in our series, have shown promise in improving sensitivity, particularly in culture-negative cases (3).

The high mortality observed in cases of mucormycosis (Cases 2, 3, and 6) is consistent with prior studies reporting mortality rates exceeding 50% despite aggressive surgical and antifungal therapy (1,13). The fulminant progression of mucormycosis, especially in diabetic or renal-impaired patients, underscores the importance of early suspicion and initiation of amphotericin B–based treatment (14).

One particularly noteworthy case was the coexistence of eumycetoma and tuberculosis in the same lesion (Case 5). Such dual infections, though rare, highlight the need for broad differential diagnosis and comprehensive microbiological work-up in chronic, non-healing lesions, particularly in endemic regions (15).

In terms of management, all patients underwent surgical intervention, either for diagnostic biopsy or therapeutic debridement, combined with systemic antifungal therapy. Amphotericin B remained the drug of choice for mucormycosis, whereas itraconazole and terbinafine were preferred for other mycoses. Literature supports a multimodal approach, combining surgery and antifungal therapy, as the optimal strategy for reducing fungal load and improving survival (13,14).

CONCLUSION

Each instance, ranging from the misleading imitation of a ganglion to the concealed abscess along side with tuberculosis, has emphasized the necessity for increased clinical attentiveness and modified therapeutic approaches.

Diagnosing these conditions poses challenges and demands prompt surgical intervention in conjunction with the administration of suitable antifungal medications. Failure to act promptly leads to significantly heightened mortality rates.

Thereby, practising surgeons must possess knowledge regarding the atypical manifestations of fungal infections, particularly in individuals with immunocompromised patients who exhibit cutaneous and subcutaneous lesions.

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