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A CHALLENGING PRESENTATION OF BOTRYOMYCOSIS.

Dermatology

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ABSTRACT

Botryomycosis is an exceptionally rare, chronic, suppurative bacterial infection that closely mimics fungal diseases both clinically and histopathologically. Despite its bacterial origin, the nomenclature suggests a mycotic etiology, often leading to diagnostic confusion and delayed treatment. The present case report documents a rare instance of cutaneous botryomycosis occurring in an immunocompetent middle-aged individual, presenting with chronic ulcerative and nodular lesions resistant to conventional antibiotic therapy. The study was conducted at Rama Medical College, Hapur, with systematic evaluation through clinical, histopathological, and microbiological methods. The patient reported a history of localized trauma at the affected site but had no significant systemic illness or immunosuppressive condition. Clinical examination revealed multiple indurated nodules and ulcerated plaques with sinus tract formation, seropurulent discharge, and surrounding hyperpigmentation-features that initially resembled chronic fungal or mycetomal infections. To confirm diagnosis, a comprehensive investigative approach was adopted, including hematological and biochemical testing, imaging to rule out systemic spread, and histopathological examination of biopsy specimens. The biopsy demonstrated a dense granulomatous inflammatory reaction with the characteristic Splendore–Hoeppli phenomenon-an eosinophilic sheath surrounding bacterial colonies. Microbiological culture of pus samples on blood agar confirmed Staphylococcus aureus as the causative agent, consistent with the most frequently reported pathogen in botryomycosis.Therapeutically, the case was managed through prolonged, culture-directed antibiotic therapy with oral cloxacillin, supported by wound care, topical antimicrobials, and surgical debridement of necrotic tissue. This integrated medical-surgical approach produced remarkable improvement, with significant regression of nodular and ulcerative lesions and resolution of discharge within eight weeks. The patient was followed up for recurrence and continued to show stable healing and restored skin integrity. The multidisciplinary strategy—combining dermatological evaluation, microbiological culture, and histopathological validation—proved essential for diagnostic confirmation and successful outcome. The report further underscores the importance of correlating clinical findings with histopathological and microbiological evidence, particularly in rare infectious diseases that present with overlapping features.From an analytical standpoint, this case highlights several key clinical implications. First, botryomycosis should be considered a potential differential diagnosis in cases of chronic, non-healing granulomatous infections, especially when standard treatments fail. Second, the condition may occur even in immunocompetent individuals, emphasizing that trauma and localized skin injury alone can serve as important predisposing factors. Third, the study exemplifies how misdiagnosis as mycetoma, actinomycosis, or deep fungal infection can lead to inappropriate therapy and prolonged morbidity. Finally, this case reaffirms that early recognition and culture-based management are pivotal for favorable outcomes. Overall, the case enriches existing medical literature by adding evidence from the Indian subcontinent-where reports of human botryomycosis remain scarce-and serves as a valuable reminder to clinicians and microbiologists to maintain high diagnostic vigilance. By documenting detailed clinical, histopathological, and microbiological findings, this paper contributes to the limited repository of knowledge surrounding botryomycosis and reinforces the need for a multidisciplinary diagnostic approach in rare bacterial infections mimicking mycoses.

KEYWORDS

Botryomycosis, Rare bacterial infection, Splendore–Hoeppli phenomenon, Staphylococcus aureus, Case report.

INTRODUCTION

Botryomycosis is a rare, chronic, granulomatous bacterial infection that often masquerades as fungal or mycotic disease due to its clinical and histopathological resemblance. First described by Bollinger in 1870, the condition derives its name from the Greek word *"botrys,"* meaning "a bunch of grapes," which refers to the grape-like appearance of the bacterial colonies within tissue. Despite its misleading nomenclature, botryomycosis is unequivocally bacterial in origin, most frequently caused by *Staphylococcus aureus,* followed by other organisms such as *Pseudomonas aeruginosa, Escherichia coli, Proteus,* and *Streptococcus* species. The disease can manifest in two major forms: cutaneous and visceral. Cutaneous botryomycosis, the more common variant, presents as nodules, abscesses, or draining sinuses confined to the skin and subcutaneous tissues [1].Visceral botryomycosis, on the other hand, affects internal organs such as the lungs, liver, or kidneys, often associated with systemic illness or immunocompromise.The rarity of botryomycosis contributes significantly to diagnostic difficulty, as its presentation closely mimics other chronic suppurative and granulomatous conditions such as mycetoma, actinomycosis, and cutaneous tuberculosis. Delayed or incorrect diagnosis may result in prolonged morbidity, unnecessary antifungal therapy, and even surgical mismanagement. Predisposing factors include trauma, poor hygiene, malnutrition, diabetes, and immunosuppressive states; however, the disease can also occur in healthy, immunocompetent individuals. The hallmark diagnostic feature is the Splendore–Hoeppli phenomenon-an eosinophilic sheath surrounding bacterial colonies, observed on histopathology [2].

Given the scarcity of reported cases and the diagnostic complexities it poses, each new case of botryomycosis adds valuable insight to the clinical understanding of this rare infection. The present report describes a rare case of cutaneous botryomycosis in an immunocompetent individual with atypical clinical features, emphasizing the importance of early recognition, microbiological confirmation, and appropriate therapeutic intervention to ensure optimal outcomes [4].

Case Report

A middle-aged, immunocompetent male presented to the Dermatology Outpatient Department of Rama Medical College, Hapur, with multiple ulcerative and nodular lesions predominantly affecting the lower limbs. The lesions had developed insidiously over several months, beginning as small, firm nodules that gradually increased in size, ulcerated, and discharged purulent material. The patient complained of pain, intermittent seropurulent discharge, and local swelling. There was a notable history of repeated minor trauma to the lower extremities, but no previous history of diabetes, tuberculosis, or immunosuppressive illness. The patient denied prolonged corticosteroid use, HIV infection, or systemic symptoms such as fever or weight loss.

Clinical Examination

Physical examination revealed multiple indurated nodules and ulcerated plaques distributed over the dorsum of both feet and lower legs. The lesions were irregular in shape, with yellowish crusting, surrounding hyperpigmentation, and thickened skin. Some nodules had developed sinus tracts discharging seropurulent material. The lesions were tender, and local warmth was evident, though regional lymphadenopathy was absent. Figures 1–3 (as documented in the original study) depicted extensive cutaneous involvement with areas

of necrosis, ulceration, and sinus formation, suggestive of a chronic granulomatous infection.

Investigations

Routine hematological evaluation showed mild leukocytosis with elevated erythrocyte sedimentation rate (ESR), indicating an ongoing inflammatory process. Biochemical parameters, including liver and renal function tests, were within normal limits. Serological screening for HIV, hepatitis B, and hepatitis C viruses was negative, confirming the absence of immunosuppression [6].

A punch biopsy was performed from the active margin of an ulcerated lesion. Histopathological examination with hematoxylin and eosin (H&E) staining revealed dense granulomatous inflammation with mixed inflammatory infiltrates composed of lymphocytes, plasma cells, and neutrophils. The most striking feature was the presence of bacterial colonies encased within an eosinophilic, club-shaped material - the classic **Splendore–Hoeppli phenomenon**- confirming the diagnosis of botryomycosis. Periodic acid–Schiff (PAS) and Gomori methenamine silver (GMS) stains were negative, ruling out fungal etiology [5].

Microbiological culture of the pus obtained from the lesion on blood agar yielded pure growth of *Staphylococcus aureus*, which was sensitive to cloxacillin and other beta-lactam antibiotics. No fungal growth was observed on Sabouraud's dextrose agar. These findings conclusively established *S. aureus* as the causative organism of cutaneous botryomycosis in this case. Imaging studies, including ultrasound of the lower limb, excluded deep tissue or systemic involvement [8].

Differential Diagnosis

Based on the chronicity, morphology, and discharge characteristics, differential diagnoses included mycetoma, actinomycosis, cutaneous tuberculosis, and deep fungal infections such as chromoblastomycosis or sporotrichosis. The absence of granules typical of mycetoma, negative Mantoux test, and lack of caseating granulomas on histology helped exclude tuberculosis. Negative fungal stains and cultures ruled out deep mycoses, while negative culture for *Actinomyces* species excluded actinomycosis [9].

Management And Outcome

The patient was treated with culture-directed antibiotic therapy consisting of **oral cloxacillin (500 mg four times daily)** for eight weeks, along with supportive anti-inflammatory medications. Local wound care included daily saline irrigation, antiseptic dressings, and application of topical mupirocin to minimize secondary bacterial load. Surgical curettage and debridement were performed to remove necrotic tissue and promote healing. Nutritional support and patient counseling regarding treatment adherence were also provided [10].

Marked clinical improvement was observed after six weeks of therapy, with progressive reduction in ulcer size, diminished discharge, and development of healthy granulation tissue. Complete epithelialization occurred by the end of eight weeks. The patient has been under regular follow-up for six months, with no evidence of recurrence or systemic dissemination [4].

This case demonstrates that botryomycosis, though classically associated with immunosuppressed individuals, can also occur in healthy hosts, particularly following localized trauma. The successful outcome highlights the importance of early histopathological and microbiological confirmation, coupled with prolonged, targeted antibiotic therapy and surgical management [7]. This report adds valuable evidence from India, where documented human cases remain exceedingly rare, underscoring the need for clinician awareness to avoid misdiagnosis and ensure timely intervention.

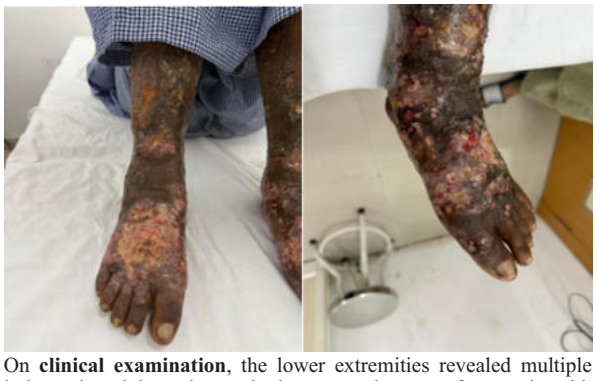
1. Patient Selection And Consent

The patient presented to the Dermatology outpatient department with multiple ulcerative and nodular lesions predominantly affecting the lower limbs. Informed written consent was obtained from the patient for clinical examination, treatment, and photographic documentation. Ethical clearance for case reporting and use of clinical photographs was obtained from the institutional review board in accordance with the principles of the Declaration of Helsinki.

2. Clinical Evaluation

A detailed clinical history was obtained, including:

- **Onset and duration of illness:** The lesions began insidiouslywith localized nodules that gradually ulcerated.
- **Symptoms:** Pain, swelling, and intermittent seropurulent discharge were reported.
- **Risk factors:** History of repeated trauma to the lower limbs was elicited; however, no history of immunosuppressive illness, tuberculosis, or diabetes was documented.
- **Treatment history:** The patient had received irregular courses of antibiotics prior to presentation without significant improvement.



On **clinical examination**, the lower extremities revealed multiple indurated nodules, ulcerated plaques, and areas of necrosis with yellowish exudates. The lesions were surrounded by hyperpigmented, thickened skin. Sinus tract formation and crusting were noted , particularly overthe dorsum of the feet and shins. Figures 1–3 depict the extent of involvement with ulceration, nodularity, and patchy necrotic tissue.

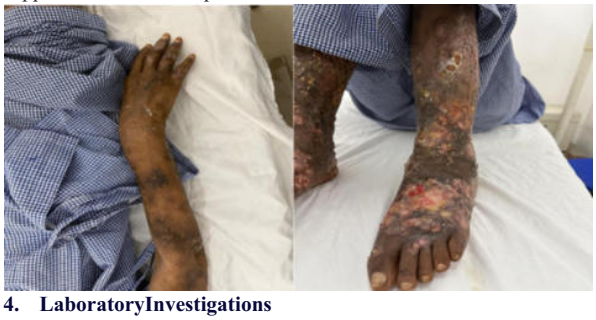
Figure1: Clinicalphotographshowingmultipleulceratedplaqueswithpurulentdischarge over the dorsum of the right foot and ankle. ·

Figure2: Lesionsextendingtothelateralaspectoftherightlegwithclusterednodulesand draining sinuses.

Figure3: Ulceratednodularlesionswithirregularmarginsinvolvingboth legs, demonstrating widespread cutaneous involvement.

3. Photographic Documentation

All clinical photographs were captured using a high-resolution smartphone camera under standardized lighting conditions. The patient was positioned supine with limbs supported to ensure optimal visualization of lesions. Images were taken from multiple angles (anterior, lateral, and dorsolateral views) to demonstrate the three-dimensional morphology of the lesions. These photographs serve as a visual record for comparison during subsequent follow-up and as supportive evidence for publication.



4. LaboratoryInvestigations

To confirm the diagnosis and exclude differentials, the following laboratory methods were employed:

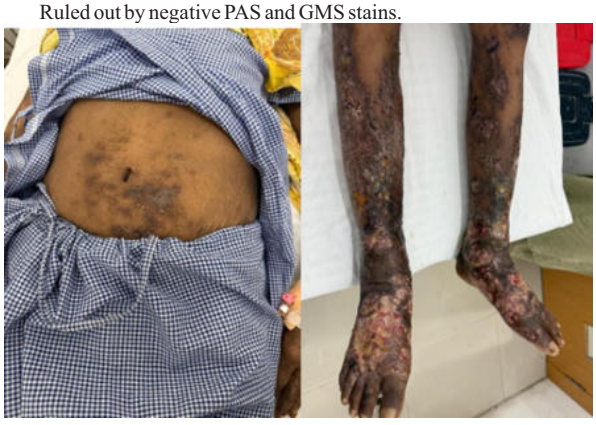
- **Hematological profile :** Complete blood count and ESR indicated a mild leukocytosis with elevated inflammatory markers.
- **Biochemical profile:** Renal and liver function tests were within normal limits.
- **Serological tests:** HIV, hepatitis B, and hepatitis C were negative, excluding underlying immunosuppression.
- **Skin biopsy:** A punch biopsy was obtained from the active margin of a representative lesion.
- **Histopathology:** Hematoxylin and eosin (H&E) staining revealed dense granulomatous inflammation with mixed inflammatory infiltrates. The hallmark *Splendore–Hoeppli phenomenon* was observed, with eosinophilic material encasing bacterial colonies.

- **Microbiological culture:** Pus samples cultured on blood agar grew *Staphylococcus aureus*, confirming the bacterial etiology of botryomycosis. Sensitivity testing guided antibiotic selection.

Differential Diagnosis

Given the chronic, granulomatous, and ulcerative nature of the lesions, several differentials were considered:

- **Mycetoma (eumycetoma / actinomycetoma):** Excluded by absence of fungal elements in microscopy and culture.
- **Actinomycosis :** Ruled out by negative culture for *Actinomyces* spp.
- **Cutaneous tuberculosis:** Excluded by negative Mantoux test and absence of caseating granulomas on histology.
- **Deep fungal infection (chromoblastomycosis, sporotrichosis):** Ruled out by negative PAS and GMS stains.



TherapeuticIntervention9*

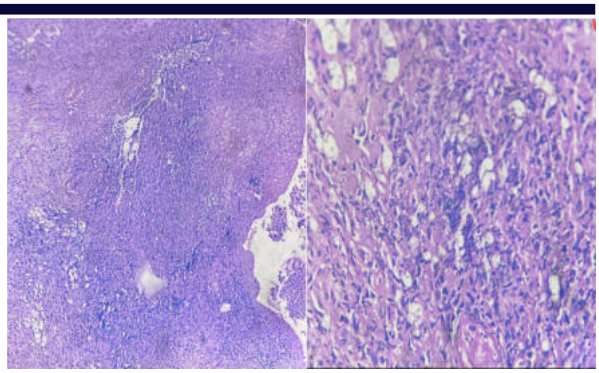
Based on sensitivity results, the patient was initiated on **prolonged culture-directed antibiotic therapy** with oral cloxacillin combined with supportive anti-inflammatory agents. Wound care included daily saline irrigation, antiseptic dressings, and debridement of necrotic tissue when necessary. Topical mupirocin was applied to reduce local bacterial load.In refractory lesions, **surgical intervention** in the form of curettage and excision was undertaken to facilitate healing .Analgesics and nutritional supplements were provided as supportive care. The patient was counseled regarding adherence to therapy and importance of follow-up.

Follow-UpandMonitoring

Clinical progress was monitored at two-week intervals. The patient demonstrated gradual reduction in ulcer size, decreased discharge, and improved granulation tissue formation after six weeks of therapy. Photographic documentation at each visit allowed objective assessment of healing progression.

Methodological *96*9502Significance

The use of **integrated methodology**—clinical photography, histopathological confirmation, and microbiological culture—was critical in establishing the diagnosis of this rare infection. The combination of **medical managementand surgical debridement** proved essential forfavorable outcome.



Histopathological section showing dense granulomatous inflammation with mixed inflammatory infiltrates, including lymphocytes, plasma cells, and neutrophils. Multiple bacterial colonies surrounded by an eosinophilic material (Splendore–Hoeppli phenomenon) are evident (H&E stain, ×400).

Low-power photomicrograph demonstrating extensive dermal involvement with inflammatory granulomas and focal necrosis. The bacterial colonies appear as basophilic clusters surrounded by eosinophilic club-shaped material, characteristic of botryomycosis (H&E stain, ×100).

DISCUSSION

Botryomycosis remains a diagnostic challenge due to its rarity and clinical resemblance to chronic fungal infections such as mycetoma or actinomycosis. Despite being a bacterial disease, its chronic suppurative and granulomatous nature often leads to misdiagnosis and inappropriate treatment. In this case, the presence of multiple ulcerated nodules with draining sinuses initially suggested a deep mycotic infection. However, the demonstration of the Splendore–Hoeppli phenomenon on histopathology and isolation of *Staphylococcus aureus* from culture confirmed the diagnosis of cutaneous botryomycosis.

The case highlights that botryomycosis can occur even in immunocompetent individuals, with trauma serving as a key predisposing factor by facilitating bacterial entry. This finding aligns with existing literature suggesting that local factors, rather than systemic immunosuppression alone, may contribute to disease pathogenesis. The excellent therapeutic response to culture-directed prolonged antibiotic therapy combined with surgical debridement supports the importance of an integrated approach to management.

Clinicians should maintain a high index of suspicion for botryomycosis in chronic, non-healing lesions unresponsive to standard antimicrobial therapy. Early diagnosis, aided by histopathological and microbiological confirmation, is crucial to avoid unnecessary antifungal or antitubercular treatments. This case contributes valuable insight to the limited global literature on this rare bacterial infection.

CONCLUSION

Botryomycosis, though a bacterial infection, continues to pose significant diagnostic and therapeutic challenges because of its close clinical resemblance to fungal and other chronic granulomatous infections. This case reinforces the importance of maintaining a broad differential diagnosis when evaluating long-standing, non-healing ulcerative or nodular lesions, especially those unresponsive to routine antibiotic therapy. Early and accurate diagnosis relies heavily on correlating clinical features with histopathological and microbiological evidence, particularly the identification of the *Splendore–Hoeppli phenomenon* and isolation of *Staphylococcus aureus* on culture.

The successful outcome in this case demonstrates that timely, culture-guided antibiotic therapy, when combined with surgical debridement and meticulous wound care, can result in complete recovery and prevent recurrence. The patient's favorable response without relapse over six months underscores that botryomycosis, even in immunocompetent individuals, can be effectively treated when appropriately recognized and managed. Furthermore, this report emphasizes the role of local trauma as a potential predisposing factor, highlighting the need for awareness even in patients without systemic

comorbidities.

From a broader clinical perspective, this case contributes to the limited pool of documented human botryomycosis cases, especially from the Indian subcontinent. It advocates for a multidisciplinary diagnostic approach involving dermatologists, pathologists, and microbiologists to ensure accurate differentiation from fungal or mycobacterial infections. Raising awareness among clinicians about this rare entity will not only aid in timely diagnosis but also help reduce unnecessary and prolonged antifungal or antitubercular treatments.

In conclusion, early suspicion, confirmatory histopathology, culture-based antibiotic selection, and consistent follow-up remain the cornerstones of successful management of botryomycosis. This case exemplifies how evidence-based, patient-specific treatment can yield excellent therapeutic outcomes in a disease often misunderstood and underreported.

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