Case Report

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Malassezia Pachydermatis Fungemia: A Dog-Owner's Dilemma

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Citation Bandyopadhyay S, Ghosh Dastidar A, Kumar Chandra S, Singhal P. Malassezia Pachydermatis Fungemia: A Dog-Owner's Dilemma. Case Reports in Clinical Practice. 2024; 9(6): 244-247. DOI:10.18502/crcp.v9i6.18942

Running Title Malassezia Pachydermatis Fungemia

Article info:
Received: October 25, 2024
Revised: November 16, 2024
Accepted: December 21, 2024

Keywords:
Malassezia pachydermatis; Fungemia; Dogs; Bloodstream infections

ABSTRACT

The present case report describes a unique instance of a 70-year-old male presenting with high-grade fever, severe respiratory distress, and drowsiness. He was diagnosed with *Malassezia pachydermatis* fungemia, attributed to his proximity to pet dogs. Treatment with empirical broad-spectrum antibiotics and echinocandin antifungal agents resulted in no improvement in the patient's condition. Upon switching to fluconazole, the patient showed gradual improvement after three days and achieved complete resolution of the infection within two weeks. This report highlights a rare case of bloodstream infection caused by *Malassezia pachydermatis* and underscores the importance of thorough history-taking in diagnosing rare conditions.

Introduction

Malassezia pachydermatis, a commensal lipid-dependent yeast, constitutes part of the normal skin microbiota while also serving as a pathogen responsible for various skin and systemic infections [1]. Direct contact with animals colonized by *Malassezia pachydermatis* increases the risk of infection transmission to humans. *Malassezia* spp. has increasingly been identified as a causative agent of severe systemic infections, such as *Malassezia* fungemia [2]. *Malassezia pachydermatis* fungemia is uncommon in adults, with a frequent presentation in neonates [3]. In adults, *Malassezia pachydermatis* fungemia is linked to specific risk factors, such as the use of parenteral nutrition and exposure to pet dogs [4].

The present report outlines the case of a 70-year-old male dog owner with multiple comorbidities who was diagnosed with *Malassezia pachydermatis* fungemia—a rare bloodstream infection attributed to his proximity to dogs.

Case Presentation

A 70-year-old male visited the emergency department with chief complaints of high-grade fever, severe respiratory distress, and drowsiness persisting for the past three days. The patient had a medical history of diabetes mellitus, hypothyroidism, and hypertension.

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His routine medications included glimepiride, metformin, and sitagliptin for diabetes; telmisartan for hypertension; and levothyroxine for hypothyroidism. During his hospital stay, he received regular insulin.

One week prior, the patient had experienced an episode of Herpes Zoster Ophthalmicus (HZO), presenting with an intensely painful vesicular rash localized to the right side of his face. Initial management by a general practitioner included administration of oral acyclovir. However, the patient later developed mild blurred vision and ocular pain, necessitating hospital admission. During hospitalization, treatment was escalated to peripheral intravenous acyclovir, topical acyclovir eye drops, and analgesics. Additionally, antibiotics were administered to mitigate the risk of secondary infections.

The patient responded well to therapy and was discharged in stable condition after a five-day hospital stay. Notably, he had three pet dogs at home.

On admission, the patient was febrile (oral temperature: 101.2 F), tachycardic (HR 120/min), and tachypnoeic (Respiratory rate 28/min). He was desaturating rapidly on room air (SpO2: 86% on room air) and Arterial Blood Gas (ABG) showed type 1 respiratory failure (Po2: 50mmHg); for which the patient was transferred to the intensive care unit (ICU) initiating high-flow nasal oxygen therapy.

The chest X-ray showed non-homogeneous opacities in the lower and middle zones of both lung fields. Echocardiography (ECG) findings revealed global hypokinesia and elevated cardiac enzyme levels, suggesting myocarditis, likely secondary to infection. Despite supportive care, fever spikes persisted, leading to the development of acute kidney injury.

A chest computed tomography (CT) scan showed basal and segmental consolidation with atelectasis of both lower lobes, moderate bilateral pleural effusion, and bilateral perihilar ground-glass infiltrates. The patient reported adequate glycemic control, with an HbA1c of 6.9%.

Initial antibiotic therapy included meropenem (1 g IV every 12 hours), teicoplanin (400 mg IV every 12 hours for three doses, then every 48 hours), and doxycycline (100 mg IV every 12 hours). Despite continuing the broad-spectrum antibiotic regimen for three days, the patient's clinical condition showed no significant improvement.

Echinocandins were added empirically due to suspicion of a fungal infection, considering the patient was diabetic and had a healing zoster infection. Following antibiotic and echinocandin therapy, inflammatory markers remained elevated, with C-reactive protein (CRP) at 14.7 mg/dL and procalcitonin at 0.73 ng/mL (Table 1).

Multiple repeat blood cultures were performed, yielding no identifiable bacterial growth. The initial blood culture obtained on admission showed fungal growth after seven days of incubation. Following the growth of the fungal colony, genus-level identification was conducted through phenotyping using the VITEK system, which detected the genus *Malassezia*. Species *Malassezia pachydermatis* was confirmed through molecular analysis using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS). Genetic analysis was performed for subspecies identification.

Antifungal therapy was switched from echinocandin to fluconazole, as triazoles are the recommended therapy for invasive *Malassezia* infections. Fluconazole was administered at a dose of 200 mg IV twice daily for 14 days following the first negative blood culture and resolution of symptoms, completing a total treatment duration of 21 days.

The patient showed gradual improvement after three days of fluconazole therapy. Resolution of fever, normalization of renal function, and improvement in sensorium were observed. Oxygen requirements decreased, and a follow-up chest X-ray indicated significant improvement. Cardiac enzyme levels returned to normal.

Supportive therapy and fluconazole treatment were continued with regular monitoring of liver function. The patient was successfully treated for *Malassezia* fungemia with fluconazole.

Discussion

Malassezia fungemia is an uncommon condition in adults, with limited reports linking its development to close contact with dogs. In this case, the patient presented with severe symptoms, including fever and respiratory distress. The condition remained undiagnosed for a week after admission due to slow fungal culture growth. Once identified, transitioning the patient from broad-spectrum antibiotics and echinocandins to fluconazole resulted in complete infection resolution. While the elimination of *Malassezia fungemia* can be easily achieved, its rarity requires physician competence in recognizing and

Table 1. Laboratory findings on presentation, day 5, and day 10

Initial blood parameters	Initial Values on Presentation	Day 5	Day 10
Haemoglobin (g/dl)	9.2	8.8	9.0
PCV (%)	27.1	26.4	27.0
Total Leucocyte Count (unit/cu mm)	10,200	17,400	8,000
Platelet count (lacs/cu mm)	2.34	4.58	1.98
PT (s)	16.3	17.6	16.2
INR	1.19	1.23	1.14
CRP (mg/dl)	14.7	20.1	6.2
Blood glucose (Random) (mg/dl)	249	216	200
Urea (mg/dl)	49	56	40
Creatinine (mg/dl)	1.6	1.7	1.2
Sodium (mmol/dl)	126	135	136
Potassium (mmol/dl)	4.6	4.8	4.4
Chloride (meq/dl)	94	99	92
Bicarbonate (meq/dl)	22	20	24
Calcium (mg/dl)	8.2	8.4	8.8
Phosphorous (mg/dl)	2.7	2.9	3.0
Magnesium (mg/dl)	2.4	2.6	2.2
Albumin (g/dl)	3.5	3.0	3.7
Total Bilirubin (mg/dl)	0.5	0.6	0.6
Direct Bilirubin (mg/dl)	0.1	0.3	0.4
AST (IU/L)	74	102	24
ALT (IU/L)	19	30	16
ALP (IU/L)	55	98	56
CPK-MB (U/L)	1005	59	55
CPK (U/L)	66	17	20
LDH (U/L)	78	215	189
Procalcitonin (ng/ml)	0.73	1.00	0.5

*ALP: Alkaline Phosphatase, ALT: Alanine Aminotransferase, AST: Aspartate Aminotransferase, CPK: Creatine Phosphokinase, CPK-MB: Creatine Phosphokinase-MB, CRP: C-Reactive Protein, INR: International Normalized Ratio, LDH: Lactate Dehydrogenase, PCV: Packed Cell Volume, PT: Prothrombin Time

diagnosing this condition correctly.

The presence of *Malassezia pachydermatis* is lower on the stratum corneum of healthy canines, while its numbers increase in dogs presenting with skin conditions. While there is potential for transmission to humans through physical contact, particularly among pet owners, limited studies have investigated the prevalence of this microorganism in humans [5].

A study identified a correlation between a *Malassezia* outbreak in a nursery and the colonization of healthcare workers' pet dogs with the same microorganism, suggesting that the healthcare personnel likely introduced the infection to the nursery after initially acquiring it from their pets at home [6]. While the treating physician suspected the patient's pet dogs as the source of *Malassezia pachydermatis*, samples from the patient's pet dogs could not be collected due to logistical constraints, preventing confirmation.

Nonetheless, the present study adds a novel case of dog-transmitted *Malassezia*, which has the potential to become life-threatening, as observed in the current patient

The patient presented with several comorbidities, which potentially contributed to a compromised immune system, increasing their susceptibility to infection. *Malassezia pachydermatis* bloodstream infections in healthy adult individuals are relatively uncommon. Most documented cases of *Malassezia pachydermatis* septicemia occur in immunocompromised patients. A case report highlighted *Malassezia* fungemia in an adult hospitalized with *Staphylococcus aureus* bacteremia, who was later diagnosed with multibacillary leprosy [1]. Another report described *Malassezia* septicemia in a patient with acute myeloid leukemia who had previously undergone an allogeneic bone marrow transplant with primary graft failure [7]. Additionally, Chowdhury et al. (2014) described *Malassezia* fungemia in a patient with acute myeloid leukemia who was receiving posaconazole prophylaxis [8]. Therefore, the comorbid state of the present patient increased their susceptibility to *Malassezia* fungemia.

The recommended antifungals for treating infections caused by *Malassezia* are azoles and amphotericin B [1]. In vitro assessments using *Malassezia* isolates have reported consistent sensitivity to triazole antifungal agents and

amphotericin B, while showing higher resistance of *Malassezia* species to echinocandins and flucytosine [9]. Tragiannidis et al. (2010) have advocated for the use of intravenous triazoles, such as fluconazole or voriconazole, as the preferred primary treatment for invasive *Malassezia* infections, with amphotericin B recommended as an alternative in refractory or life-threatening cases [10]. The present patient achieved full recovery with fluconazole, further supporting the use of azoles in *Malassezia* fungemia.

Conclusion

There is a pressing need for improved and expedited diagnostic techniques for fungal infections, including those caused by *Malassezia*. Additionally, this study supports the use of fluconazole, a triazole antifungal agent, for the systematic elimination of this pathogen. Incorporating an azole antifungal into empiric therapy may be advantageous when risk factors for *Malassezia* infection are present, underscoring the importance of thorough history-taking practices.

Acknowledgments

None.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

Funding

No funding was received to assist with the preparation of this manuscript.

Conflict of Interests

The authors have no conflict of interest to declare.

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