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## Case Report

# Disseminated histoplasmosis in a renal transplantation recipient: Peripheral blood smear was the key

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## ABSTRACT

Disseminated histoplasmosis is common in immunocompromised patients such as patients with AIDS, hematologic malignancies, transplant recipients, and those on prolonged corticosteroid use. We report the case of a 53-year-old man with a history of end-stage renal disease due to uncontrolled hypertension who underwent renal transplantation in 2013. He presented to the hospital with a 5-day history of dyspnea, and blood tests showed pancytopenia. The diagnosis of disseminated histoplasmosis was made rapidly by peripheral blood smear. We encourage clinicians to check peripheral blood smear if disseminated histoplasmosis is suspected.

## 1. Introduction

Histoplasmosis is an opportunistic systemic fungal infection caused by an intracellular dimorphic fungus called *Histoplasma capsulatum* [1]. Histoplasmosis is classified into acute, disseminated, and chronic pulmonary histoplasmosis. Disseminated histoplasmosis (DH) typically occurs in immunocompromised patients such as those with transplant recipients [2]. Kidney transplant recipients, in particular, seem to be at high risk for DH [3,4]. The clinical characteristics of DH closely resemble those observed in tuberculosis; therefore, a conclusive diagnosis of DH is required and is generally based on identifying the fungus in tissue samples and body fluids. Different laboratory techniques can be used, including molecular identification, antibody responses, and histopathology [5,6]. Histopathology of a peripheral blood smear is not commonly used in the diagnosis of histoplasmosis; however, it does provide a definitive diagnosis of active infection. Here, we report a case of disseminated histoplasmosis in a renal transplant recipient diagnosed on the first day of presentation by identifying the fungus in a peripheral blood smear.

## 2. Case presentation

A 53-year-old man with a history of end-stage renal disease due to uncontrolled hypertension underwent renal transplantation in 2013. He presented to the hospital with a 5-day history of dyspnea (day 0). Two

months earlier, the patient had started a new job in gardening. On physical examination, the temperature was 39.3 °C, heart rate 110 beats/min, blood pressure 100/60 mmHg, respiratory rate 26/min, and oxygen saturation 86 % in room air. His pulmonary and abdominal examinations revealed decreased breath sound in the right lower lobe and hepatosplenomegaly. Laboratory results showed a hemoglobin level of 10.2 g/dL (reference range, 12.0 to 16.0), a white cell count of 3000/ml<sup>3</sup> (reference range, 4000 to 11,000), a platelet count of 18,000/ml<sup>3</sup> (reference range, 150,000 to 450,000), and an increased creatinine of 4.05 mg/dL (reference range, 0.5 to 1.2), aspartate transaminase 531 U/L (reference range, 10 to 40), and alanine aminotransferase 570 U/L (reference range, 7 to 56). Peripheral blood smear on day 0 showed a neutrophil filled with intracellular yeast-like organisms consistent with *Histoplasma* sp (Fig. 1). Blood and urine cultures were negative. Chest X-ray and chest computed tomography showed right lower lobe consolidation. The patient was started on intravenous liposomal amphotericin B 3 mg/kg per day. On first of hospitalization, the patient's clinical condition deteriorated, which required mechanical ventilation and admission to the intensive care unit (ICU). The diagnosis of disseminated histoplasmosis was established. Urine *Histoplasma* antigen level was 18.5 ng/mL (positive range,  $\geq 1.1$ ). The patient underwent computed tomography-guided lung biopsy, and samples were sent for culture. On the third day of hospitalization, a lung biopsy was performed, and culture grew *H. capsulatum* after two weeks. The patient is currently hospitalized with a favorable response to treatment. On day 14 of

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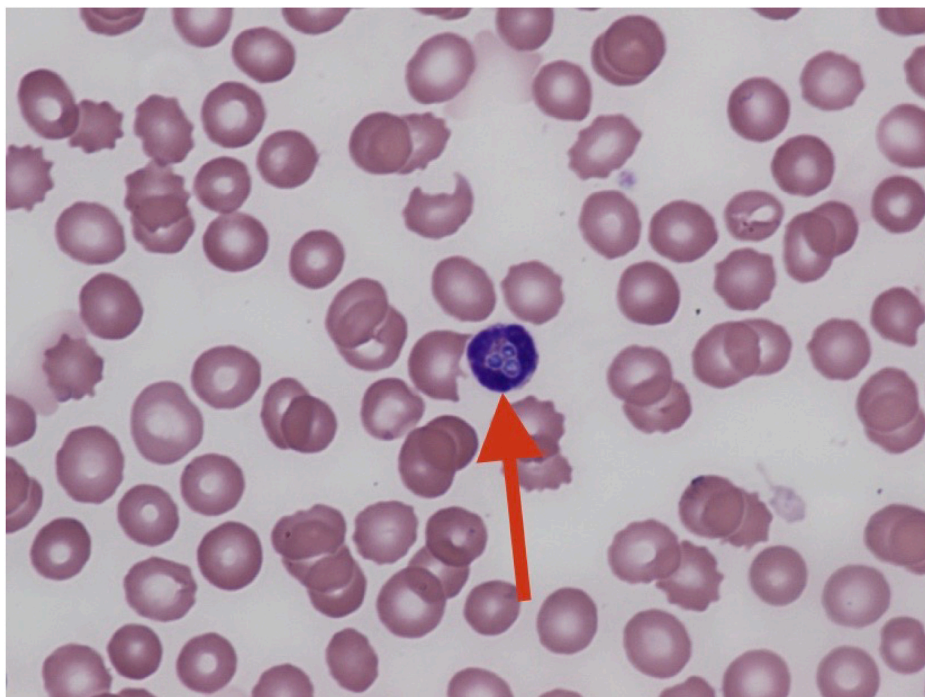


Fig. 1. Peripheral blood smear showing a neutrophil filled with intracellular yeast-like lesions consistent with *Histoplasma* sp.

hospitalization, he is vitally stable, off mechanical ventilation, and transferred out of the ICU to the regular medical service. Based on Infectious Disease Society of America (IDSA) guidelines, we will continue liposomal amphotericin B for two weeks followed by oral itraconazole for at least 12 months with outpatient follow-up.

### 3. Discussion

*Histoplasma capsulatum* was first described in 1906 by Samuel Darling, MD. He also described the disseminated form of the disease with fatal outcomes [7]. *H. capsulatum* is most commonly found in North America and Central America [8]. In the United States, *H. capsulatum* is common in the Mississippi, Ohio River valleys, and many Mideastern states. It is found in soil, especially under blackbird roosts or next to chicken coops [9]. Risk factors for our patient include living in Houston, Texas, working in gardening fields, and being a transplantation recipient. The majority of infected patients with *H. capsulatum* have either no or mild symptoms. Disseminated histoplasmosis usually occurs in patients with impaired cellular immunity, such as patients with AIDS, hematologic malignancies, transplant recipients, and those on prolonged corticosteroid use [10]. Patients with disseminated histoplasmosis have a higher rate of positive cultures and positive *H. capsulatum* polysaccharide antigen in urine. Peripheral blood smears can sometimes show yeasts within neutrophils in patients with fungal-like particles such as severe disseminated histoplasmosis and candidiasis [2,11]. In 1998, Berrouane Y et al., has described a case of an intracellular yeast-like in peripheral blood smear which finally identified to be *Candida albicans* [12]. Positive peripheral blood smear in our patient led to rapid diagnosis and management.

Infectious Disease Society of America (IDSA) guidelines recommend initiating amphotericin B for patients with severe disseminated disease. When the clinical condition improves, amphotericin B can be switched to oral itraconazole to finish the entire course of therapy. To conclude, peripheral blood smear can be of value to early diagnosis of disseminated histoplasmosis and facilitate a successful outcome.

### Declaration of competing interest

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