CASE REPORT

Pulmonary Histoplasmosis in Renal Allograft Patients-Diagnostic Challenge of Radiology, Sorted By Cytology

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Abstract:

Pulmonary histoplasmosis is caused by the fungus *Histoplasma capsulatum* acquired by inhaling microconidia or hyphal fragments of the mould primarily affecting lungs. Clinical disease may vary from asymptomatic mild flu like illness to a chronic disseminated disease or a chronic pulmonary disease resembling tuberculosis. It may often resemble pulmonary malignancy and continues to complicate the evaluation of pulmonary nodules. Here we present a case of a 22 year old male, receipent of a renal transplant with cough, recurrent haemoptysis and low grade fever posing a diagnostic challenge clinically and radiologically.

Keywords: *Histoplasma capsulatum*, Pulmonary histoplasmosis

Introduction:

Histoplasmosis is a systemic fungal disease caused by *Histoplasma capsulatum*, a dimorphic and ubiquitous fungus. The disease is endemic in certain areas of North, Central, and South America, as well as Africa and Asia [1].

H. capsulatum was first described as a cause of disease by Darling in 1906 [2]. The natural habitat of this fungus is soil that has been contaminated with bird or bat droppings. Pulmonary infection usually develops through inhalation [1, 3], followed by haematogenous spread to the reticuloendothelial system within a few weeks before the onset of specific cellular immunity [1, 4].

Most primary infections with *H. capsulatum* are either asymptomatic or result in mild influenza-like illness; however, certain forms of histoplasmosis can cause life-threatening infections with considerable morbidity [1, 4, 5].

Case Report:

We present a case of a 22 year old male, recepient of a renal transplant with cough, recurrent haemoptysis and low grade fever since three weeks. Routine laboratory investigations and cultures were non-diagnostic. Sputum smears were negative for Acid Fast Bacilli (AFB). Chest X-ray showed a solitary nodular lesion in left lung parenchyma. Computed Tomogram (CT) revealed a nodular lesion in left lobe of lung (Fig.1) and Fine Needle Aspiration Cytology (FNAC) was done under guidance from the same. Cytological smears stained with Leishman-Geimsa stain showed numerous macrophages with intracellular oval yeast forms with single nucleus budding via a narrow base. Extracellular yeast forms were also noted with clear halo around them in a background of few RBCs lymphocytes (Fig. 2). A diagnosis of histoplasmosis-lung was formulated and serological studies were advised to confirm.

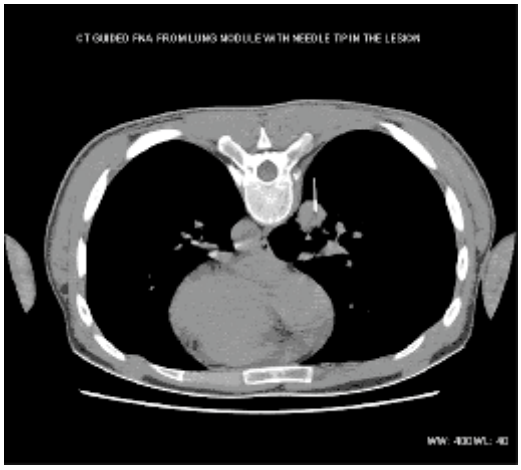

Fig.1: CT-Guided FNAC from Lung Nodule with Needle Tip in the Lesion.

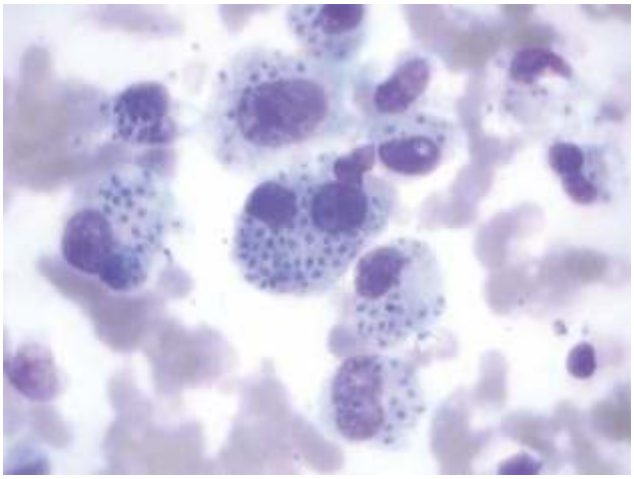

Fig. 2: Small (2-5um) Narrow Budding Yeast Forms of *Histoplasma capsulatum* Seen In Macrophages (100X)

Discussion:

Histoplasmosis is found to prefer moist soil as a habitat, mainly that contaminated by droppings of birds and bats [6, 7].The pathogenesis of histoplasmosis infection starts with the disruption of the soil. As a result, the hyphae and conidia of *H. capsulatum* become aerosolized, inhaled and deposited into the lung. The fungus is engulfed by macrophages and other phagosomes, but eludes elimination by converting to the yeast form. The yeast cells then reside and multiply within the phagolysosomal vesicles; possibly through a mechanism that elevates intraphagosomal pH [8, 9]. In the absence of cell mediated immunity (CMI), the yeasts continue to multiply and disseminate to involve organs of the reticuloendothelial system. Once CMI develops, in the immunocompetent adult, the formation of a granuloma begins and the intracellular yeasts are finally destroyed. The clinical presentation of acute histoplasmosis usually depends on the size of the inoculum and the immune response of the host. The vast majority of infections are asymptomatic or present as an influenza-like illness, with cough, fever, and headache. Chest radiographic findings typically demonstrate small areas of infiltrate or mediastinal lymphadenopathy. With time, a granulomatous reaction occurs with areas of caseating necrosis leading to the appearance of a round mass of scar tissue that may or may not be calcified, known as a histoplasmoma. This infection usually starts by the colonization of diseased lung tissue in the upper zones, and progresses gradually, leading to cavity formation and scarring. Symptoms are characterized by a productive cough, fever, hemoptysis, weight loss, and occasional night sweats along with lung cavitations that may be seen on chest radiographs, often mimicking tuberculosis. Also the lungs are considered the second most frequent site of metastasis, mainly by hematogenous spread, usually presenting as multiple, bilateral nodules distributed peripherally [10].

Although the primary diagnostic hypothesis for this image findings in patients with a malignant tumor, whether the metastatic disease, different etiologies can lead to similar conditions, including sarcoidosis, Wegener's granulomatosis, rheumatoid arthritis, Churg-Strauss syndrome, multiple hamartomas, and granulomatous infections, empirical treatment can be inefficient and harmful [10, 11].

Histoplasmosis can manifest in different clinical forms that depend on the amount of fungal spores inhaled, the lung parenchyma anatomical conditions and host cellular immunity [11, 12]. When found in the form of pulmonary nodules, histoplasmosis can simulate primary or metastatic malignant disease in patients with a history of cancer, and lung lesion should therefore, be biopsied in those patients, in addition to performing histopathological examination and staining for specific microorganisms in order to make the differential diagnosis [11-13].

Patients with inadequate CMI, such as those receiving immunosuppressive therapy or those infected with the Human Immunodeficiency Virus (HIV), may develop progressive disseminated histoplasmosis, an often rapidly progressive and fatal illness that presents with fever, anemia, leukopenia, hepatosplenomegaly, central nervous system involvement, and cardiac manifestations. Several laboratory tests are useful in the diagnosis of infections caused by *H. capsulatum*. Culture samples of the organism remain the gold standard for diagnosis. The samples are usually recovered from bone marrow, liver, sputum, and broncho-alveolar lavage.

Histopathologic visualization using special stains such as Giemsa or Methenamine silver stains also aids in the diagnosis and yields very rapid results. Complement fixation is another test used for the diagnosis of *H. capsulatum*, detecting both mycelial and yeast antigens.

Conclusion:

Pulmonary histoplasmosis presenting as a solitary solid nodular lesion is not unusual especially in immunocompromised patients. Awareness by physicians of the possibility of this disease is essential for diagnosis. It can mimic many other conditions such as tuberculosis and malignancy on radiological examination and can be readily missed. The chronic form is indistinguishable from pulmonary tuberculosis both symptomatically and radiologically hence; accurate diagnosis rests entirely on cytological/histopathological examination, culture and serology.

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