

Unusual Case of Pulmonary Pneumocystosis Coinfected with Cryptococcal Meningitis in HIV Individual: A Case Report

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Case Report

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ABSTRACT

To have a dual/co infection of organism in HIV positive individual is quite unusual phenomenon which indicate patient having CD 4 count <200 units.

Here, we are presenting a case history of patient who came to the hospital with altered sensorium and was having respiratory complaints from 15 days prior to the hospitalization.

Based on the microscopic picture we could diagnose the cyst of pneumocystic carinii in the broncho alveolar lavage sample and isolation of cryptococcus neoformans. The lungs of individuals infected with HIV are often affected by opportunistic infections and tumours and over two-thirds of patients have at least one respiratory episode during the course of their disease. Pneumonia is the leading HIV-associated infection.

As patient came to the hospital in the late phase of infection patient could not respond to the treatment and succumbed.

Keywords: Co-infection; PCP; *Cryptococcus neoformans*.

1. INTRODUCTION

Opportunistic infections associated with HIV infection are increasingly recognized. Most of the HIV infected individuals in the advanced stage of infection gets infected with *Cryptococcus* & present with Meningitis. These patients commonly present with CNS manifestations. *Cryptococcus* infection affects approximately one million HIV infected patients worldwide each year and is associated with high mortality [1]. A previous Indian study has estimated nearly 8.7% of HIV positive patients with Lower respiratory tract infections to have a definite fungal aetiology [2].

Although the portal of entry of fungus is through Respiratory tract and when initial infection gets missed out, in severe stages infection gets lodged into Central Nervous System.

Pneumocystis pneumonia (PCP) is one of the other lung infections frequently seen in HIV infected patients and is included in the WHO list of AIDS indicative diseases [3]. The pathogen responsible for the development of this opportunistic infection is an atypical fungus called *Pneumocystis jiroveci*. Other fungal infections including *Cryptococcus neoformans*, *Aspergillus* species and various endemic fungi such as *coccidioides immitis*, *Histoplasma Capsulatum* and *penicillium marneffii* [4].

PCP remains the most common infection diagnosed at the onset of acquired immunodeficiency syndrome (AIDS), especially in individuals not aware of their HIV infection. The most important risk factor of PCP development in HIV-infected person is the decrease of TCD4+ cell number below 200 /mL.

Generally the clinical symptoms consist of chronic cough, dyspnea and weakness. Arterial blood gas analysis often reveals the presence of hypoxemia, and High-resolution computed tomography (HRCT) imaging shows diffuse ground glass opacities [5].

Although a biopsy may need to be performed in complicated patients or bronchoalveolar lavage (BAL) is an important adjunct to the diagnosis of pulmonary and disseminated infections. Culture is the gold standard for diagnosis in many instances, but cytologies and morphologic analysis are often considered as diagnostic. Although newer molecular and antigen techniques may be applied to BAL samples, the

role of such tests is yet to be defined for many pathogens.

Hence, we communicate the diagnosis by microscopy of a coinfection produced by *Cryptococcus neoformans* and *Pneumocystis jiroveci*, from a CSF sample and respiratory secretion obtained by bronchoalveolar lavage of an AIDS patient.

2. CASE REPORT

A 35 years male patient brought by relatives with complaints of fever since 1 month and cough since 15 days before admission and altered sensorium since few days when he developed fever which was insidious in onset gradually progressing in nature, moderate grade. The patient also had cough since 15 days. Patients' relatives were also complaining of altered sensorium of the patient since few days in the form of not responding to commands.

On examination patient was having altered sensorium with pulse -76 /min, BP-100/60, No pallor, cyanosis, clubbing, Lymphadenopathy, in Respiratory system crackles present on left side, CNS: altered sensorium, Bilateral planter unelicitable.

On investigation: Hemogram showed Hb: 7.8 counts raised, CT head showed infarct. Other routine blood investigations were normal. On Investigating Viral markers, patient was HIV positive and CD4 cells were subnormal. CSF sent for microbiological staining was divided into three parts for CSF, wet mount, Gram staining, India ink preparation and aerobic culture. Wet mount and Gram staining revealed 4-7 µm, round budding yeasts with capsule and confirmed by India ink preparation (Fig. 1). On Sabouraud dextrose agar medium, typical creamy mucoid colonies (Fig. 2). After seeing the Microscopy, culture identification and pathogenicity of *Cryptococcus neoformans* was established by the growth at 37°C and urease production.

Bronchial lavage was performed by the method of Masur and Jones. Lavage fluids were processed for staining [6]. Giemsa staining was performed (with 2 ml of Giemsa in 40 ml of 6.7 mM Phosphate buffer at pH 7.2) on methanol fixed BAL smears, as described previously [7]. Using this technique we were able to demonstrate aggregates of pneumocystis cysts approximately 6-7 µm round to oval in shape and few of cysts showed 4 to 6 intracystic bodies

called sporozoites within (Fig. 3). Chest X-ray was showing patch of consolidation. Patient was started on treatment by giving antivirals and other supportive treatment but patient didn't showed any sign of improvement in sensorium. Alongwith this patient had developed

hypotension for which fluids and inotropic support was given but patient didn't responded and had persistent hypotension. He suddenly went into cardiac arrest, CPR was given. Despite of all resuscitative efforts he could not be revived and died.

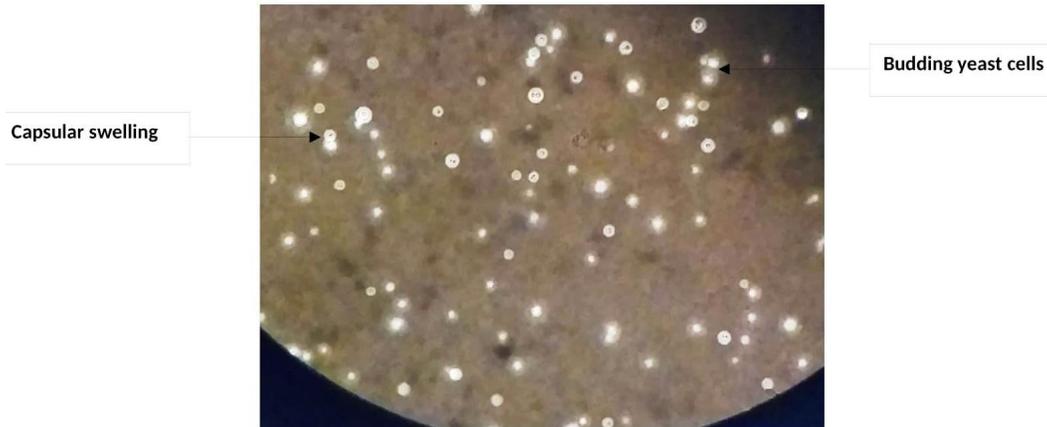


Fig. 1. India ink staining 40x



Fig. 2. Mucoïd colonies of Cryptococcus on SDA

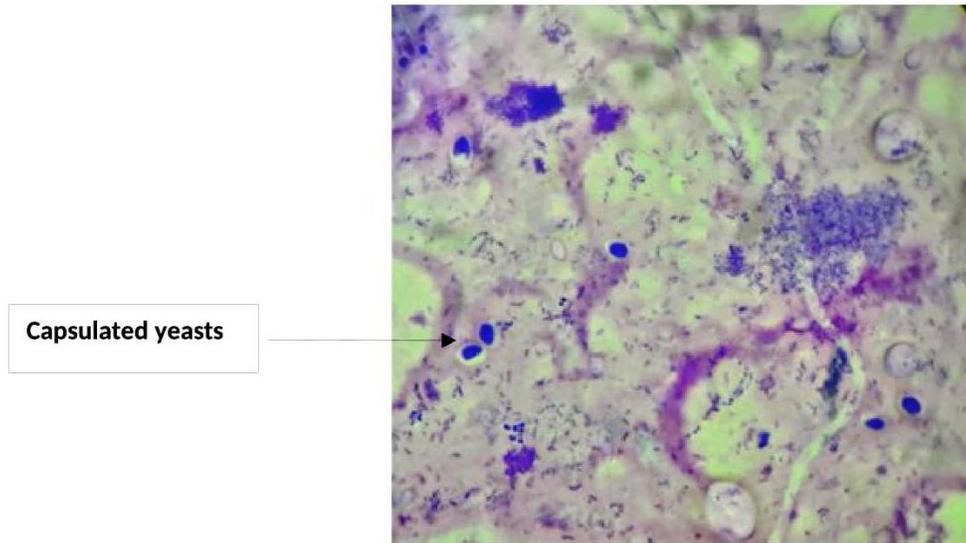


Fig. 3. Cysts *P. jirovecii* & capsulated yeasts in a smear of BAL concentrate strained giemsa 100X

3. DISCUSSION

In HIV infection, infected individuals are more likely to get pulmonary as well as central nervous system infection. Pulmonary disease is a major source of morbidity and mortality in HIV-infected persons. PCP has decreased substantially during the last ten years. In contrast, tuberculosis is by far the most important AIDS-associated indicator disease. Along with coinfection of *P. jirovecii* with other microbial agents i.e. bacteria, Mycobacteria, fungi or protozoa, is infrequently diagnosed by microscopy in respiratory samples. About 10% of these samples corresponds to associated infectious diseases, as it was further confirmed.

Over two-thirds of all HIV-infected individuals have an associated pulmonary disease [8]. The following causes are frequently noticed as: bacterial infection (*Streptococcus pneumoniae*, *Haemophilus influenzae* and *Mycobacteria*), protozoal infection (*P. jirovecii*), fungal infection (*C. neoformans* and *Histoplasma capsulatum*), viral infection (*Cytomegalovirus*), tumors (*Kaposi's sarcoma*) and pneumonitis.

Cryptococcal meningitis most commonly occurs in AIDS patients, those undergoing cytotoxic chemotherapy, those receiving other immunomodulating agents such as corticosteroids, transplant recipients, or patients with hematologic malignancy. Most patients, particularly those who are immunocompromised,

present with meningoencephalitis. The Pulmonary Cryptococcal disease can manifest either alone or in conjunction with meningitis [4]. Respiratory infection with *P. jirovecii* remains common as a cause of pneumonia in HIV-infected patients, mainly in those without prophylaxis [9] next to drug resistant tuberculosis.

In our case report patient was having dual infections which infer patient's immune system was too weak to acquire dual infection. On examination patient was having altered sensorium which reflects the central nervous system was affected and examination of cerebrospinal fluid showed presence of budding yeast cells & India ink proved to be capsular swelling positively. To further confirm the diagnosis CSF was cultured on SDA. Along with these findings Broncho Alveolar Lavage gram staining and further Giemsa staining showed cysts of *Pneumocystis jirovecii*.

These signs & symptoms may also be observed with other immune compromised states. In such immunocompromised patients with lung infection it is advisable to collect Broncho Alveolar Lavage than the sputum sample to know variety of microbial isolates. This will avoid the chances of missing the microorganism because opportunistic pulmonary infections remain a significant problem in HIV infected patients. Diagnostic yield from Broncho Alveolar Lavage is high in immunocompromised patients. It has

been reported in upto 40% cases in some series. Organism such *cytomagalovirus*, *C. neoformansherps simplex* and bacteria have been from patient with PCP. If the immune status&comorbidities of patient is more vulnerable and CD4 count is less than 200 units there is very less chances of patient's survival.

Patients with higher CD4 counts are prove to develop isolated pulmonary nodules. Due to nonspecific presentation it is important to rule out definite diagnosis in HIV infected patients.

4. CONCLUSION

To summarize our case report analysis, HIV infected individuals are vulnerable to several infections than the normal individual. The role of CD4 count infers the immune status of the patient which leads to several infections. In patients' lungs are the primary site of infection in HIV infected individual it may be due to MultidrugResistant Mycobacterial infections or *Pneumocystis carinii* infection. These are said to be an indicator organism in HIV infected individuals, but next vulnerable site for infection is Central nervous system. In our condition patient had a dual infection of *Pneumocystis carinii* as well as *cryptococcus neoformans*.

As in our case patient had CNS manifestation too patient could not survive from the infections.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant/ patients consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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