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Pneumocystis Jiroveci Pneumonia in an Immunocompetent Man: A Case Report

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ABSTRACT

Pneumocystis jirovecii (previously carinii) pneumonia is a subacute to acute lung infection that typically proves lethal in immunocompromised or severely malnourished individuals. Although the start of HIV-positive PCP is often gradual, the clinical course, which occasionally includes respiratory failure, can be rapid. A low CD4+ lymphocyte count of under 200 cells/mm3 is a risk factor for PCP development, which has evolved into the most serious HIV consequence. Steroid usage has been identified in certain studies as a risk factor for PCP, especially in individuals with connective tissue disorders or cancer. Clinical presentations include low grade fever, productive cough, dyspnea over weeks. Patients also have some level of hypoxemia and respiratory distress. The primary cause of PCP is a decrease in white blood cells, particularly CD4+ lymphocytes, which affects the patient's capacity to fight infection. An X-ray of chest shows diffuse interstitial infiltrates and single or numerous nodules that can develop into cystic and cavitory lesions. The most commonly prescribed medicine to treat PCP is the antibiotic Trimethoprim-Sulfamethoxazole. Primaquine, Clindamycin, Dapsone, Atovaquone are the alternative therapies.

I. INTRODUCTION

Pneumocystis Jiroveci Pneumonia (PCP) is an opportunistic fungal infection which is typically observed in immunocompromised individuals, particularly those with Human Immunosuppressive Virus (HIV), cancer, organ transplants, and pharmacological regimens like chemotherapy and treatment with steroids. [1] The primary cause of PCP is a decrease in white blood cells, particularly CD4+ lymphocytes, which affects the patient's capacity to fight infection. PCP is a deadly infection that causes inflammation and fluid buildup in the lungs, which results in respiratory symptoms. [2] Clinical presentations include low grade fever, productive cough, dyspnea over weeks. Patients also have some level of hypoxemia and respiratory distress. [3]

In healthy individuals, PCP is quite uncommon, but the fungus that causes it may survive in the lungs without showing any signs of illness. Immune systems are typically impaired in people who get PCP. [4] PCP spreads from person to person through exposure to air. People get exposed to the fungus through air, but most of them do not get infected because their immune systems prevents the fungus growth thus preventing the infection. For an accurate clinical diagnosis of PCP, a thorough medical history that includes information on any immunodeficiency and medication use is necessary. The diagnosis can be supported by clinical suspicion, risk factors, lab investigations, imaging techniques, sputum studies and invasive lung examinations. Elevated Lactic Acid Dehydrogenase (LDH) can be found in patients infected with this disease. An X-ray of chest shows diffuse interstitial infiltrates and single or numerous nodules that can develop into cystic and cavitory lesions. [5] CT chest usually show ground glass attenuation and cystic lesions. Polymerase chain reaction (PCR) of respiratory specimen, fluorescein antibody staining are the definitive diagnostic option for PCP. The detection of pneumocystitis organisms on histological staining results in a conclusive diagnosis of PCP. [6]

The most commonly prescribed medicine to treat PCP is the antibiotic Trimethoprim/

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Sulfamethoxazole, also known as co-trimoxazole. [7] Side effects like rashes and fever can be caused by taking this antibiotic. Other medications are available for those people who do not respond to Trimethoprim/ Sulfamethoxazole. For mild to moderate cases oral antibiotics are preferred and severe cases are treated with intravenous therapy. Primaquine, Clindamycin, Dapsone, Atovaquone are the alternative therapies. [8] Outcomes depends on various factors of the patient including their age, comorbidities, extend of hypoxia, CD4+ counts and other opportunistic infections. Prophylactic treatment can be given to immunocompromised patients and also glucocorticoids can be given to HIV induced cases of PCP.

II. CASE REPORT

A 61 year old male patient was admitted under the pulmonology department in a tertiary care hospital with complaints of breathlessness, cough on and off for 3 days. The patient has history of Chronic Obstructive Pulmonary Disease since 1 month and was not on any regular treatment. The patient also had a history of hypertension and was on treatment with Tablet. Amlodipine 5mg since 2 years. Human Immunodeficiency Virus (HIV) And HbsAg were positive. At the time of admission respiratory rates were elevated. He had unintentional weight loss accompanied with loss of apetite. On clinical examination he had bilateral crackles in the lungs and resonant wheezing. Laboratory investigation reports showed elevated WBC, Erythrocyte Sedimentation Rate (ESR), C - reactive protein (CRP). Lymphocytes were declined. Absolute CD4+ Lymphocyte count were 58 (low) and % CD4 (T-Helper cells) were 5.9 (low). USG Abdomen and Pelvis showed impression of small hyperchoic area in right lobe of liver likely hemangioma, splenomegaly, Bilateral Grade I renal parenchymal changes and bilateral renal cysts. Chest X-ray showed bilateral diffuse interstitial prominence with nodular infiltrates. HRCT Chest revealed Bilateral lungs show extensive mosaic attenuation with swiss cheese pattern (area of low attenuation, high attenuation and normal lung), hypersensitivity pneumonitis/pneumonia. Sputum culture was negative for any organism. Oxygen saturation levels were declined. Initially he was commenced on Intravenous Cefoperazone Sulbactum, Azithromycin and Methylprednisolone based on provisional diagnosis of interstitial pneumonia. On confirming the diagnosis of PCP , Tablet Bactrim DS (Trimethoprim/Sulfamethoxazole) and Tablet Wysolone (Prednisolone) were initiated. Patient had oral ulcers, Capsule Becosules once daily regimen was given. The patient was also treated with Tablet Fluconazole 200mg, Tablet Spegra (Dolutegravir + Emtricitabine + Tenofovir alafenamide). The patient had complaints of decreased sleep during the hospital stay and was managed with Tablet Alprazolam. Nebulization Levosalbutamol and Ipratropium Bromide were given. Injection Clexane was prescribed as a prophylactic therapy to prevent venous thromboembolism. His respiratory conditions were improved and hence the patient was discharged with Tablet Bactrim DS , Tablet Wysolone and Tablet Pantoprazole.

III. DISCUSSION

Previously known as Pneumocystis carinii, Pneumocystis jirovecii affects immunocompromised people. PCP is an illness that can be deadly. [9] It causes an inflammatory reaction and fluid buildup in the lungs, which results in respiratory symptoms. Even though infection is uncommon, it can spread via the air and, in extreme situations, can affect the liver, bone marrow, and lymph nodes in addition to other bodily organs. Two thirds of instances in immunocompromised individuals include HIV patients. Patients with cancer, persistent inflammatory diseases, or people using immunosuppressive medications account for one-third of cases. Dry cough, fever and dyspnea are the most significant clinical presentation which was also present in this case. A chest X-ray shows radiographic indications that are often bilateral and diffuse interstitial infiltrates which was significant in our case. Neutrophils, alveolar macrophages, neutrophils, CD4 cells, CD8 cells, and mediators all play a role in the body's defence against Pneumocystis infection; nevertheless, the most significant risk factors for PCP in HIV-infected individuals are CD4 count and viral load. [10] The CD4 count in the majority of PCP patients is less than 200 cells/L. With low CD4 levels, it is the most prevalent opportunistic infection among HIV-positive individuals. Among PCP patients, severe acute respiratory failure is still a prevalent presentation. Presence of oral candidiasis and peripheral blood lymphocytopenia are significant differential diagnosis that should be considered for PCP which was also relevant in this case. The management of PCP usually involves first line treatment with Trimethoprim-Sulfamethoxazole and second line agents like Primaquine, atovaquone, or in severe cases intravenous

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pentamidine is used. Physicians should maintain a high clinical suspicion for PCP in all immunocompromised patients presenting with respiratory disease notwithstanding a considerable drop in PCP incidence among HIV-infected patients following the administration of ART (antiretroviral treatment). [11]

IV. CONCLUSION

Even though PCP infection is uncommon, it should be taken into consideration when making a pneumonia diagnosis in immunocompromised individuals with non-specific respiratory symptoms and lymphocytopenia. The short-term or intermittent use of high-dose steroids is one of the main risk factors for developing PCP in non-HIV-infected individuals. Regardless of risk factors, the CDC advises that all people aged 13 to 64 get tested for HIV as part of routine medical care, and those who do should get tested more frequently—at least once a year.

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CONFLICTS OF INTEREST

The authors have the required patient consent form, on which the patients have agreed to participate in the study and be represented in the corresponding publication. Althougth the patients are aware that the writers would take precautions to take their names secret, anonymity cannot be guaranteed.

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