

# Clinical Image ‘Spontaneous Bilateral Pneumothoraces in a Patient with Human Immunodeficiency Virus Infection’

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## Case

A 28-year-old man with history of substance abuse presented to the emergency department for fever and shortness of breath. Chest X-ray (CXR) showed bilateral pneumothoraces (Figure 1). Bilateral chest drains were inserted. CXR after chest drains insertion showed diffuse reticular shadow over bilateral lung fields (Figure 2).

The patient was also suffering from severe oral candidiasis and eventually diagnosed to have Human Immunodeficiency Virus (HIV) infection. High-Resolution Computed Tomography (HRCT) of thorax (Figure 3) was performed due to persistent air leak from the chest drains and showed numerous thin-walled, air-filled cysts, diffuse ground-glass opacity and multiple patchy consolidations in bilateral lungs. Small bilateral pneumothoraces were present with bilateral chest drains in-situ. The radiological findings with the background of HIV infection and clinical presentation of bilateral pneumothoraces were highly suggestive of *Pneumocystis Jirovecii* Pneumonia (PCP). The CD4 cell count of the patient was only 62cells/mm<sup>3</sup>. Empirical treatment with trimethoprim-sulfamethoxazole was given based on the radiological findings. His clinical condition improved with fever down and decreasing oxygen requirement. Bilateral chemical pleurodesis were subsequently performed and both chest drains were successfully weaned off. He was then referred to infectious disease specialist for initiation of Highly Active Antiretroviral Therapy (HAART).

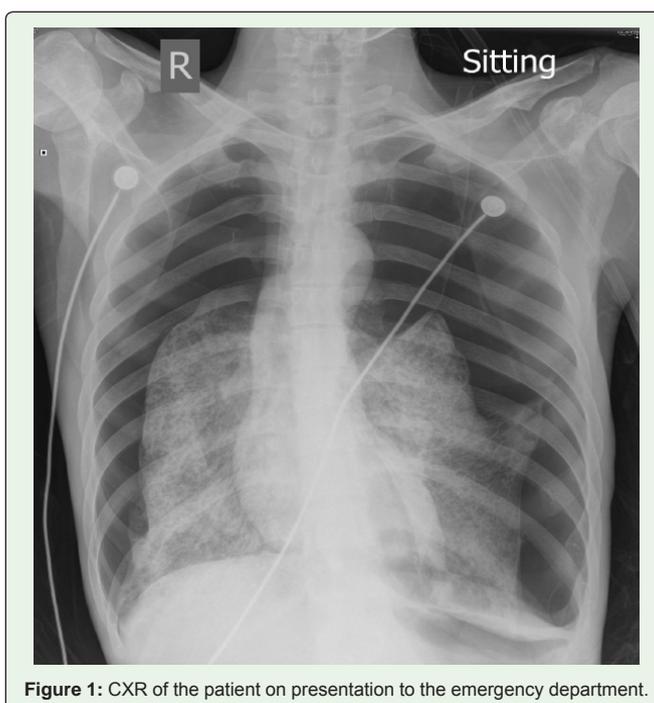


Figure 1: CXR of the patient on presentation to the emergency department.



Figure 2: CXR of the patient after insertion of chest drains.

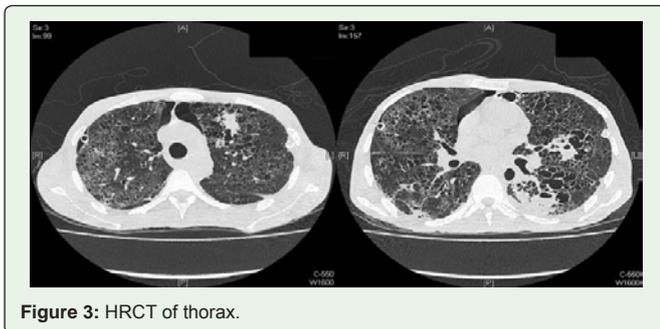


Figure 3: HRCT of thorax.

## Discussion

Patients with HIV infection are at high risk of pulmonary complications depending on the degree of the immune suppression. The risk of bacterial pneumonia, pulmonary tuberculosis and lymph proliferative disorders increases when the CD4 cell count is less than 500cells/mm<sup>3</sup> while patients with less than 200 CD4cells/mm<sup>3</sup> are at risk of opportunistic infections including PCP, Cytomegalovirus (CMV) pneumonia and fungal infections [1]. PCP is an important opportunistic infection in patients with HIV infection/ Acquired Immune Deficiency Syndrome (AIDS). The classical presentations of PCP are fever, cough and dyspnea [2]. On CXR, PCP infection presents as bilateral, diffuse, reticular, or granular opacities. However, CXR is neither sensitive nor specific to diagnose PCP and up to one third of the patients with PCP have normal CXR [3].

The principle finding of PCP in HRCT is extensive (patchy or diffuse) ground glass opacity [4,5], which is the slight increase of pulmonary attenuation reflecting the accumulation of intra-alveolar

fibrin, debris and organisms. However, ground glass opacity is a non-specific finding which only indicates a change of the underlying pulmonary attenuation below the limit of resolution of HRCT. Apart from PCP, ground glass opacity also occurs in CMV pneumonia and other non-infectious pulmonary conditions in the AIDS patients, such as lymphocytic and non-specific interstitial pneumonia [6]. A study involving 32 patients with HIV infection and PCP showed that central distribution with relative peripheral sparing of the ground glass opacity was the commonest finding occurring in 41% of the patients while mosaic pattern and diffuse distribution were observed in 29% and 24% of the patients respectively [7]. HRCT is highly sensitive to detect PCP. In a study of AIDS patients who were clinically suspected to be suffering from PCP but had normal, equivocal or nonspecific findings in the CXR, the sensitivity, specificity and accuracy to diagnose PCP based on the presence or absence of ground-glass opacity in HRCT were 100%, 89% and 90% respectively [8].

Pulmonary cysts are another important finding of PCP in HRCT and have been reported in up to 40% of AIDS patients with PCP [9]. The incidence of pulmonary cysts in PCP is higher in patients with HIV infection than those without HIV infection [4]. Thus, the identification of pulmonary cysts and ground glass opacity in an HIV-positive patient is highly suggestive of PCP [10]. The presence of pulmonary cysts is associated with higher risk of spontaneous pneumothorax. Other radiological findings of PCP include interlobular septal thickening and consolidations which occur in patients with more advanced disease [5].

Pneumothorax occurs in 2 to 4 % of patients with PCP [11,12]. While most of the AIDS patients with pneumothorax have concurrent or past history of PCP [12,13]. The proposed mechanisms for the development of pneumothorax include direct lung tissue destruction by *Pneumocystis jirovecii*, obstructive bronchiolitis leading to pulmonary over-distension, interstitial emphysema and the release of proteolytic enzymes due to the activation of inflammatory response [14]. PCP should be considered in all HIV-positive patients with pneumothorax [12].

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