

**Original Article****A Study on the Incidence of Pneumocystis Jiroveci Pneumoniae in HIV Patients in a Tertiary Care Hospital**

Authors

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Three of the 10 most common AIDS deficiency illnesses are recurrent bacterial pneumonia, TB and PCP pneumonia. Pneumocystis pneumonia once the hallmark of AIDS has dramatically declined in incidence following the development of effective prophylactic regimens and the widespread use of HAART. Pneumocystis is an opportunistic eukaryote that is classified as a fungus. The genus Pneumocystis infects mammalian species and is host-species specific. Infection in humans is caused by Pneumocystis jirovecii;. Humans are the only reservoir of P. jirovecii.

The risk of pcp is common among who have CD4+T cell counts of < 200/μL. Recurrent fever, non productive cough, night sweats and unexplained weight loss are the main clinical features of pcp. Symptoms may be subtle at first but gradually progress and may be present for several weeks before diagnosis. The incidence of pcp is reaching zero in patients with known HIV

infection receiving appropriate cART and prophylaxis in developed countries, the prevalence of AIDS related PCP in developing countries remains high and poorly controlled.

Pneumocystis cannot be cultured, and the diagnosis of PCP relies on microscopic visualization of characteristic cystic or trophic forms in respiratory specimens obtained most often from sputum induction or bronchoscopy. Bronchoscopy with BAL is regarded as the gold standard procedure to diagnose PCP in HIV-infected patients and has a reported sensitivity of 98% or greater .However, bronchoscopy requires specialized personnel, rooms, and equipment, and it is also expensive and carries an associated risk of complications. Thus, bronchoscopy is limited in its availability throughout many areas of the world that are burdened with HIV/AIDS.

This study aims to find the incidence of PCP pneumonia in known HIV patients on ART with respiratory complaints in Kanyakumari Medical

College on the basis of clinical symptoms, chest x ray and HRCT chest.

Materials and methods

Study design: Prospective observational study

Study period: July 2018 to December 2018

Study centre: ART centre, Kanyakumari Government Medical College, Asaripallam

Inclusion criteria

- 1) HIV patients on ART
- 2) age 15-65 years
- 3) CD4 count < 500/ μ l

Exclusion criteria

- 1) Pregnant patients
- 2) Patients taking ATT
- 3) Age < 15 years > 65 years
- 4) Patients with other comorbidities

One hundred and thirty-five HIV/AIDS patients registered to the ART centre Kanyakumari Medical College were the study subjects. They were followed up for a period of 6 months. Patients who developed respiratory symptoms like cough, fever, breathlessness were further evaluated. The clinical data of these patients were analyzed, and detailed history was collected. Clinical examination was done in detail. History included symptoms like fever, sore throat, dry cough, weight loss, breathlessness and chest pain. Results of physical examination and chest X-ray findings were recorded and compared. Sputum was sent for AFB and CBNAAT. Chest x ray was the cornerstone of the diagnostic evaluation of pcp pneumoniae and included bilateral, symmetric, reticular (interstitial), or granular opacities. Sputum negative smears with respiratory symptoms with c x ray findings of pcp was further evaluated with hrct chest. Chest HRCT mainly demonstrated patchy areas of ground glass opacity in pcp pneumonia. Patients diagnosed of pcp pneumonia were treated with cotrimoxazole and were followed up.

Treatment

Trimethoprim-sulfamethoxazole is the recommended first-line treatment for PCP in HIV-infected patients with mild, moderate, and severe PCP, with intravenous therapy generally recommended for inpatients with moderate to severe disease and oral therapy used for outpatients with milder disease. Alternative regimens include intravenous pentamidine, clindamycin plus primaquine, trimethoprim plus dapsone, and atovaquone suspension. Adjunctive corticosteroids are recommended for patients with moderate to severe PCP as demonstrated by aPaO₂ less than 70 mm Hg or an alveolar-arterial oxygen gradient greater than 35 mm Hg. Patients should be started on adjunctive corticosteroids at the same time that PCP therapy is initiated. The recommended duration of treatment is 21 days.

Prophylaxis

Trimethoprim-sulfamethoxazole is also the recommended first line regimen for primary and secondary prophylaxis against PCP. Alternative regimens include dapsone with or without pyrimethamine and leucovorin, atovaquone suspension, and aerosolized pentamidine. HIV-infected adolescents and adults, including pregnant women, should receive PCP prophylaxis if their CD4cell count is below 200 cells/ml or if they have a history of oral candidiasis (primary prophylaxis) and after an episode of PCP (secondary prophylaxis). Persons with a CD4cell count below 14/ μ l and those with a history of an AIDS-defining illness should also be considered candidates for PCP prophylaxis. Once initiated, PCP prophylaxis is recommended for life, but it can be discontinued in HIV-infected adolescents and adults who are receiving combination antiretroviral therapy and have responded with an increase in their CD4cell count from below 200 cells/ml to above 200 cells/ml for at least 3 months. One potential exception is patients who developed PCP when their CD4cell count was above 200 cells/ml; these individuals should probably remain on PCP prophylaxis regardless of

their CD4cell count. After discontinuation of PCP prophylaxis, the risk of subsequent PCP on combination anti-retroviral therapy with a sustained CD4cell count above 200cells/ml (and generally accompanied by a sustained suppression of plasma HIV RNA below the limits of detection) has been shown to be extremely low, but rare cases have been described. Prophylaxis should be resumed if the CD4cell count declines below 200 cells/ml .Recent data from a 12-cohort collaboration suggest that PCP incidence is low in HIV-infected persons with CD4cell counts of 100 to 200 cells/ml and HIV RNA levels less than 400 copies/ml irrespective of PCP prophylaxis use, suggesting that it may be safe to stop prophylaxis earlier, though additional data are needed.

Results

One hundred and thirty-five cases of were enrolled in our study. Number of males were 80 (59.3) and females were 55 (40.7%)The mean CD4 count of patients involved in our study was 381 cells/ μ l .

Five cases were positive for PCP in our study by using our clinical and radiological methods of identification. The CD4 counts ranged from 7 to 326 cells/ μ l, and the mean CD4 count of these patients was67.27 cells/ μ l. Weight loss (100%), cough (100%), fever (60%), and dyspnea (80%) were the most common complaints, followed by night sweats (40%), while wheezing and crepts were seen in 80% and 60 %patients with PCP, respectively

For the patients who tested negative for PCP, the mean CD4 count was 250 cells/ μ l, and the CD4 count ranged from 100 to 450 cells/ μ l. 19(14.07%) patients were found to be sputum CBNAAT positive and was started on ATT.

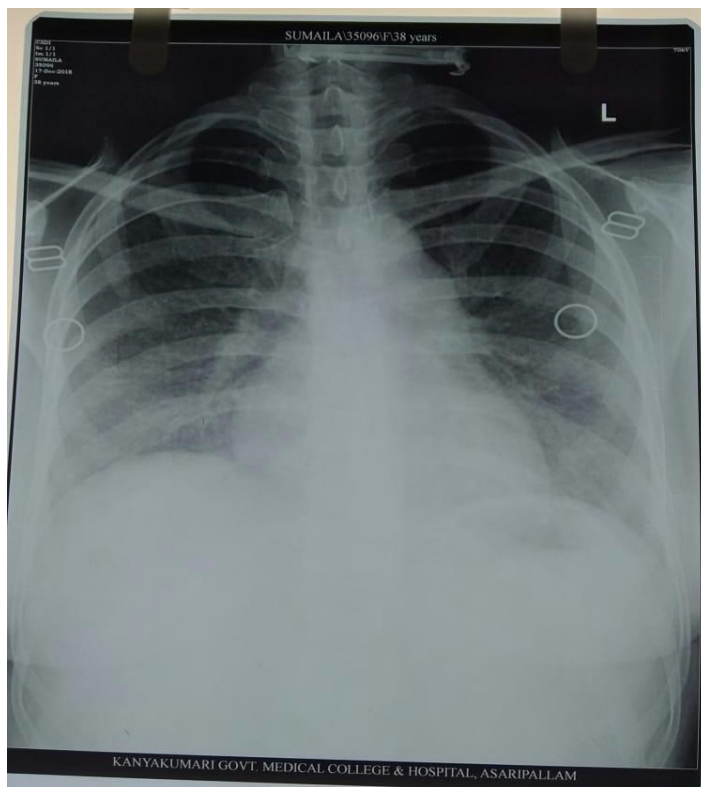
98 (72%) patients had non specific symptoms of URI and no features of infiltrates in chest xray. it is found to have increased risk of respiratory infections with increasing age. Smokers were found to have increased risk of respiratory infections. No deaths were reported during the study period due to respiratory causes. No cases were seen to have recurrent episodes of pcp pneumonia infection during study period.

Chest x ray Findings in PCP Pneumoniae

Sl No.	Chest x ray Findings	Number	Percentage
1.	Central Perihilar Infiltrates	4	80
2.	Patchy Infiltrates	1	20
3.	Consolidation	1	20
4.	Pneumothorax	0	0
5.	Pleural Effusion	1	20

Signs and Symptoms- PCP in HIV

Sl No.	Clinical Feature	Number	Percentage
1.	Non Producticve Cough	5	100
2.	Night Sweats	2	40
3.	Fever	3	60
4.	Weight Loss	5	100



C x ray and ct findings of a HIV case with pneumocystis pneumonia showing perihilar infiltrates

Conclusion

In our study of 135 patients presenting with atypical pneumonia, 3.7 % patients were positive for *P. jiroveci*. Patients with URI/ILI with no radiological signs were the most common (72%) was the most common followed by TB (14.07%), PCP is found to have higher incidence patients with $CD4 < 200/\mu\text{L}$. Non productive cough was the most common symptom in patients with PCP pneumonia followed by fever, weight loss and breathlessness. In a major study in the United States it was established that recurrent undiagnosed fevers, night sweats, oropharyngeal thrush, and unintentional weight loss were associated with risk of pneumocystinosis even among persons with $CD4$ counts above 200 cells/ μL which has been seen in our study also. Most common chest X-ray finding seen in PCP pneumoniae was bilateral infiltrates (central perihilar infiltrates > patchy infiltrates) followed by consolidation and pleural effusion. While the

classical finding of diffuse, central (perihilar) alveolar infiltrates was found in majority, less common findings include patchy asymmetric infiltrates, pleural effusion as has been seen in our study. Pneumothorax and intrathoracic adenopathy are rare. It was found to have increased rate of PCP in incidence in smokers.

One of the limitations of the study is we have diagnosed PCP based on clinical and radiological findings and not based on microbiological evidence. Bronchoalveolar lavage (BAL) and lung biopsies are invasive and the inaccessibility of these samples made us depend on radiological evidences.

The HIV/AIDS pandemic has witnessed significant advances in our understanding of HIV/AIDS and PCP, one of the prominent diseases associated with the pandemic PCP is an important pathogen in HIV infected people. Despite a significant decrease in PCP incidence among HIV infected patients after the use of ART

physicians should keep a high clinical suspicion for PCP in all HIV patients presenting with respiratory illness

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