pISSN:2355-7583 | eISSN:2549-4864
http://ejurnalmalahayati.ac.id/index.php/kesehatan

CHALLENGES IN MANAGING HIV-ASSOCIATED CO-INFECTION WITH TUBERCULOSIS AND SUSPECTED *Pneumocystis Jirovecii* pneumonia (PCP): A CASE REPORT

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Abstract : Challenges In Managing Hiv-Associated Co-Infection With Tuberculosis And Suspected *Pneumocystis jirovecii* pneumonia (PCP): A Case Report. HIV-positive individuals are highly vulnerable to opportunistic infections such as tuberculosis (TB) and *Pneumocystis jirovecii* pneumonia (PCP), particularly in low-resource, TB-endemic regions. We report a 30-year-old male patient with a history of unprotected multipartner sexual activity, diagnosed with clinical pulmonary TB and HIV infection, who developed progressive dyspnea, hypoxemia, and systemic symptoms over a four-month period. Physical examination revealed signs of pulmonary consolidation and neurologic abnormalities. Laboratory tests showed leukocytosis, hypoalbuminemia, and electrolyte imbalances. Imaging demonstrated bilateral lung infiltrates. The patient received antimicrobial therapy, electrolyte correction, and supportive care. Co-infection of TB and HIV with suspected PCP complicates diagnosis and necessitates an integrated approach. Clinicians must maintain high suspicion for overlapping infections in HIV-positive patients with deteriorating respiratory symptoms. Prompt clinical assessment, empiric therapy, and multidisciplinary management are essential in improving outcomes in resource-limited settings.
Keywords: HIV, Tuberculosis, *Pneumocystis jirovecii pneumonia* (PCP)

Abstrak : Tantangan Dalam Tatalaksana Infeksi HIV - TB Paru dan Terduga *Pneumocystis jirovecii* pneumonia (PCP) : Individu dengan HIV sangat rentan terhadap infeksi oportunistik seperti tuberkulosis (TB) dan Pneumocystis jirovecii pneumonia (PCP), terutama di wilayah dengan sumber daya terbatas dan endemis TB. Kami melaporkan kasus seorang pria berusia 30 tahun dengan riwayat aktivitas seksual multipasangan yang didiagnosis dengan TB paru klinis dan infeksi HIV, serta mengalami dispnea progresif, hipoksemia, dan gejala sistemik selama periode empat bulan. Pemeriksaan fisik menunjukkan tanda-tanda konsolidasi paru dan kelainan neurologis. Pemeriksaan laboratorium menunjukkan leukositosis, hipoalbuminemia, dan ketidakseimbangan elektrolit. Pemeriksaan pencitraan menunjukkan infiltrat bilateral pada paru. Pasien menerima terapi antimikroba, koreksi elektrolit, dan perawatan suportif. Ko-infeksi TB dan HIV dengan dugaan PCP mempersulit diagnosis dan memerlukan pendekatan terintegrasi. Klinisi harus memiliki kecurigaan tinggi terhadap infeksi yang tumpang tindih pada pasien HIV dengan gejala respirasi yang memburuk. Penilaian klinis yang cepat, terapi empiris, dan manajemen multidisiplin sangat penting untuk meningkatkan luaran pasien di daerah dengan sumber daya terbatas.
Kata Kunci: HIV, Tuberkulosis, *Pneumocystis jirovecii pneumonia* (PCP)

INTRODUCTION

HIV/AIDS continues to pose a major global health burden, with more than 39 million people living with HIV worldwide as of 2022 (UNAIDS, 2023). Indonesia, as one of the countries in Southeast Asia with a high HIV burden, continues to face rising rates of co-

infection with tuberculosis (TB), especially among individuals with risk factors such as unprotected multipartner sexual contact (Ministry of Health RI, 2023). People living with HIV (PLHIV) have impaired cellular immunity, particularly in CD4+ T-lymphocyte depletion, which predisposes them to opportunistic infections such as *Pneumocystis jirovecii* pneumonia (PCP) and TB (Kapata et al., 2020; Meintjes et al., 2010).

Pneumocystis pneumonia is a serious fungal infection seen predominantly in patients with advanced HIV/AIDS. It classically presents with progressive dyspnea, dry cough, fever, and hypoxemia. Chest imaging, particularly high-resolution CT, often reveals diffuse bilateral ground-glass opacities, which are a hallmark of PCP, although they are nonspecific (Morris et al., 2008). Co-infection with *Mycobacterium tuberculosis* may further complicate the clinical picture, particularly in endemic regions. In this patient, a 30-year-old male, HIV was confirmed to be reactive, and he was started on anti-tuberculosis therapy following a clinical diagnosis of pulmonary TB. He later developed symptoms suggestive of PCP, including progressive dyspnea, hypoxemia, and bilateral rhonchi on auscultation. The diagnosis of PCP was made clinically in the absence of direct organism identification, which is often limited in resource-constrained settings. Chest radiograph findings supported the diagnosis, and appropriate empiric antimicrobial treatment was initiated.
Malnutrition, hypoalbuminemia, and electrolyte imbalance, which were evident in this case, may worsen the disease trajectory in immunocompromised patients. These comorbidities highlight the multifactorial burden and management complexity in patients with advanced HIV. This case emphasizes the importance of early recognition and aggressive management of opportunistic infections in HIV-positive individuals, especially in TB-endemic countries. It also reflects the limitations in diagnostic resources and the need for high clinical suspicion to initiate timely treatment.

CASE REPORT

A 30-year-old male, working as a minimarket employee, was admitted to the emergency department of RSAM on July 18, 2025, with complaints of worsening shortness of breath for the past three days, which had been intermittent for the last four months. He also reported a chronic productive cough with white sputum, nocturnal diaphoresis, intermittent fever responsive to antipyretics, loss of appetite, and a weight loss of approximately 10 kg over the last four months. There was no history of hemoptysis, chest pain, wheezing, nausea, or vomiting. Bowel and urinary habits were reported as normal. The patient had previously been treated at RS Hermina Palembang in March 2025 for similar complaints and underwent sputum testing (TCM) with negative results. On April 6, 2025, he was clinically diagnosed with pulmonary tuberculosis and started on first-line anti-tuberculosis treatment at a primary care facility. On July 14, 2025, he was diagnosed with HIV infection during hospitalization at Airan Hospital, where he was also treated with intravenous levofloxacin for suspected *Pneumocystis jirovecii pneumonia* (PCP). He was referred to RSAM for further management due to persistent and worsening symptoms.

His past medical history was negative for diabetes, hypertension, asthma, heart disease, or kidney disorders. Family history was non-contributory. He had a smoking history of 12 cigarettes per day for 10 years (Brinkman Index 120, classified as light), and admitted to engaging in unprotected multipartner sexual activity. He denied any history of intravenous drug use, tattoos, or alcohol consumption. On examination at admission, he appeared moderately ill and somnolent. Vital signs were as follows: blood pressure 102/63 mmHg, heart rate 139 beats per minute, respiratory rate 28 breaths per minute,

temperature 36.9°C, and oxygen saturation of 96% with 3 L/min nasal cannula. His BMI was 18.3 kg/m², indicating borderline undernutrition. Head and neck examination revealed oral candidiasis and tongue deviation to the left. Jugular venous pressure was elevated to 5+1 cmH_2O. Thoracic examination showed decreased movement of the right chest wall, reduced tactile fremitus, dullness to percussion at the right basal region, and diminished vesicular breath sounds in the right lung fields. Bronchovesicular sounds were audible in the left lung, with bilateral rales noted on auscultation and no wheezing. Cardiac examination was within normal limits, with the point of maximal impulse at the fifth intercostal space in the midclavicular line. Abdominal examination was unremarkable, while extremity examination was limited due to patient cooperation.

Laboratory tests revealed leukocytosis (36.010/µL), neutrophilia (93%), mild anemia (hemoglobin 10 g/dL), lymphopenia (7%), hyponatremia (124 mmol/L), hypokalemia (4.0 mmol/L), hypocalcemia (7.7 mg/dL), and hypoalbuminemia (2.5 g/dL). Liver and renal function tests were within normal limits. Arterial blood gas analysis showed features of hypercapnia and hyperoxemia. A rapid HIV test was reactive. Radiological evaluation through chest X-ray showed opacities in the right upper and lower lung lobes, with bilateral infiltrates consistent with pneumonia.

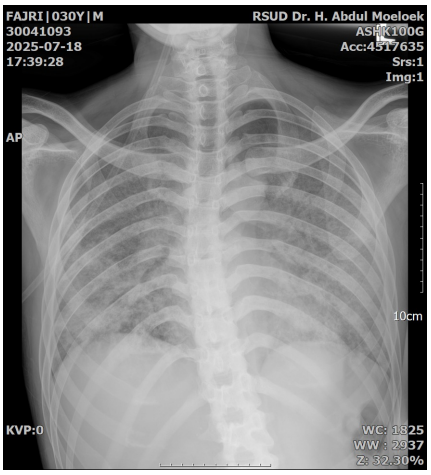

Figure 1. Chest X-ray examination

	Airan Hospital 17/07/2025	AMH 18/07/2025	AMH 22/07/2025	AMH 25/07/2025	Range Normal
Hb/Ht/Leucocyte/ Trombocyte	**12,1/36/8.640/ 140.000**	**12,2/37/7.940/ 294.000**	**10,0/30/36.010/ 178.000**	**11,0/33/14.240/ 232.000**	**13,2-17,3/40-52/3.800-10.600/150.000-440.000**
Diff count	**0/1/0/77/15/7**	**0/3/0/77/13/7**	**0/0/0/93/4/3**	**-**	
Na/K/Ca/Cl	**-**	**124/4,0/7,7/94**	**-**	**-**	**135-147/3,5-5,0/8,8-10,3/95-105**
Ur / Cr	**30/1,1**	**23/0,67**	**-**	**-**	**18-55/<1,2**
GDS	**-**	**-**	**-**	**-**	**<140**
Albumin	**-**	**2,5**	**-**	**-**	**3.5-5.2**
ALT/AST	**58/23**	**36/18**	**-**	**-**	**0-50/0-50**
Anti HIV	**Reactive**	**-**	**-**	**-**	**Non reactive**

Based on the patient's clinical presentation, physical examination, and supporting investigations, the working diagnosis was immunocompromised

status due to HIV infection, tuberculosis co-infection, clinically suspected Pneumocystis jirovecii pneumonia (PCP), malnutrition and electrolyte disturbances. The patient received comprehensive medical therapy consisting of oxygen therapy via nasal cannula at 2 L/min, dual intravenous fluid support (0.9% NaCl 500 mL every 12 hours and hypertonic NaCl 3% 500 mL over 24 hours), and empirical intravenous antibiotics including meropenem 1 g every 8 hours and levofloxacin 750 mg daily. Antituberculosis therapy was continued with a fixed-dose combination (2KDT) of four tablets daily. Treatment for PCP was initiated with high-dose oral cotrimoxazole (960 mg, 2 tablets three times daily) along with systemic corticosteroids—IV methylprednisolone 30 mg every 12 hours for five days, followed by tapering doses for up to 21 days.

Supportive therapy included N-Acetylcysteine (200 mg every 8 hours), oral paracetamol (500 mg every 8 hours), calcium and albumin supplements (every 8 hours), and vitamin B6 daily. Antifungal coverage was provided with IV fluconazole (200 mg daily for 7 days) and oral nystatin drops (2 cc every 6 hours) to address oral candidiasis. Adjunct hepatoprotection with oral curcuma (every 8 hours) was also initiated.

The patient's HIV treatment consisted of a fixed-dose combination of Tenofovir, Lamivudine, and Efavirenz (1 tablet once daily). A specialist in internal medicine was involved for HIV management, and antiretroviral therapy (ART) was continued. A follow-up evaluation of sputum AFB (acid-fast bacilli) was planned for the end of the fifth month of tuberculosis treatment.

DISCUSSION

This case illustrates the diagnostic and therapeutic complexity in a young male patient with advanced HIV infection, ongoing tuberculosis treatment, and a suspected diagnosis of *Pneumocystis jirovecii* pneumonia (PCP). HIV significantly impairs cellular immunity, particularly CD4+ T cells, rendering individuals susceptible to opportunistic infections such as tuberculosis and PCP (Meintjes et al., 2010; Morris et al., 2008). In resource-limited settings where CD4 counts are unavailable as in this case clinical suspicion, radiologic findings, and the presence of hypoxemia and bilateral rales serve as crucial indicators for PCP (CDC, 2023).

Pneumocystis pneumonia (PCP), caused by *Pneumocystis jirovecii*, is a fungal infection predominantly affecting immunocompromised individuals, particularly those with HIV. While initial exposure to the pathogen typically occurs during early childhood, clinical disease often results from either reactivation of latent infection or new exposure, especially in those with CD4 counts below 200 cells/mm³. Before the advent of antiretroviral therapy (ART) and prophylaxis, PCP was a leading opportunistic infection in AIDS patients, with high mortality. Currently, most PCP cases are seen in individuals unaware of their HIV status or not receiving HIV care. Clinically, PCP presents subacutely with progressive shortness of breath, fever, and dry cough. Hypoxemia is a hallmark, and chest imaging typically shows diffuse bilateral interstitial infiltrates. However, atypical radiographic features and co-infections—such as TB or bacterial pneumonia—may complicate diagnosis. Early recognition and treatment are essential to improve outcomes in affected individuals.

PCP classically presents with progressive dyspnea, dry cough, hypoxemia, and diffuse bilateral infiltrates in patients with HIV, especially when CD4 <200 cells/μL (Kapata et al., 2020). Definitive diagnosis often requires specialized microbiological or PCR-based testing, but in many low-resource settings, diagnosis remains clinical (Morris et al., 2008; WHO, 2022). Empiric treatment with agents such as trimethoprim-sulfamethoxazole (TMP-SMX) is often initiated based on strong clinical and radiologic suspicion, although adverse

drug reactions are common in HIV-positive patients (Budisan et al., 2021).

Since clinical symptoms, blood tests, and chest X-rays are not specific to *Pneumocystis jirovecii* pneumonia (PCP), and because the organism cannot be cultured routinely, a definitive diagnosis relies on histopathological or cytological identification of the organism in tissue samples, bronchoalveolar lavage (BAL) fluid, or induced sputum. Spontaneously expectorated sputum has low sensitivity and is not recommended for diagnosing PCP. Stains such as Giemsa, Diff-Quik, and Wright can detect both cystic and trophic forms of *P. jirovecii*, but do not highlight the cyst wall. In contrast, stains like Grocott-Gomori methenamine silver, Gram-Weigert, cresyl violet, and toluidine blue are used to stain the cyst wall. Some laboratories prefer direct immunofluorescent staining.

The diagnostic accuracy of respiratory specimens depends on several factors: the type of stain used, the microbiologist's or pathologist's experience, the pathogen load, and the sample quality. Reported diagnostic sensitivities vary: less than 50% to over 90% for induced sputum, 90% to 99% for BAL, and up to 100% for transbronchial or open lung biopsies. Polymerase chain reaction (PCR) is a highly sensitive and specific alternative method for detecting *Pneumocystis*, though it may not clearly distinguish between colonization and active infection. Quantitative PCR (qPCR), which measures organism burden, may better correlate with clinical disease. Additionally, 1,3-β-D-glucan—a component of the *Pneumocystis* cyst wall—is often elevated in PCP cases. Low β-glucan levels (e.g., <80 pg/mL via the Fungitell assay) suggest PCP is unlikely, although specificity is limited since various fungal infections, certain dialysis membranes, and some medications can also elevate β-glucan levels.

Given the overlapping clinical features of PCP with other diseases, establishing a definitive diagnosis is essential, especially in moderate-to-severe cases. Nonetheless, empiric treatment is often started before confirmation, as *P. jirovecii* can persist in respiratory samples for days or weeks after effective therapy has begun. Malnutrition and electrolyte abnormalities, such as hypoalbuminemia, hyponatremia, and hypocalcemia observed in this patient, are frequently associated with poor outcomes in HIV and TB co-infected individuals (Meintjes et al., 2010). Nutritional deficits impair immune response and may exacerbate pulmonary symptoms and metabolic instability (Budisan et al., 2021).

This case highlights the complex interaction between HIV, TB, and PCP. A multidisciplinary approach is critical for optimal care, including input from infectious disease specialists, pulmonologist and nutritionists. Initiation of ART and continuation of TB treatment, along with supportive care, are key to improving this patient's prognosis (WHO, 2023).

CONCLUSION

This case underscores the diagnostic and therapeutic challenges in managing a young HIV-positive male with clinical tuberculosis, suspected Pneumocystis jirovecii pneumonia (PCP). The coexistence of multiple pulmonary pathologies in an immunocompromised host-compounded by malnutrition and electrolyte imbalances demonstrates the critical need for a multidisciplinary approach to care.

In resource-limited settings, diagnosis often relies heavily on clinical judgment and radiological assessment due to the lack of advanced diagnostic tools such as CD4 count or molecular tests for opportunistic infections. Early recognition and empiric treatment of life-threatening infections like PCP and CAP are essential to improve survival. Comprehensive management should integrate antiretroviral therapy (ART), continued anti-tuberculosis treatment, appropriate antibiotic or antifungal coverage, nutritional support, and close monitoring of neurologic and metabolic

status. This case illustrates how infectious processes in immunocompromised patients can obscure diagnosis and delay appropriate interventions, highlighting the importance of vigilance, timely referral, and coordinated multidisciplinary care.

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