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Co-infection with *Mycobacterium tuberculosis* and *Pneumocystis jirovecii* in a kidney transplant recipient: a case report

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Abstract

Background: Opportunistic infections remain a major cause of morbidity and mortality among kidney transplant recipients. *Pneumocystis jirovecii* pneumonia (PJP) and tuberculosis (TB) are well-recognized complications, but their co-occurrence is exceedingly rare outside HIV infection.

Case presentation: We report the case of a 36-year-old man who underwent living-donor kidney transplantation in 2015. Seven months later, he developed biopsy-proven mixed rejection requiring intensified immunosuppression. Three months afterwards, he presented with acute respiratory distress syndrome (ARDS), fever, diffuse pulmonary infiltrates, and worsening renal function. Bronchoalveolar lavage revealed *P. jirovecii* cysts, while sputum culture was positive for acid-fast bacilli, confirming pulmonary tuberculosis. HIV and CMV serologies were negative. The patient was successfully treated with high-dose cotrimoxazole and first-line antituberculous therapy (isoniazid, rifampicin, ethambutol, pyrazinamide). Respiratory and radiological recovery occurred within two months.

Conclusions: This case highlights the importance of vigilance for opportunistic co-infections in kidney transplant recipients, especially during intensified immunosuppression for acute rejection. Prophylaxis, early diagnostic testing, and multidisciplinary management are crucial to improve outcomes.

Keywords: Kidney transplantation; *Pneumocystis jirovecii*; Tuberculosis; Opportunistic infections; Immunosuppression; ARDS

Introduction

Kidney transplant recipients are highly vulnerable to opportunistic infections due to prolonged immunosuppressive therapy. Among these, *Pneumocystis jirovecii* pneumonia (PJP) and tuberculosis (TB) represent two of the most serious threats. TB, often latent, can be reactivated under immunosuppression, while PJP typically develops in the context of CD4+ lymphopenia. Although co-infection with these two pathogens has been described in HIV-infected patients, it remains exceptional in solid-organ transplantation. Recent reviews have emphasized a resurgence of PJP in solid-organ transplant recipients due to intensified immunosuppressive regimens, and stressed the

importance of prophylaxis with trimethoprim-sulfamethoxazole (TMP-SMX) as well as the value of molecular diagnostics (1). Large cohort studies indicate that nearly one-third of kidney transplant recipients develop opportunistic infections, with the highest risk in the first year post-transplant (2).

Here, we describe a case of dual infection with *P. jirovecii* and *M. tuberculosis* in a renal transplant recipient, illustrating the diagnostic and therapeutic challenges in this setting.

Case presentation

A 36-year-old man underwent a living-donor kidney transplant in March 2015. The immediate postoperative course was uneventful with prompt recovery of graft function.

Seven months later, he developed mixed graft rejection confirmed by biopsy despite appropriate immunosuppressive therapy. Intensified treatment (including high-dose steroids and anti-thymocyte globulin) resulted in partial improvement, with serum creatinine decreasing from 28 to 13 mg/L.

Three months later, the patient presented with acute respiratory distress syndrome (ARDS), fever (38.7 °C), diffuse pulmonary infiltrates, and worsening renal function. Bronchoalveolar lavage demonstrated cysts of *P. jirovecii*, and a previous sputum culture grew acid-fast bacilli, confirming pulmonary TB. HIV and CMV serologies were negative, chest imaging showed diffuse bilateral infiltrative opacities without cavitation (Figure 1).

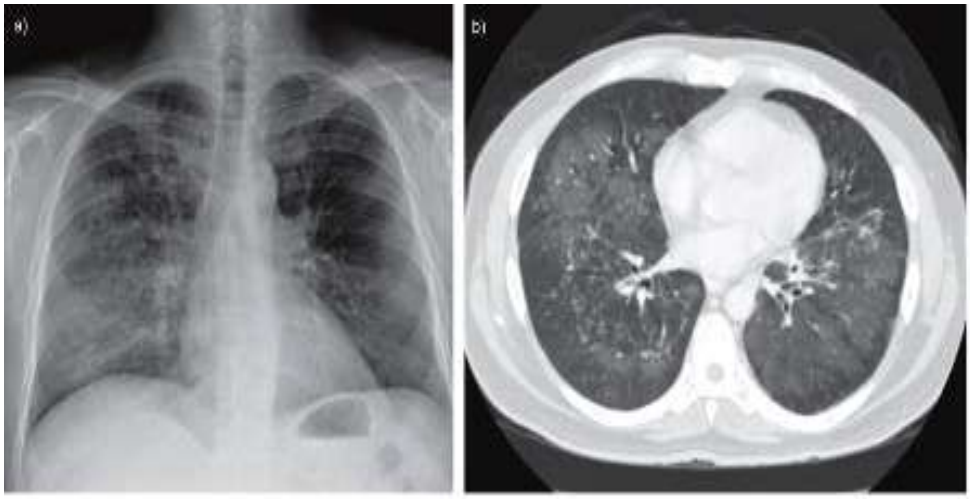

Figure 1: Chest X-ray and CT scan of pulmonary pneumocystis : ***Diffuse bilateral infiltrative opacities without cavitation.***

He was treated with high-dose cotrimoxazole and a four-drug antituberculous regimen (isoniazid, rifampicin, ethambutol, pyrazinamide). Clinical course was favorable, with progressive respiratory improvement and regression of radiological lesions within two months.

Discussion

This case illustrates a rare but life-threatening co-infection with *P. jirovecii* and *M. tuberculosis* in a kidney transplant recipient following rejection treatment. Opportunistic infections remain a major concern in this population, particularly during intensified immunosuppression, which disrupts host immune defenses (2,3).

Similar complex cases have been reported, including disseminated TB with invasive aspergillosis in a renal transplant recipient, underscoring the heightened vulnerability of this group to multiple pathogens (3). Furthermore, atypical presentations of PJP have been described, sometimes mimicking viral pneumonia such as COVID-19, complicating the diagnostic process (4).

Preventive strategies are crucial. TMP-SMX prophylaxis is recommended for the first 6–12 months post-transplant, though recent literature suggests prolongation in patients with persistent CD4+ lymphopenia (<300/µl) (1,5). For TB, pre-transplant

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screening and treatment of latent infection are essential, particularly in endemic regions.

Management of such co-infections requires a multidisciplinary approach, balancing antifungal and antituberculous therapies with drug–drug interaction monitoring, especially in the context of calcineurin inhibitors.

Conclusions

Co-infection with *Pneumocystis jirovecii* and *Mycobacterium tuberculosis* is extremely rare in kidney transplant recipients but carries high morbidity and mortality. Vigilance is warranted during episodes of intensified immunosuppression. Early diagnosis, prophylaxis, and multidisciplinary management are key to improving patient outcomes.

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