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CORRESPONDENCE

Coinfection of *Pneumocystis jiroveci* pneumonia and pulmonary tuberculosis in a non-HIV-infected patient



Dear Editor,

We fervently read the article by Li et al¹ in the *Journal of Microbiology, Immunology and Infection*, in which the authors reported that *Pneumocystis jiroveci* pneumonia (PJP) diagnosed late in nonhuman immunodeficiency virus (HIV)-infected populations has poor outcomes. The incidence rate of PJP in non-HIV-infected populations is uncertain because PJP is difficult to diagnose. In this paper, we report a non-HIV-infected patient admitted to an intensive care unit who was diagnosed as having a PJP and pulmonary tuberculosis coinfection. Although we initiated the standard treatment for PJP and pulmonary tuberculosis and prescribed potent antibiotics to prevent other possible bacterial and fungal infections, the patient died because of fungemia.

An 89-year-old woman with a history of osteoporosis was admitted because of a recent onset of fever, cough, progressive dyspnea, and general malaise for 1 week. She had a low body mass index (13.1 kg/m²), and diffuse reticulonodular opacities on chest radiographies were detected. Lymphocytopenia (lymphocyte count, 62/μL; CD4⁺ T cell count, 59 cells/μL) was observed upon admission, and a chest computed tomography scan revealed bilateral patchy ground-glass opacities (Fig. 1). Results of her serologic tests were negative for HIV antibodies and negative for B and C viral hepatitis. No malignancy was identified. Acute hypoxic respiratory failure developed on Day 5 of admission, and invasive mechanical ventilation was applied. Conducting a sputum acid-fast stain through transtracheal suction revealed positive readings, and subsequently, *Mycobacterium tuberculosis* was identified by conducting a culture test. Using bronchial washing fluid with cell block yielded a positive Gomori's methenamine silver stain with a structure that revealed a typical *P. jiroveci* cyst. We began administering the standard treatment for tuberculosis and PJP on

Day 6 of admission, and the patients' general condition improved slightly. However, although we administered potent antibiotics for pulmonary tuberculosis and PJP and to prevent other possible bacterial and fungal infections, septic shock developed. Despite the aggressive treatment, the patient eventually died because of fungemia.

P. jiroveci and *M. tuberculosis* are common opportunistic infections in patients infected with HIV, and other immunosuppressed patients may become infected with these bacteria. PJP is a severe and potentially lethal opportunistic infection.¹ However, concurrent pulmonary infections with *P. jiroveci* and *M. tuberculosis* in HIV-seronegative patients is extremely rare, and sporadic cases involving HIV-negative patients have been published.² Diagnosing PJP is challenging because of the lack of a reliable culture system for *P. jiroveci* and the low sensitivity of conventional staining.¹ We describe a case of concurrent PJP and pulmonary tuberculosis infection in acute hypoxic respiratory failure without any underlying diseases, but with CD4⁺ T-cell depletion and malnutrition.

The predisposing factors for cell-mediated immunodeficiency include steroid therapy (alone or with chemotherapy), alcohol-related hepatic cirrhosis, severe malnutrition, visceral leishmaniasis, pancytopenia, and CD4⁺ T lymphocytopenia.^{2,3} Our patient did not exhibit any evidence of disease-associated CD4⁺ T lymphocytopenia, and she did not receive immunosuppressive therapy. Lymphocytopenia was reported to occur in several chronic *M. tuberculosis* infections.² *M. tuberculosis* actively promotes down-modulatory mediators to counteract Th1-type and innate immunity.⁴

Previous studies have described the association between tuberculosis and CD4⁺ T lymphocytopenia, especially that in HIV infections; however, it remains unclear whether the low count is a result of tuberculosis or a predisposing factor

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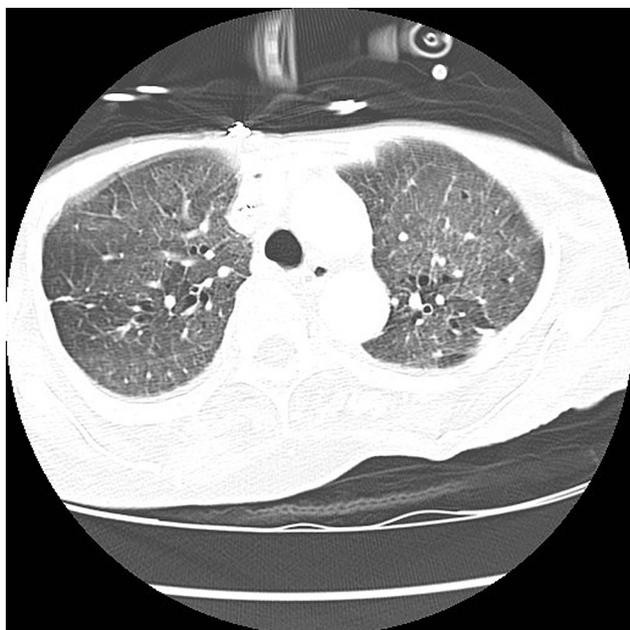


Figure 1. Chest CT revealed bilateral patchy ground-glass opacity.

in non-HIV-infected patients.^{3,5} By contrast, in our case, it is likely that the coexistence of CD4⁺ T lymphocytopenia and malnutrition affected our patient's immune system. Thus, the low CD4⁺ T cell count facilitated the development of an opportunistic *P. jirovecii* infection.⁶

Li et al¹ and other previous studies have reported that PJP can be more fulminant among immunosuppressed non-HIV-infected patients than among HIV-infected patients, resulting in high mortality rates of 50–90%, and a greater degree of lymphocytopenia has been associated with mortality in non-HIV-infected patients with PJP.¹ In addition, Li et al¹ determined that a delay in anti-PJP treatment was more common among non-HIV-infected patients than among HIV-infected patients. We observed that our patient had severe hypoxemia during intensive care unit admission, and the initiation of her PJP treatment was delayed. Lymphocytopenia was observed upon hospitalization, and the patient died 3 weeks after disease management was initiated.

In conclusion, pulmonary coinfections of *P. jirovecii* and *M. tuberculosis* in non-HIV-infected patients are rare. Moreover, PJP in non-HIV-infected patients is extremely severe, and is associated with higher mortality than that in HIV-infected patients. Thus, we must be attentive to the possibility that non-HIV-infected patients with progressive dyspnea and bilateral patchy ground-glass pulmonary

infiltration may develop PJP. In addition, rapid and sensitive diagnostic assays to confirm or rule out PJP are imperatively required to improve prognosis and prevent unnecessary administration of medication to immunocompromised patients. Early diagnosis and initiating treatments early may improve patient outcomes.

Conflicts of interest

The authors have no competing interests to declare.

References

1. Li MC, Lee NY, Lee CC, Lee HC, Chang CM, Ko WC. *Pneumocystis jirovecii* pneumonia in immunocompromised patients: delayed diagnosis and poor outcomes in non-HIV-infected individuals. *J Microbiol Immunol Infect* 2014;**47**:42–7.
2. Mongardon N, Bruneel F, Henry-Lagarrigue M, Legriel S, Azarian R, Bedos JP. Pneumonia involving *Mycobacterium tuberculosis* and *Pneumocystis jirovecii* in HIV-seronegative patients. *Eur J Intern Med* 2008;**19**:e70–2.
3. Onorati P, Carfagna P, Palange P, Venditti M, Serra P. CD4(+) T-lymphocytopenia and *Pneumocystis carinii* pneumonia in a patient with miliary tuberculosis. *Eur J Intern Med* 2001;**12**:134–6.
4. Almeida AS, Lago PM, Boechat N, Huard RC, Lazzarini LC, Santos AR, et al. Tuberculosis is associated with a down-modulatory lung immune response that impairs Th1-type immunity. *J Immunol* 2009;**183**:718–31.
5. Kony SJ, Hane AA, Larouze B, Samb A, Cissoko S, Sow PS, et al. Tuberculosis-associated severe CD4⁺ T-lymphocytopenia in HIV-seronegative patients from Dakar. SIDAK Research Group. *J Infect* 2000;**41**:167–71.
6. Thomas Jr CF, Limper AH. *Pneumocystis pneumonia*. *N Engl J Med* 2004;**350**:2487–98.

Chi-Won Suk
Kuan-Jen Bai
Ming-Chih Yu
Ting-Yu Hu*

Division of Pulmonary Medicine,
Department of Internal Medicine, Wan Fang Hospital,
Taipei Medical University, Taipei, Taiwan

*Corresponding author. Division of Pulmonary Medicine,
Department of Internal Medicine, Wan Fang Hospital,
Taipei Medical University, Number 111, Section 3,
Hsing-Long Road, Taipei 116, Taiwan.
E-mail address: b8801033@tmu.edu.tw (T.-Y. Hu)

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