

CASE REPORT

CD4 LYMPHOCYTOPENIA WITHOUT HIV INFECTION

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Abstract. The CD4 lymphocytes are an important part of the immune system. Besides HIV Infection, other conditions can cause a low CD4 count. We report the case of a 82-year-old female who presented with a markedly low CD4 count during a severe lower respiratory tract infection and respiratory failure without HIV infection. The total lymphocyte and the absolute CD4 counts are 255/mm³ and 109/mm³, respectively. Sputum and bronchial lavage fluid were both negative for acid-fast bacilli. The anti-HIV antibody test was negative. The blood culture was also negative. She had no history of diabetes, malnutrition or chronic kidney disease. Because pneumocystis jiroveci pneumonia could not be excluded, she was treated with a combination of clindamycin, dexamethasone, primaquine, meropenem and oseltamivir because of sulfamethoxazole drug allergy. One week later, she developed herpes simplex of her labia majora, so acyclovir was added. She had history of having a normal lymphocyte count during her routine yearly check-up. Her severe respiratory tract infection was associated with CD4 lymphocytopenia.

Keywords: CD4 lymphocytopenia, without HIV infection, respiratory failure

INTRODUCTION

The CD4 lymphocytes or T helper cells are an important part of the immune system. CD4 lymphocytes comprise 36.1 ± 6.4 % of total lymphocytes among healthy Thais (Vithayasai *et al*, 1997). When the CD4 cell count is less than 350/mm³, the host is 1.7 times more likely to contact an infection (Baker *et al*, 2008). Lower CD4 cell counts, are associated with a greater

risk of developing both common and opportunistic infections due to bacteria, mycobacteria, viruses, fungi and parasites (Jung and Paauw, 1998). Some malignancies, such as non-Hodgkin's lymphoma are more common among those with CD4 cell count ≤200/mm³ (Jung and Paauw, 1998). CD4 cells are targeted by the HIV virus and HIV infection is the most common cause of CD4 cell lymphocytopenia (Ulrich and Klaus, 2006). Other causes of CD4 lymphocytopenia include autoimmune diseases, immunosuppressive therapy, lymphoma (Ulrich and Klaus, 2006), pneumonia, active tuberculosis, sepsis, leprosy and some other viral infections (Erwin, 2001).

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CD4 lymphocytopenia, ranging from <50 to $<500/\text{mm}^3$ can be found in severe pneumonia among westerners (Williams *et al*, 1983) but has rarely been reported among Thais. We report here a case of severe respiratory infection among an elderly Thai woman.

CASE REPORT

An 82-year old Thai woman was referred to our department because of acute respiratory failure after having fever, dry cough and dyspnea for two weeks. She also developed a left pneumothorax requiring intercostal drainage. Physical examination revealed an elderly female who had a good level of consciousness, she had occasional crepitations and rhonchi in both lung fields and she had no hepatosplenomegaly or lymphadenopathy.

Her blood tests showed a hemoglobin of 12.1 g%, white blood cell count of $14,400/\text{mm}^3$, platelet count of $203,000/\text{mm}^3$, 92.9% neutrophils, 3.0% lymphocytes, a mean corpuscle volume of 95.0 fl, CD4 cell count of $109/\text{mm}^3$ (normal 700-1,100), CD8 cell count of $30/\text{mm}^3$ (normal 500-900), a natural killer cell count of $40/\text{mm}^3$ (normal 200-400), a B cell count of $390/\text{mm}^3$ (normal 200-400), a beta-1-C level of 1.12 g/l (normal 0.79-1.52), and a negative rheumatoid factor test.

The ANA, anti-HIV, HBsAg, and anti-HCV tests were all negative. She had normal liver and kidney function tests. Her lactate dehydrogenase level was 808 U/l, her fasting blood sugar was 86.1 mg%, albumin was 3.4 g%, globulin level was 3.3 g%, and cholesterol level was 170 mg%.

A high resolution computed tomography of the chest showed mild cardiomegaly, a ground glass appearance and no hilar lymphadenopathy. The differential

diagnoses of the results included pulmonary alveolar proteinosis, bronchioloalveolar carcinoma, and pneumocystis jirovecii pneumonia (PJP). A sputum culture yielded *A. baumannii* susceptible to co-trimoxazole, resistant to cefipime, amikacin, tazocin, meropenem, and imipenem.

On bronchoscopy, she had mild inflammation. The bronchial lavage fluid and sputum showed no organisms on acid-fast bacillus (AFB) staining and modified AFB stain. Polymerase chain reaction testing for tuberculosis and non-tuberculosis mycobacteria were negative.

The patient was diagnosed with having pneumonia causing acute respiratory failure, and CD4 lymphocytopenia without HIV infection. Because PJP could not be ruled out, the patient was treated with respiratory support, clindamycin, dexamethasone, primaquine, meropenem, and oseltamivir, because of sulfamethoxazole drug allergy. Within one week of admission, the patient developed herpes simplex of both labia majora and acyclovir was added. She poorly responded to treatment and passed away 10 days after admission because of severe pneumonia.

DISCUSSION

The total lymphocyte, absolute CD4, CD8 and NK cell counts were all low but the B lymphocyte count was normal. She had a history of normal lymphocyte counts in the past during previous check-ups. Therefore we assume the cause of the low lymphocyte cell type counts is probably the severe pneumonia. Ahmad *et al* (2013) studied 258 cases diagnosed with idiopathic CD4 lymphocytopenia (ICL) in 143 published reports, the mean initial CD4 count was $142 \pm 103.9/\text{mm}^3$. The majority of patients (226, 87.6%) had at

least one infection. Cryptococcal infections were the most prevalent infections in ICL patients (26.6%), followed by mycobacterial infection (17%), candidal infection (16.2%), and VZV infection (13.1%).

Although the low T cell count in our patient is similar to patients with idiopathic CD4 lymphocytopenia (ICL) (Zonios *et al*, 2008), the diagnosis of ICL requires a CD4 count $<300/\text{mm}^3$ and $<20\%$ of lymphocytes being T cells on at least 2 consecutive occasions without evidence of HIV-1 or HIV-2 infections, and the finding of no primary or secondary immunodeficiency disease or therapy causing a low CD4 cell count. Our case had a low CD4 count ($109/\text{mm}^3$) during active pneumonia. Our patient CD4 cell count could not be repeated because she passed away.

The previously low CD4 count could have resulted in our patient developing severe pneumonia, or her lung infection itself could have caused her low CD4 cell count. Infections especially pulmonary tuberculosis can lower CD4 and CD8 and they can return to normal levels after treatment (Al-Aska *et al*, 2011). To clarify the above, a post-recovery CD4 cell count would have been repeated which was not possible.

Our patient had no chronic kidney disease, malnutrition, history of blood transfusion, drug abuse or organ transplantation which are known contributors to the acquired cell-mediated immunity impairment (Moretti, 1992).

In conclusion, we reported here an 82-year old Thai woman who had acute respiratory failure due to severe pneumonia, which was presumably the cause of her low total lymphocyte, CD4, CD8 and NK cell counts. She had no HIV infection. She did not respond to multi-drug treatment

for pneumonia and passed away 10 days after admission.

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