Received: 29 February 2016 | Accepted: 24 May 2016

DOI: 10.1002/jgf2.30

LETTER TO THE EDITOR

Journal of General and Family Medicine Open Access WILEY

Lymphocytopenia exacerbated by lack of sleep caused by heavy workload

Dear Editor:

The common causes of lymphocytopenia include diseases of infectious, iatrogenic, systemic, nutrition and dietary, and idiopathic origins; congenital immunodeficiencies; and aplastic anemia.[1] Major surgery[2] and short-term high-intensity training[3] are also known to reduce lymphocyte count. Several clinical studies have investigated changes in blood cell number after sleep deprivation in humans, but the results were contradictory.[4]

A 37-year-old Japanese man presented with a history of recurrent infections during the preceding 2 years; these included acute bacterial pharyngitis (requiring hospitalization), influenza type A, mycoplasma, and herpes zoster. He had no medical history of congenital immunodeficiency syndrome and no other known causes of immunodeficiency or therapies associated with depressed $CD4^+$ T-cell levels. At 30 years of age, he was diagnosed with Hashimoto's thyroiditis without thyroid dysfunction. His thyroid function was within the normal range. He had essential hypertension and was being treated with an angiotensin II receptor blocker; secondary hypertension was excluded. He is a physician specializing in cardiology; because of this, he was exposed to radiation through coronary angiography and percutaneous coronary intervention. However, at only one and half days per week, this exposure was not deemed excessive.

On his first visit, a blood test revealed that he had lymphocytopenia (the total lymphocyte count was 684 cells/μL) and was HIV-negative (HIV-1/2 antibody and p24 antigen of HIV-1). He decided to reduce his workload to avoid another infection. Particularly, he discontinued managing inpatients and doing overnight on-call duty. He visited the outpatient clinic once a month for further blood tests. After reducing his workload, his lymphocyte count gradually recovered from 684 to 979 cells/μL over 4 months.

We focused on the relationship between change in lymphocyte count, and lack of sleep caused by a heavy workload. We examined results of the patient's routine medical checkups from the past 10 years. His total lymphocyte count range was approximately 600-1000 cells/μL (Figure 1). When we took a detailed medical history, he said that he was more prone to infection when he was suffering from lack of sleep because of an increased workload. He had experienced a heavy workload during this time as a junior resident in a community hospital and, more recently, because of his increased clinical work. We, therefore, presumed that his total lymphocyte count correlated with the lack of sleep caused by the heavy workload (Figure 1).

As mentioned above, several clinical studies have investigated changes in lymphocyte count after sleep deprivation in humans, but the results were contradictory.[4] For example, Dinges et al.[5] showed that sleep deprivation for 64 hours did not reduce lymphocyte count. Born et al.[6] reported that one night of sustained wakefulness increased the number of all lymphocyte subsets. Compared with these previous studies, we observed change in lymphocyte count for a long period in the present case. In the present case, he had overnight on-call duty on a regular basis. The effects of continual sleep loss because of overnight on-call duty on a regular basis were different from that reported in previous studies. In addition, compared with previous studies, the long-term observation period in the present study enabled us to assess whether impaired immune function was actually a cause of infectious diseases.

Despite the lack of quantitative assessment of sleeping hours in the present case observation, we received the impression that heavy workload caused by lack of sleep caused lymphocytopenia. Further long-term studies by using quantitative assessment of sleeping hours are needed to clarify our result in enough numbers of subjects.

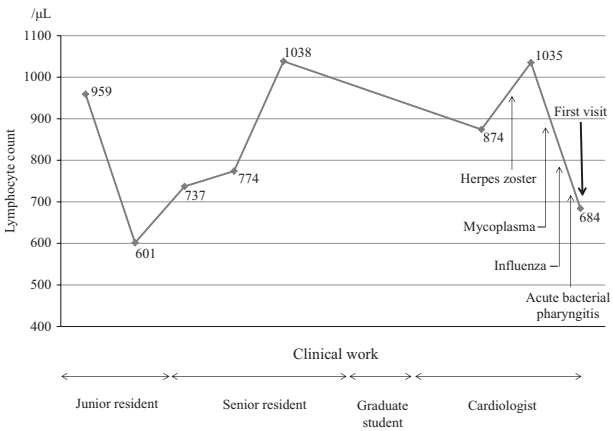

FIGURE 1 The correlation between total lymphocyte count and clinical work derived from past routine medical checkup and laboratory data on the first outpatient visit

FUNDING SOURCES

None.

CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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