Dear Editor,

An increase in peripheral blood eosinophil count is observed in some diseases including allergic/atopic diseases, parasitic diseases, and malignancies. Hypereosinophilia-associated diseases (HEADs) show eosinophil infiltration into some organs resulting in an organ injury. The severity of eosinophilia associated with these diseases varies widely. In 1994, Wardlaw classified eosinophilia into mild (1000–1500/μL), moderate (1500–5000/μL), and severe (>5000/μL), but the report did not present any basis for this classification. To differentiate HEADs from atopic diseases, Kobayashi et al. reported a cutoff count of 1500/μL, 49 patients (11.1%) were administered prednisolone 5 mg/day. Further, Nakachi et al. indicated that non-episodic angioedema with eosinophilia (NEAE) usually develops with severe eosinophilia reaching to a count of >10000/μL. Taking these into consideration, the severity of eosinophilia might serve as a useful indicator for an early tentative diagnosis. This study aimed at clarification of the relationship between peripheral eosinophil count and incidence of a HEAD to make a quick diagnosis.

The blood samples from the patients who were 20 years of age and older examined for the complete blood cell count and differential count in our hospital between January 2006 and March 2013. Eosinophil count was measured using SE-5000 and SE-2100 (Sysmex, Kobe, Japan). The patients with an eosinophil count of >10000/μL were enrolled and examined for their maximum eosinophil count, diagnosis of eosinophilia-related disease, and steroid dose at the sampling for the maximum count. For each patient’s disease course, the maximum eosinophil count was used in the analysis regardless of treatment. The diagnoses were based on clinical records. According to their diagnoses, the patients were classified into ten groups: skin diseases including atopic dermatitis and urticaria, NEAE, solid tumors including lung cancer, digestive tract cancer, hepatobiliary cancer, pancreas cancer, brain cancer, breast cancer, uterus cancer and renal cancer, hematological tumors including leukemia, lymphoma, multiple myeloma, amyloidosis, myelodysplastic syndromes and idiopathic thrombocytopenic purpura, bronchial asthma, eosinophilic granulomatosis with polyangitis (EGPA), mono-organ involvement associated with eosinophilia, drug reactions including drug-induced eruption and hepatitis, parasitic diseases, and others. As for patients with solid or hematological tumor, if their peripheral eosinophilia were clearly related to the side effect of their treatment, they were classified into drug reactions. Mono-organ involvement associated with eosinophilia was defined as an organ injury considered to be caused by eosinophil infiltration.

During the study period, 845493 blood samples were examined. Among these samples, 1137 (0.13%) showed an eosinophil count of >2000/μL and 62 (0.007%) showed a count of >10000/μL. As for samples with a count of >2000/μL, the number of samples at each 1000/μL interval is shown in Figure 1.1134 samples with a count of >2000/μL were from 442 patients (248 males and 194 females) aged 63.1 ± 17.3. The ratios of disease in patients with an eosinophil count of >2000/μL and 10000/μL are shown in Figure 2. The number of patients and mean ± SD maximum eosinophil count in each of ten groups were as follows: n = 70, 3676 ± 3018/μL in skin diseases; n = 68, 3275 ± 3376/μL in solid tumors; n = 51, 4631 ± 3217/μL in drug reactions; n = 37, 3808 ± 2355/μL in hematological tumors; n = 36, 5711 ± 3332/μL in mono-organ involvement associated with eosinophilia (pneumonia; 66.7%, gastroenteritis; 8.3%, sinusitis; 8.3%, serositis; 5.6%, myocarditis; 5.6%, others; 5.6%); n = 23, 8412 ± 8121/μL in NEAE; n = 16, 8290 ± 6428/μL in EGPA; n = 15, 2919 ± 1157/μL in bronchial asthma; n = 6, 3898 ± 1821/μL in parasitic diseases; and n = 116, 3291 ± 2065/μL in others. Others consist mainly of transient eosinophilia of unknown causes during treatment of various diseases. Only 28 patients showed a maximum count of >10000/μL; the major diagnoses were EGPA (n = 7, 25.0%), NEAE (n = 4, 14.3%), and mono-organ involvement associated with eosinophilia (n = 5, 17.8%). As for the steroid regimen, among the 442 patients with eosinophil counts of >2000/μL, 49 patients (11.1%) were administered prednisolone (PSL) (1.3 ± 5.0 mg/day) at the sampling, and 34 (8.2%) had PSL at a dose of ≥5 mg/day.

This study focused on the severity of the peripheral blood eosinophilia. Among over the 800000 samples, only 0.13% of samples showed an eosinophil count of >2000/μL, and only 0.007% showed a count of >10000/μL. An eosinophil count of >10000/μL was associated with a few diseases, namely EGPA, NEAE and mono-organ involvement associated with eosinophilia. For the differential diagnosis of HEADs, an eosinophil count of >10000/μL...
only six of the 442 patients had eosinophilia related to parasitic diseases.

The peripheral blood eosinophil count during the treatment of corticosteroids, which usually decrease it, is not appropriate for the argument about the usefulness of the count. However, in this study, the maximum eosinophil count was observed without steroid therapy in almost 90% of the patients, and only a few had ≥5 mg of PSL at the sampling. The use of corticosteroids would not be a limitation of this study.

In conclusion, a peripheral blood eosinophil count of ≥10000/μL was observed only in a limited number of patients and in a few diseases, mainly EGPA, NEAE and mono-organ involvement associated with eosinophilia. It is useful to evaluate the maximum eosinophil count for the presumptive diagnosis of HEADs.

**Conflict of interest**

The authors have no conflict of interest to declare.

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**References**


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