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DIURNAL VARIATION IN THE NUMBER OF CIRCULATING EOSINOPHIL LEUCOCYTES IN NORMAL CONTROLS AND ASTHMATICS

By

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Eosinophilia is often found in allergic disorders. Previous investigations have demonstrated a diurnal variation in the number of circulating eosinophil leucocytes (NCE). In normals (2,5) a minimum count is seen in the forenoon, after which the number rises, until a maximum is reached during the night. Arnoldsson & Helander (2) found the exact opposite pattern in patients with bronchial asthma; an unexpected result, which has not later been confirmed. Therefore, we found it indicated to repeat this study.

MATERIAL AND METHOD

Eight healthy volunteers with no sign of atopic disease were selected as controls. The eight patients had bronchial asthma as defined by the American Thoracic Society (1). The age range was 24–58 years, in both groups.

All subjects were exposed to daylight, and between 11 p.m. and 7 a.m. they were told to close their eyes and try to sleep. No medical treatment was allowed 12 h before or during the investigation. None had received treatment with steroids within the previous 3 months.

Blood was collected from a venous catheter. The number of eosinophil leucocytes was estimated in Fuchs-Rosenthal chambers (chamber volume, 0.2 ml) using Rud's modification (5) of Dunger's method (4). For each counting all eosinophils in four chambers were counted. Blood samples were taken at 8 a.m., 10 a.m., 12 a.m. and subsequently every fourth hour.

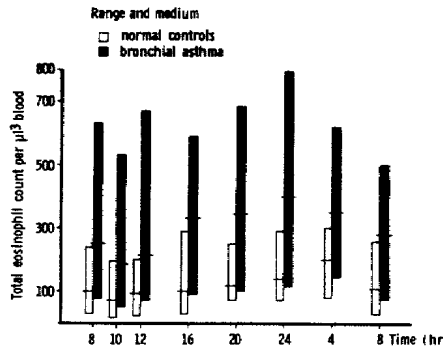

Fig. 1.
Spontaneous 24-h variation in the number of circulating eosinophil leucocytes in eight normal controls and eight patients with bronchial asthma.

RESULTS

The results are seen in Fig. 1. The range and medium values of NCE in normals and asthmatics are plotted against time. Similar diurnal variation patterns in NCE were found in asthmatics and normals, with the lowest value at 10 a.m. and the highest at night. The mean total eosinophil count was, as expected, elevated in the patient group.

DISCUSSION

Corticosteroid hormones are one of the factors regulating the NCE. The diurnal variation in serum cortisol concentration, with the lowest value at midnight and the highest in the morning, is thought to be determinative for the observed opposite variation in NCE. Vissher & Halberg (6) could abolish the characteristic cycle in mice by removal of the adrenal glands, and the same was the case in untreated adrenal insufficiency in man. In asthmatic children with normal serum cortisol levels Blumberg & Buckley (3) found a fall in NCE during the interval between 8 a.m. and

9.30 a.m., whereas in asthmatic children with steroid-induced adrenal insufficiency a rise in NCE was seen. The inverse diurnal variation in NCE as found by Arnoldsson & Helander in asthmatics could possibly be explained in a similar way as no information was given in their study of the patients' adrenal function. The participants in the present study could not be suspected of having adrenal insufficiency, and no major difference was observed in the diurnal variation of NCE.

SUMMARY

Similar diurnal variation patterns in the number of circulating eosinophil leucocytes were found in normal controls and patients with bronchial asthma not treated with corticosteroids.

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