

## Hypereosinophilic syndrome appearing as a focal defect on liver scan

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The case reported here is of a 34-year-old man diagnosed as having hypereosinophilic syndrome. Blood tests showed a large increase in the number of eosinophils and a slight increase in aspartate aminotransferase and alkaline phosphatase. In scintigraphy of the liver with Tc-99m-phytate and with Ga-67-citrate, a focal defect was found in the outer part of the right lobe of the liver. Abdominal computed tomography showed a low density lesion in the same area. Histological inspection of the biopsy specimen showed heavy periportal infiltration with eosinophils. The results suggested that the focal defect seen in liver scintigraphy arose from a circulatory disturbance arising from infiltration by eosinophils.

**Key words:** hypereosinophilic syndrome, liver scintigraphy, Tc-99m-phytate

### INTRODUCTION

AN INCREASED NUMBER of eosinophils in the peripheral blood has been found in subjects with allergic reactions, parasitic, microbial, or fungal infections, malignant diseases such as leukemia,<sup>1</sup> and collagen disease.<sup>2</sup> The hypereosinophilic syndrome, which is of unknown etiology, involves the infiltration of various organs by a large number of eosinophils.<sup>3-6</sup> Reports of such infiltration of the liver are few.<sup>7</sup> Here we report a patient with a large increase in the number of eosinophils and eosinophil infiltration of subcutaneous tissue from the lower back to the lower part of the left thigh. Marked infiltration by eosinophils was found in the biopsy specimen of the liver, and the results of liver scintigraphy were of interest.

### CASE REPORT

The subject, a 34-year-old man, developed swelling of the lower back accompanied by itching, but he

did not seek medical attention. Then the swelling spread to include the left thigh, and the patient was hospitalized when a blood test showed a large increase in the number of eosinophils.

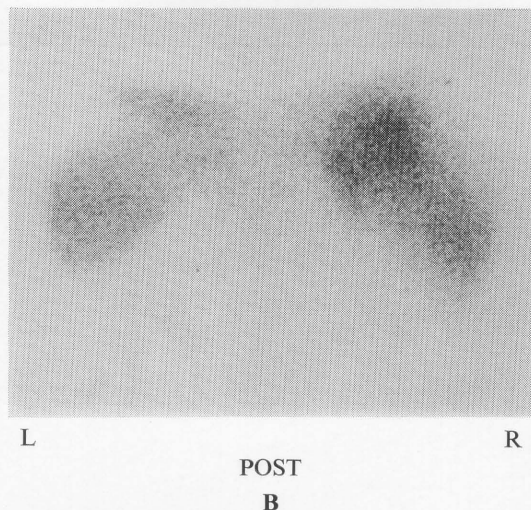
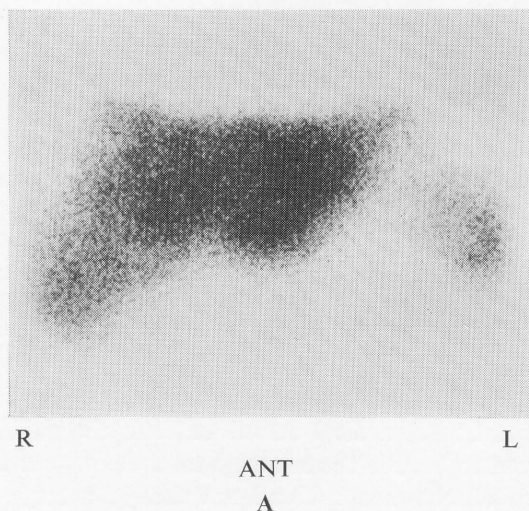
The results of tests at that time were white blood cells 22,400/mm<sup>3</sup>, eosinophils 78%, total protein 7.1 g/dl,  $\gamma$ -globulin 16.9%, erythrocyte sedimentation rate 38 mm/hr, total bilirubin 1.1 mg/dl, aspartate aminotransferase 77 IU, alkaline phosphatase 11.3 KAU, and  $\gamma$ -glutamyltransferase 24 U/L. Bone marrow examination showed an increased number of eosinophils (23.3%), but the results of a cytogenetic study of the bone marrow were normal (109,000/mm<sup>3</sup>). An abdominal CT showed a low density lesion in the outside part of the right lobe of the liver (Fig. 1). A focal defect was found in the same area of the right lobe of the liver in Tc-99m-phytate liver imaging (Fig. 2). The image obtained with Ga-67-citrate showed a focal defect in the same area (Fig. 3). Ultrasonogram of the liver looked normal, including the area with abnormalities seen on the scintigram. Histological examination of the biopsy specimen showed marked periportal infiltration by eosinophils, but the lobular structure was maintained (Fig. 4). A subcutaneous biopsy specimen taken from the lower back showed heavy infiltration by eosinophils. Prednisolone was given at the dose of 40 mg/day. One week after the start of this treatment, the swelling

Received July 1, 1991, revision accepted August 30, 1991.

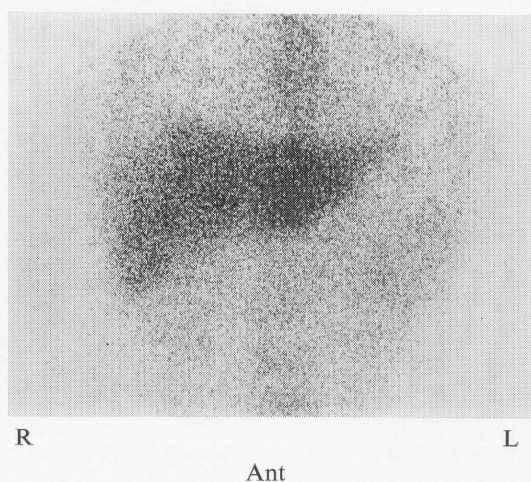
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**Fig. 1** Abdominal CT scan showing a low density lesion in the outer part of the right lobe of the liver.



**Fig. 2** Tc-99m-phytate liver-spleen scan showing a focal defect in the outer part of the right lobe of the liver. A: anterior view, B: posterior view.



**Fig. 3** Ga-67-citrate scan showing a focal defect in the outer part of the right lobe of the liver.

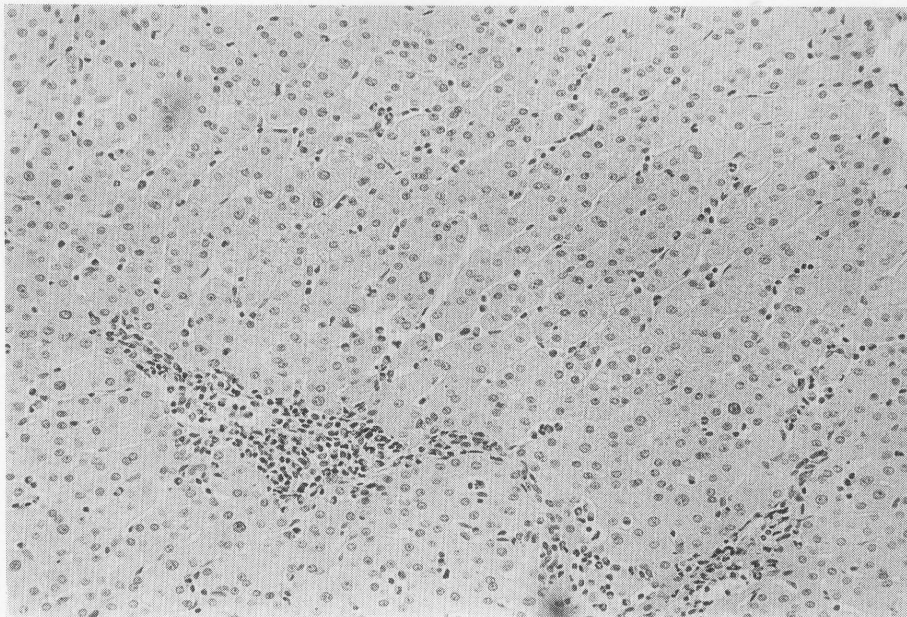
of the lower back and thigh had disappeared, and eosinophils were 3%.

## DISCUSSION

An increase in the number of eosinophils is found in various conditions, but most often in persons with allergy or parasitic infection, and the extent of the increase is often great in these persons. However, there is also a specific syndrome with characteristic clinical and pathological findings, which Hardy and Anderson<sup>3</sup> named the hypereosinophilic syndrome. As their diagnostic criterion, Parrillo et al.<sup>4</sup> used an eosinophil count of more than 1,500 cells/mm<sup>3</sup>, which persisted at this high level. There was no evidence that the disease involved allergy, parasitic infection, or other such causes; and there were findings that indicate that the eosinophil infiltration may have caused organ damage. The onset of the syndrome has been reported in persons aged 5 to 80 years, with persons in their 40s at onset most numerous. Men account for about 85% of patients with the disease.<sup>5</sup> Organ damage is generally of the heart and

the circulatory system, followed by the skin, muscle, and nervous system. Changes found in the digestive organs include swelling of the liver, and at times, increases in total bilirubin, aspartate aminotransferase, and alkaline phosphatase.<sup>3-6</sup>

In one of the few reports of liver damage in this disease being assessed by imaging techniques, White et al.<sup>7</sup> have reported that neither CT nor ultrasonography, done at hospitalization, showed abnormalities. They found multiple focal defects by liver scintigraphy in their patient, and found severe infiltration by eosinophils in a periportal biopsy specimen taken soon after hospitalization. In ultrasonography we detected no abnormalities in our patient, but found a low density area by CT and a defect in liver scintigraphy. The lobular structure of the liver was maintained in the biopsy specimen, but



**Fig. 4** Biopsy specimen of the liver showing that many eosinophils have infiltrated into the portal area (HE,  $\times 100$ ).

eosinophil infiltration was severe, suggesting that the focal defect found in liver scintigraphy with Ga-67-citrate and Tc-99m-phytate arose because of a circulatory disturbance caused by the eosinophil infiltration of the periportal area. The CT done by White et al.<sup>7</sup> was taken when eosinophils had decreased to 2.5%, which may be one reason for the difference between the CT findings in their patient and ours.

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