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Allergic Granulomatosis and Angiitis of Churg–Strauss

A Case of High Serum Level of Eosinophil Cationic Protein

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We report a case of allergic granulomatosis and angiitis of Churg–Strauss. The patient is a 40-year-old woman who satisfied the clinico-pathological triad of asthma, tissue and blood eosinophilia, and granulomatous vasculitis. We also measured serum eosinophil cationic protein (ECP) levels in this patient. In the active stage, the serum ECP level was higher than in healthy controls, declining in the remission stage, a finding suggesting that ECP is involved in the pathogenesis and course of Churg–Strauss disease.

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Allergic granulomatosis and angiitis (AGA) or Churg–Strauss disease is a systemic condition characterized by the clinicopathologic triad of asthma, tissue and blood eosinophilia, and granulomatous vasculitis. Churg & Strauss were the first to describe this syndrome, in 1951 (1). They distinguished it from periarteritis nodosa by virtue of the presence of eosinophils, granulomatous lesion and leukocytoclastic vasculitis. The function of eosinophils in this disease is still unknown.

Eosinophil cationic protein (ECP) (2) has recently been highlighted as a cytotoxic protein poduced by eosinophils. We have investigated a case of Churg–Strauss disease, and measured the serum ECP level, which we found was high during the active period, but decreased in the remission stage.

CASE REPORT

A 40-year-old woman presented in December 1989 because of fever, cough, shortness of breath and skin eurptions on both lower legs, both forearms and the soles of her feet. She had occasionally suffered asthma attacks over the past 5 years, but the eruption did not appear until December 1989.

A physical examination on admission (December 6, 1989) revealed skin eruptions consisting of indurated purpuric erythema on both lower legs, soles of the feet (Fig. 1) and both forearms. Reddish nodules with crust formation were also noted on both forearms. Hair, nails and mucous membranes were not involved. Cardiac, abdominal and neurologic findings were normal. Laboratory studies produced the following values: hematocrit 37.9%; leukocyte count 14,000/mm^3 with 38% neutrophils, 10% lymphocytes, 1% monocytes, and 51% eosinophils; erythrocyte sedimentation rate 55 mm/h; platelets, 274,000/mm^3; antinuclear antibody, anti-DNA antibody, anti-ENA antibody, and anti-Sm antibody were negative. Total IgE was 1,802 U/ml (normal, 0–400 U/ml). Liver function tests, electrolytes, glucose, and complement levels were normal. Peripheral T-cell studies showed that OKT4-positive T-cells were 40.1%, and OKT8-positive T-cells were 32.6%. Stool examinations for ova and parasites were negative. The chest radiograph showed a remarkable interstitial infiltrate in the lower right area of the lung.

A transbronchial biopsy specimen from the lower right lung showed intra-alveolar and perivascular granulomatous aggregations of eosinophils, histiocytes and lymphocytes. No fungi or acid-fast bacilli were identified by special staining or by culturing. A skin biopsy was taken under local anesthesia from a characteristic indurated purpuric lesion on the right lower leg. The biopsy specimen, stained with hematoxylin-eosin, showed a perivascular and granulomatous infiltrate of numerous eosinophils with lymphocytes and histiocytes. Fibrin, nuclear dust and eosinophils were present within the lumen of medium-sized vessels located in the dermis.

Measurement of serum ECP levels was performed using a Pharmacia ECP Kit (Uppsala, Sweden) and the serum ECP level at the time of admission was 112 ng/ml. We also measured serum ECP levels of 25 healthy controls which was 6.5 ± 3.2 ng/ml (mean ± SD).

The patient was treated initially with oral betamethasone from December 8, 1989 at 3 mg/day for 7 days and then 1.5 mg/day for 9 days. Thereafter, prednisolone was given at 10 mg/day until she was discharged. There was dramatic improvement in all symptoms and complete healing of skin eruptions and pulmonary infiltration 7 days after systemic steroid therapy. When the patient was discharged (January 14, 1990), the serum ECP level was 27 ng/ml and the leukocyte count was 8.400/mm^3 with 1% eosinophils. A chest radioagraph showed normal findings.

DISCUSSION

Allergic granulomatosis (Churg–Strauss) is characterized by the clinicopathologic triad of asthma, tissue and blood eosinophilia, and granulomatous vasculitis (1). Our patient satisfied all these criteria, plus the additional findings of leukocytosis and elevated serum IgE and ECP levels.

The role of eosinophils in allergic disease has been highlighted ever since they were found to contain cytotoxic proteins in their granules (2). Typical of these protein contents are major basic protein (MBP) and ECP, the latter being the

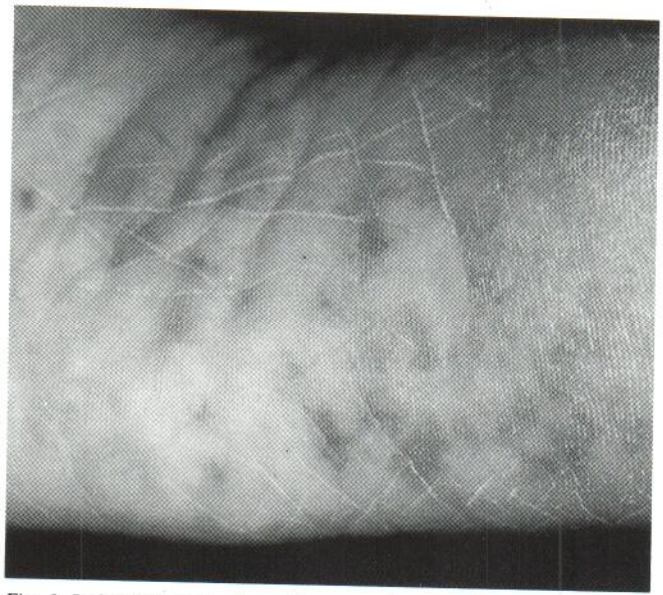

Fig. 1. Indurated purpuric erythema on the sole of the right foot.

subject of our study. An in vitro study has shown that ECP injures the tracheal epithelial cells in the guinea pig (3). ECP has also been shown to act upon mast cells and to release histamine (4) and is believed to be related to allergic diseases such as bronchial asthma, since ECP deposition has been observed in the tracheal mucosa of asthmatics (5) and serum ECP levels are high in these patients (6). ECP deposition has also been observed in the endocardium in patients with hypereosinophilic syndrome (7) and in cardiac lesions in patients with Churg–Strauss disease (8).

In the present study, the serum ECP level was elevated in the active stage of Churg–Strauss disease, compared with that in healthy persons and it decreased in the remission stage. This finding suggests that ECP is involved in the pathogenesis and progress of Churg–Strauss disease.

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