

Cardiogenic Shock With Hypereosinophilic Syndrome

VINITHA PRASAD, L RAJAM AND ASHWIN BORADE

From the Department of Pediatrics, Amrita Institute of Medical Sciences and Research Centre, Kochi, Kerala, India.

Correspondence to:

Dr Vinitha Prasad,

Professor of Pediatrics,

Amrita Institute of Medical Sciences

and Research Centre, Elamakkara

(PO), Kochi, Kerala 682 026, India.

vinithaprasad@aims.amrita.edu

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We report a child with hypereosinophilic syndrome who presented with cardiogenic shock. In addition, she had skin and joint involvement. The clinical condition improved and eosinophil counts normalized with steroid therapy. However, the skin lesions and hypereosinophilia relapsed on stopping the steroids. The child was subsequently maintained in remission on low dose prednisolone.

Keywords: *Cardiogenic shock, Child, Hypereosinophilic syndrome.*

Hypereosinophilic syndrome (HES) is a rare disorder characterized by unexplained, persistent eosinophilia and end organ damage due to eosinophilic infiltration. We report a girl with HES who presented acutely with cardiogenic shock along with skin and joint involvement.

CASE REPORT

A 12-year old girl was admitted with fever, swelling of knee and wrist joints for 2 weeks and skin rashes for 6 months. There was no history suggestive of food or drug allergy, worm infestation, throat pain, oliguria or dyspnea.

On examination, her pulse rate was 136/min, respiratory rate 34/min and blood pressure 84/60 mm Hg. She had raised jugular venous pressure, bilateral pedal edema and arthritis of bilateral knee and wrist joints. There were erythematous papules with scaling on the extremities and angioedema of the perioral and periorbital regions. There was no pallor, icterus, cyanosis or clubbing. The anthropometry was normal. Examination of the chest revealed bilaterally decreased air-entry in the infrascapular areas. Cardiac apex was at the left 5th intercostal space in the mid clavicular line. Heart sounds were muffled. There were no murmurs. She had tender

hepatomegaly 4 cm below the right costal margin (span 11 cm). Spleen was just palpable. Rest of the systemic examination was normal.

Investigations revealed hemoglobin 12.4 g/dL, total leucocyte count of 29,000/mm³ (polymorphs 68.9%, lymphocytes 6%, eosinophils 22.2%, absolute eosinophil count: 6438/mm³), platelet count 647 × 10³/mm³ and erythrocyte sedimentation rate of 8 mm in first hour. Peripheral blood smear showed marked eosinophilia, few eosinophils showed multilobation of nuclei and hypogranulation (**Fig. 1**). Other cells had normal morphology.

Chest X-ray revealed mild pericardial effusion and bilateral obliteration of costophrenic angles. ECG showed tachycardia with low voltages. Echocardiogram on the second hospital day revealed a small pericardial effusion, more over the right atrium (width 1.5 cm) and a mild increase in the echogenicity of the myocardium. There was no intracardiac thrombus, right ventricular dilatation, tricuspid regurgitation or pulmonary artery hypertension. Her pulmonary artery pressure was normal (mean pressure: 11mm Hg). Ultrasound abdomen showed hepatomegaly, mild splenomegaly with ascites and bilateral mild pleural effusion. Liver and renal function tests, PT and APTT were normal.

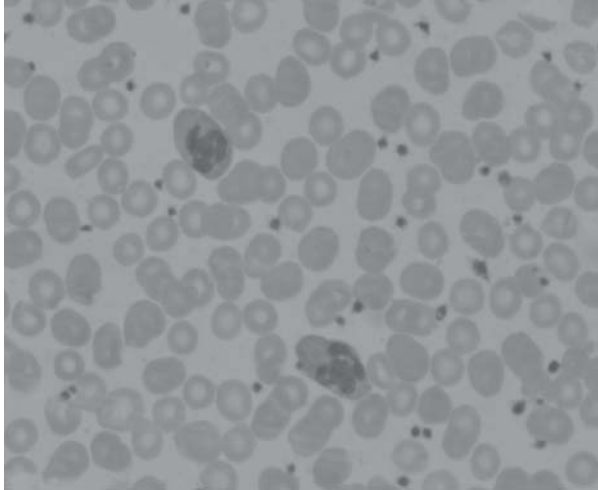


FIG.1 Peripheral smear showing eosinophils with multilobation of nuclei and hypogranularity (Leishman stain X 100).

Mantoux test, smear for malarial parasite, microfilariae and stool examination for ova and parasites were negative. ASO titer, Rheumatoid factor, ANA and anti-ds DNA were negative. IgE levels were 400 IU/mL. Bone marrow aspirate showed normocellular marrow with diffuse eosinophilia. Karyotype was normal. The patient initially required inotropic supports to stabilize the blood pressure. Subsequently, a cardiac catheterization and endomyocardial biopsy were performed. A right ventricular endomyocardial biopsy showed hypertrophied myocardial fibres, eosinophilic infiltrates and moderate interstitial fibrosis. Skin biopsy revealed dermal infiltration with lymphocytes, plasma cells and few eosinophils.

Child was treated with oral prednisolone (1 mg/kg/day) for 2 weeks. Thereafter, the steroids were gradually tapered and stopped over 8 weeks. At 8 weeks, the WBC count was 12000/mm³ with 0.2% eosinophils. The pericardial effusion resolved after a week. One month after stopping the steroids, she developed fever, erythema and angioedema over the face. The absolute eosinophil count was 2470 cells/mm³. Echocardiography was normal. She was started on prednisolone 1 mg/kg. Her skin lesions disappeared and eosinophil counts became normal after 4 weeks. She has been maintained on low dose alternate day prednisolone (0.25 mg/kg) and is asymptomatic without peripheral eosinophilia.

DISCUSSION

Hyperosinophilic syndrome (HES) is a rare disease in children, the exact prevalence is not known(1). The diagnostic criteria for “idiopathic HES” proposed in 1975 are blood eosinophilia > 1500 cells/mm³ for at least 6 months, absence of an underlying cause of eosinophilia despite extensive evaluation, and presence of end organ damage or dysfunction due to eosinophil infiltration(2). Heart, skin and nervous system are most frequently involved. Eosinophils release many cytotoxic substances like eosinophil-derived neurotoxin, eosinophil cationic protein, major basic protein, reactive oxygen species and proinflammatory cytokines, producing end organ damage and fibrosis(2). HES must be distinguished from eosinophilic leukemia, which is characterized by increased blood and bone marrow blasts, eosinophilic clonality and specific cytogenetic abnormalities(2).

Recently three subtypes of HES have been identified(3). The myeloproliferative variant (m-HES) is characterized by an interstitial deletion in chromosome 4q12 in cells of the myeloid lineage and FIP1L1-PDGFRA gene fusion. Supportive evidence of m-HES includes splenomegaly, anemia, thrombocytopenia, increased circulating myeloid precursors, dysplastic eosinophils, elevated serum vitamin B₁₂ and altered leucocyte alkaline phosphatase levels. Leukemic transformation can occur. The lymphoproliferative variant (l-HES) is associated with clonal proliferation of phenotypically abnormal T cells. Idiopathic HES is a subtype of the disease that is not associated with a specific chromosomal or clonal abnormality. Our patient had overlapping characteristics of myeloproliferative and lympho-proliferative variants.

A combination of eosinophilic myocarditis and pericarditis with effusion contributed to the heart failure and shock in our patient. Pulmonary embolism was ruled out. Biopsy showed myocardial hypertrophy and moderate fibrosis, but repeat echocardiography did not reveal any restrictive cardiomyopathy. It is possible that significant ventricular thickening had not yet occurred, which could be detected by routine echocardiography.

Our patient had no previous documented hypereosinophilia and did not fulfill the classic duration criteria. She presented with marked eosinophilia and serious cardiac involvement, which required immediate treatment(2,4).

Corticosteroids are the initial treatment, except in FIP1L1-PGDFRA gene fusion causing mutation. Hydroxyurea, interferon alpha, anti IL-5 antibody mepolizumab, imatinib mesylate and bone marrow transplantation are other therapeutic options. Anticoagulants are required for patients with intracardiac thrombosis(5,6).

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