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Case Report

Acute parvovirus B19 infection mimicking juvenile myelomonocytic leukemia

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Abstract: An 11-month-old patient with parvovirus infection mimicking juvenile myelomonocytic leukemia (JMML) is presented. The patient's history, presenting physical and laboratory features, was suggestive of JMML and consisted of fever, hepatosplenomegaly, lymphadenopathy, desquamation of the skin, anemia, leukocytosis with monocytosis and trilineage dysplastic findings of the peripheral blood and bone marrow. However, positive IgM titers for parvovirus B19 followed by seroconversion, negative cytogenetics and the benign follow-up of the patient suggested acute parvovirus infection as an etiologic factor for development of dysplastic features in the patient, and thus is recommended for consideration in the differential diagnosis of MDS. Although parvovirus B19 infection mimicking MDS has previously been shown in two patients with spherocytosis and one with subclinical immune deficiency; to our knowledge, the present report is the first describing the association of acute parvovirus B19 infection with dysplastic features mimicking myelodysplasia (MDS) in a child without a demonstrable underlying hematolymphoid disorder.

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Juvenile myelomonocytic leukemia (JMML) is classified under the myelodysplastic diseases of childhood. Common clinical features include hepatosplenomegaly, generalized lymphadenopathy and skin changes. Laboratory findings usually consist of moderate leukocytosis with monocytosis, anemia, thrombocytopenia, elevated fetal hemoglobin and hypergammaglobulinemia (1).

Acute parvovirus infection may present as erythema infectiosum (fifth disease) in children. It infects the erythroid progenitor cell in the bone marrow and causes transient erythroblastopenia. Giant pronormoblasts are often demonstrated in bone marrow aspirates. A transient increase in leukocyte and platelet counts has also been reported (2). Here we report a case with parvovirus infection mimicking JMML, who also suffered from recurrent pulmonary infections.

Case report

An 11-month-old male patient was referred to our hospital for frequent febrile episodes and recurrent infections with a presumptive diagnosis of immune deficiency disorder. There was history of multiple antibiotic use since early infancy. He was admitted to our hospital for high-grade fever of one week's duration. He was noted to be somewhat delayed in growth and development by the family members. The family history was unremarkable, with no consanguinity of parents. He was the second of two children, the first being healthy. Physical examination revealed a febrile child whose height was 72 cm (25–50th percentile), weight 7.5 kg (3–10th percentile) and head circumference 44 cm (3–10th percentile). The skin was dry and desquamation was noted. Bilateral cervical, axillary and inguinal microlymphadenopathy was present and the liver extended 4 cm below the costal margin. The rest of his physical examination was unremarkable.

Initial laboratory data were as follows: hemoglobin 10.5 g/dL, hematocrit 31%, MCV 79.6 fL, platelets 250×10^9/L and leukocytes 28.8×10^9/L with a differential count of 52% polymorphonuclear leukocytes (PNL), 28% lymphocytes and 20% monocytes. Examination of a peripheral blood

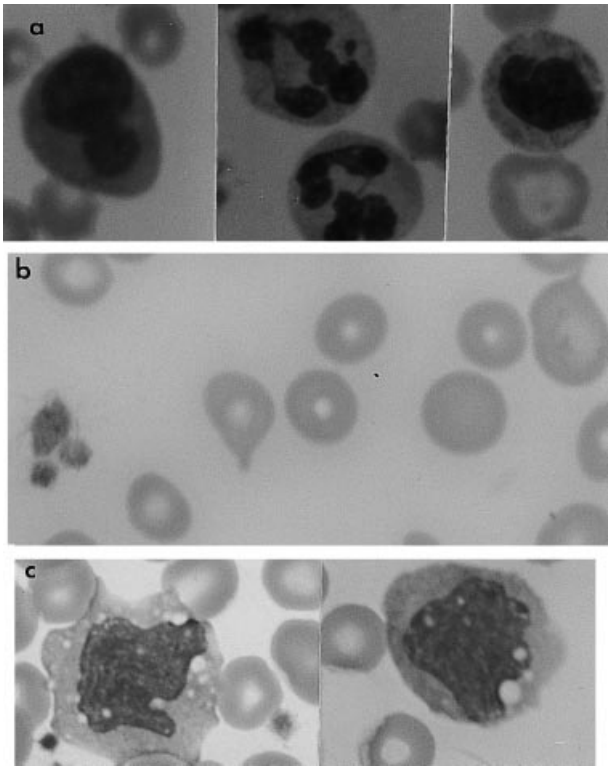

Fig. 1. Peripheral blood showing neutrophils with nuclear abnormality (a), anisocytosis, poikilocytosis, polychromasia, spherocytes and giant platelets (b), monocytic cells with vacuoles (c).

(PB) smear revealed anisocytosis, poikilocytosis, spherocytes, polychromasia, giant platelets and PNL with Pelger–Huet (6%) anomaly (Fig. 1). Bone marrow was normocellular; multiple abnormal and micromegacaryocytes and erythroblastopenia with M/E = 8 were noted. Giant pronormoblasts and eythroblasts with dysmorphic nuclei, 50% of myelomonocytic cells with hypogranularity and 3–10% blasts with myelomonocytic features were also present (Fig. 2 and Table 1).

The patient's Hb dropped to 8.8 g/dL within a few days of admission. Urine culture revealed *E. coli* without significant pyuria. Blood chemistry was normal except for elevated transaminases (AST 588, ALT 200 U/L). Direct and indirect Coombs tests, G6PD, HbF analysis and red cell fragility were normal and *Salmonella*, *Brucella* agglutinations and hepatitis markers were negative. The sweat test, using pilocarpine iontophoresis, showed values

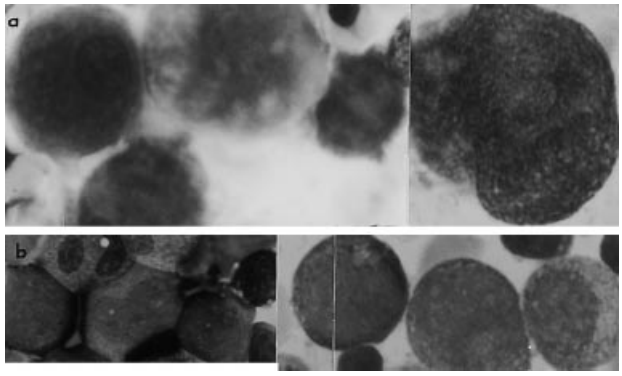

Fig. 2. Bone marrow aspirate showing dysplastic micromegakaryocytes (a), and myelomonocytic cells with hypogranularity, giant normoblast, and blast cells (b).

ranging between 45 and 110 meqiv/L. Total protein and albumin were 7.7 and 5.4 g/dL, respectively. C3, C4, ANA; anti-DNA, alpha-1 antitripsin, serum and urine aminoacids were within normal limits. Immunologic studies, including serum immunoglobulins, lymphocyte subsets, blastic transformation, specific antibody titers (tetanus; polio) and a skin test with candida antigen, were all normal. Microscopic examination of the patient's hair did not show evidence of Griscelli syndrome. Central nervous system infection was ruled out by a normal cerebrospinal fluid examination. Acute parvovirus B19 infection was diagnosed with positive IgM titers in the acute phase followed by IgG positivity by enzyme-linked immunoassay (ELISA). Epstein–Barr virus cytomegalovirus, herpes simplex viruses and toxoplasmosis titers were unremarkable. Cytogenetic examination was normal. A chest X-ray showed hyperinflation and right paracardiac infiltration. Abdominal ultrasonography showed hepatosplenomegaly. Echocardiography and cranial computed tomography performed as a work-up for prolonged fever were within normal limits.

There was a remarkable improvement of the clinical and hematological findings within 3 wk except for a subnormal Hb level that persisted for a year (Table 1). Over a follow-up period of 3 yr the patient remained clinically well with height and weight at the 25th percentile and normal hematological findings. However, he still suffers from recurrent mild pulmonary infections without a demonstrable immunological defect. In addition,

Table 1. Hematological findings during follow-up

Date	Hb (g/dL)	WBC ($\times 10^9$/L)	Monocyte (10^9/L)	Platelet (10^9/L)	BM blast (%)
9/10/1996	10.5	28.8	5.6	250	3–10
9/17/1996	8.8	18.8	2.7	210	ND
9/30/1996	8.9	15.4	2.4	170	ND
12/30/1999	12.2	5.4	0.25	285	ND

cystic fibrosis has been ruled out with normal serum protein and albumin levels and inconsistent results of sweat tests.

Discussion

In the present case, although the history of frequent infections and clinical and laboratory findings suggested JMML, an acute parvovirus infection was diagnosed with positive IgM titers for parvovirus B19. Erythroblastopenia and giant normoblasts in the bone marrow smear were also consistent with parvovirus infection (2). Furthermore, hepatosplenomegaly, lymphadenopathy and abnormal liver transaminases, as observed in this patient, may accompany acute parvovirus B19 infection. The patient was followed closely because of the physical and laboratory features suggestive of JMML consisting of fever, hepatosplenomegaly, lymphadenopathy, skin findings, anemia, elevated leukocyte counts, prominent monocytosis, trilineage dysplastic findings of peripheral blood and bone marrow cells and the presence of blasts.

Myelodysplastic features mimicking JMML have been described in viral diseases such as acquired immundeficiency syndrome (3, 4), cytomegalovirus (5) and Epstein–Barr virus infection (6). Acute and chronic parvovirus infection mimicking MDS has previously been described in two patients with hereditary spherocytosis (7, 8) and in a patient with subclinical immune deficiency (9), respectively. Furthermore, it has been demonstrated that transient dysplastic findings may accompany immunosuppressive treatment (10, 11) or autoimmune diseases (12). It may be speculated that viral infection may influence the hemapoietic system, perhaps through a dysregulation between T-cells and mononuclear cells leading to abnormal hematological maturation.

In summary, the present case suggests that the clinical and hematological picture of an acute parvovirus infection may mimic JMML in a patient without hereditary spherocytosis or an immune deficiency disorder, and is suggested to be included in the differential diagnosis of MDS.

References

1. Emanuel PD. Myelodysplasia and myeloproliferative disorders in childhood: an update. Br J Haematol 1999;**105**: 852–863.
2. Postmore AC. Parvoviruses (*Erythema infectiosum* aplastic crisis). In Mandell GL, Bennett JE, Dolin R, eds. Principles and Practice of Infectious Diseases, 4th edn. New York: Churchill Livingstone, 1995:1439.
3. Schneider DR, Picker LJ. Myelodysplasia in the acquired immune deficiency syndrome. Am J Clin Pathol 1985;**84**: 144–152.
4. Candido A, Rossi P, Menichella G, *et al*. Indicative morphological myelodysplastic alteration of bone marrow in overt AIDS. Haematologica 1990;**75**:327–333.
5. Kirby MA, Weitzman S, Freedman MH. Juvenile chronic myelogenous leukemia: Differentiation from infantile cytomegalovirus infection. Am J Pediatr Hematol Oncol 1990;**12**:292–296.
6. Herrod HG, Dow LW, Sullivan JL. Persistent Ebstein–Barr virus infection mimicking juvenile chronic myelogenous leukemia: Immunologic and hematologic studies. Blood 1983;**61**:1098–1104.
7. Baurmann H, Schwarz TF, Oertel J, Serke S, Roggendorf M, Huhn D. Acute parvovirus B19 infection mimicking myelodysplastic syndrome of the bone marrow. Ann Hematol 1992;**64**:43–45.
8. Castenada VL. Acute human parvovirus B19 infection hereditary spherocytosis mimicking myelodysplastic syndrome (Abstract) Proc Am Soc Pediatr Hematol Oncol 1993;**2**:34.
9. Hasle H, Kerndrup G, Jacobsen BB, Heegaard ED, Hornsleth A, Lillevang ST. Chronic parvovirus infection mimicking myelodysplastic syndrome in a child with subclinical immunodeficiency. Am J Pediatr Hematol Oncol 1994;**16**:329–333.
10. Laver JH, Yusuf U, Cantu ES, Barredo JC, Holt LB, Abboud MR. Transient therapy-related myelodysplastic syndrome associated with monosomy 7 and 11q23 translocation. Leukemia 1997;**11**:448–455.
11. Renneboog B, Jannssen F, Forster A. Spontaneous remission in a patient with therapy-related myelodysplastic syndrome (t-MDS) with monosomy 7. Br J Haematol 1996;**92**:676–698.
12. Yetgin S, Özen S, Saatçi Ü, Bakkaloğlu A, Beşbaş N, Kirel B. Myelodysplastic features in juvenile rheumatoid artritis. Am J Hematol 1997;**63**:166–169.