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Parvovirus B19 Induced Transient Aplastic Crisis in an Immunocompetent Child

İmmünokompetan bir Çocukta Parvovirüs B19 Tarafından İndüklenen Geçici Aplastik Kriz

Dear Editor,

Viral-induced aplastic crisis is an important cause of unexplained anaemia. It becomes significant in the context of an immunocompromised host. However, it is commonly overlooked in a well-nourished immunocompetent host. Parvovirus B19-induced transient crisis is one such example. Bone marrow study is a commonly performed preliminary investigation for an unexplained anaemia and can provide important morphological clues as in our case. We encountered classic Parvovirus B19 inclusions in the proerythroblasts of the marrow while looking for the cause of severe anaemia in an immunocompetent child.

Our patient, an 11-year-old girl, was apparently asymptomatic 15 days before presentation and then developed high grade fever which subsided after 4 days. She started to complain of unrelenting fatigue and her parents noticed progressive pallor. She was evaluated on an out-patient basis, wherein the only positive finding was severe pallor. There was no rash, organomegaly or lymphadenopathy. She was moderately built. Complete blood picture revealed a haemoglobin of 5.6gm/dl, total leucocyte count of 2800/mm3 with normal differential, and platelet count of $2.8x10^5$/mm3. Her biochemical evaluation revealed serum iron of 95 µg/ml, folate level: 11 ng/ml. B12: 547 pg/ml, bilirubin: 0.7 mg/dl and SGPT/SGOT: 33/28 U/l. In view of bi-cytopenia with normal biochemical parameters, she underwent a bone marrow study. The marrow aspirate smears were particulate with increased cellularity. There was myeloid prominence (M: E= 7:1) with normal and orderly maturation. Severe erythroid hypoplasia was noted with the only recognisable erythroid cell being giant proerythroblasts (Figure 1A-D). These cells had large megaloblastoid nucleus with 2-3 intranuclear nucleoli like viral inclusions. The cytoplasm was moderate in amount and basophilic with irregular fuzzy margins, classically described as "dog ears". Megakaryocytes were mostly unremarkable except for occasional presence of emperipolesis (Figure 1E). Bone marrow biopsy showed similar features (Figure 1F). Extensive work up for any underlying causes of

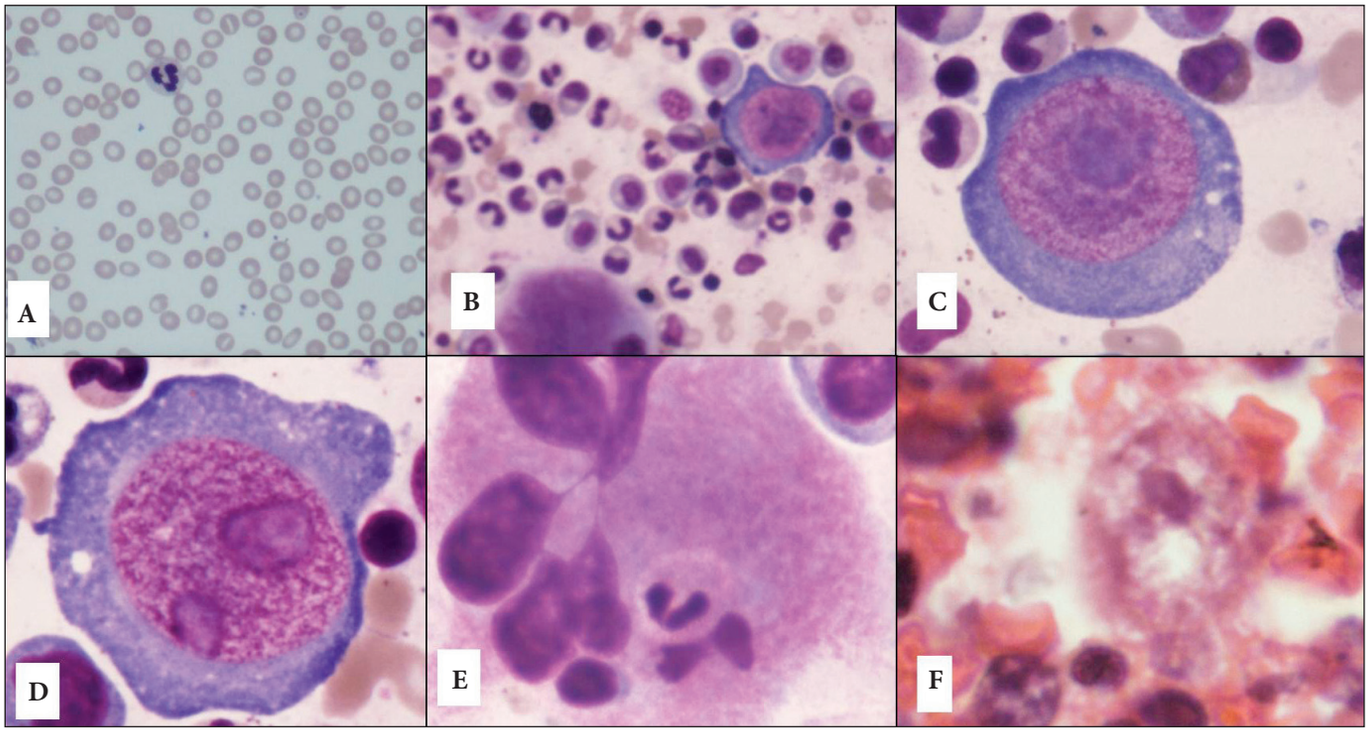

Figure 1: Low power photomicrographs of **A)** Peripheral smear showing mild anisocytosis and leucopenia (MGG; x100). **B)** Marrow aspirate with marked myeloid prominence (MGG; x100). **C)** Abnormally large proerythroblasts with classic intranuclear viral inclusions (x200) and **D)** High power photomicrograph of proerythroblast with inclusions, cytoplasmic vacuolation and fuzzy " dog ear" like outpouchings (x400). **E)** Megakaryocyte showing emperipolesis (x200). **F)** Giant erythroid precursors on biopsy (H&E; x200).

hypoproliferative or hemolytic conditions and immune-deficiency was negative. Correlating the presence of red cell hypoplasia with characteristic intranuclear inclusions, a diagnosis of 'transient aplastic crisis probably due to Parvovirus B19' was made.

Serological tests were not done. In view of the severe anaemia, two units of packed red cells were transfused. The patient recovered within 2 weeks of initial presentation and is asymptomatic and healthy at present.

Both viral and bacterial agents may cause transient myelo-suppression. Bacteria-induced bone marrow hypoplasia usually occurs in the setting of chemotherapy due to the concurrent neutropenia. Viruses can affect various cell lineages in the bone marrow. Dengue virus and Parvovirus B19 directly affect megakaryopoiesis and erythropoiesis respectively (1). Direct viral targeting of the marrow cells is the basic pathogenetic mechanism in these cases. Human herpes virus 6 (HHV-6) and disseminated adenovirus infections have also been reported to cause marrow suppression in immunocompromised patients and mainly transplant recipients (2, 3). In vitro cell culture studies have implicated the Hepatitis A and non A, non B (NANB) hepatitis viruses as causative agents of myelosuppression (4, 5). Amongst all of these, morphological changes have been best described for Parvovirus B19.

Parvovirus B19 is a small DNA virus belonging to the Picornavirinae family. Though overt infection manifests in immunocompromised patients, most immunocompetent individuals are also seropositive by 15 years of age (6). It is known to cause transient aplastic crisis in patients with chronic underlying hemolytic disorders. However, demonstration of its transient presence in the absence of hemolysis or immunodeficiency is rarely reported.

The B19 virus is known to be associated with aplastic crisis, erythema infectiosum or fifth disease, fetal hydrops and arthropathy (7, 8). In humans, the cellular receptor for the virus is the P antigen, located on mature erythrocytes, platelets and tissues from the heart, lung and liver. Within erythroid series, there is preponderance for proerythroblasts. Individuals lacking in P antigen are resistant to B19 infection.

The severity of the infection depends on the infected person's age, and haematological and immunological status (8,9). Haematological disorders related to decreased RBC production or increased destruction predispose to Parvovirus-related transient aplastic crisis. However, a complete workup for all these conditions was negative in our patient.

The viral inclusions in giant proerythroblasts are quite characteristic and were seen in our case. A major drawback of the present case is the lack of serological and PCR correlation. One reason could be the almost complete recovery of the patient and thus loss to follow up, even before appropriate serology could be performed. This it is a common problem in a developing country like ours. It is therefore important to collect the relevant samples at the initial visit and preserve aliquots.

We conclude that viral-induced hypoplastic crisis must be kept in mind even in an immunocompetent host and appropriate serological tests must be done if necessary.

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