

## Parvovirus B19 co-infection with falciparum malaria: a cause of severe anemia

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Dear Sir,

Recently we came across an interesting case of co-infection of Parvovirus B19 with falciparum malaria. The patient was a 7-year-old boy presenting with complaints of high-grade fever, fatigue and abdominal pain for five days. There was no history of jaundice. Physical examination revealed a temperature of 38.5°C, pallor and mild hepatosplenomegaly. Hematological investigations showed hemoglobin of 9.1g/dL, total leukocyte count of  $8.8 \times 10^9/L$  with 30% neutrophils, 58% lymphocytes and 12% monocytes; reticulocytes were 0.6% and platelet count was  $280 \times 10^9/L$ . A thin peripheral smear showed Plasmodium falciparum trophozoites. The patient was started on chloroquine therapy (10 mg/kg on days 1 & 2 followed by 5 mg/kg on day 3) after which pyrexia subsided and parasitemia was absent on blood smear.

However, the patient had to be admitted four days later due to worsening general condition with increasing pallor and reappearance of fever. The patient had not received any medication (allopathic or alternative) in the intervening period. At this time, hemoglobin had fallen to 6.3 g/dL and reticulocytes were 0.3%. No malarial parasite was found on smear.

Bone marrow aspiration showed normocellular fragments, myeloid: erythroid ratio of 20:1, marked erythroid hypoplasia with presence of occasional giant pro-erythroblasts. Myeloid and megakaryocytic series appeared unremarkable. There was an increase in histiocytes in the marrow with few of them showing non-refractile pigment suggestive of malarial pigment. A suggestion of Plasmodium falciparum malaria with pure red cell aplasia due to parvovirus B19 infection was given. Serologic investigation (ELISA) for B19 specific IgM antibody (NovaTec Immunodiagnosics, Germany) done on fourth day of admission was positive. During hospital stay, the patient required two packed cell transfusions for worsening anemia. With conservative management, the condition improved with rise in hemoglobin. A repeat ELISA for B19 specific antibody two weeks after discharge showed absence of B19 specific IgM with appearance of IgG antibodies.

Malaria, especially due to Plasmodium falciparum, is a major health problem in developing countries, including India. Anemia in malaria is multifactorial, both due to hemolysis and to dyserythropoiesis.<sup>1</sup> Though both Parvovirus and plasmodium species infect erythroid cells, the former shows predilection for early erythroid precursors while malarial parasite infects mature red cells.<sup>2</sup> Though association of Parvovirus B19 with aplastic crisis in hemolytic diseases like sickle cell anemia is well reported, its role in malaria is under controversy. A report from Nigeria reported high rate of Parvovirus B19 and Plasmodium falciparum co-infection.<sup>3</sup> However, a prospective study from Malawi concluded that

Parvovirus B19 had no role in causation of severe anemia in malaria. But the same authors also suggested that malaria in Malawi occurs in seasonal pattern, which does not overlap with outbreaks of B19 viremia.<sup>4</sup>

Ho et al hypothesized that depression of cell mediated immunity in Plasmodium falciparum infection might favor co-infection with opportunistic pathogens, including Parvovirus B19.<sup>5</sup> Such a co-infection results in severe anemia since Parvovirus B19 selectively inhibits actively replicating erythroid progenitors. This is recognized by the failure of recovery of hemoglobin after effective anti-malarial treatment.<sup>2</sup> This was also seen in our patient, who recovered two weeks later after subsidence of Parvovirus B19 infection.

Thus, we conclude that unexplained reticulocytopenia in a patient with anemia of any etiology should arouse a suspicion of Parvovirus B19 infection, which can be confirmed by serology or antigen testing by PCR. Since the manifestations of Parvovirus B19 infection are non-specific, this diagnosis has to be considered in patients with malaria who have worsening anemia, reticulocytopenia and persistent fever in spite of anti-malarial therapy.

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