Unsuspected Malaria Infection in a Case with Pancytopenia

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We present the case of a 62-year-old woman who reported experiencing fatigue and bone pain for 2 weeks. Laboratory investigations revealed pancytopenia, with a hemoglobin level of 93 g/L, a total leukocyte count of 2.5 × 10^9/L, and a platelet count of 16 × 10^9/L. Given the short duration of symptoms, along with bone pain and pancytopenia, a provisional diagnosis of aplastic anemia or acute leukemia was considered, prompting a bone marrow examination.

Peripheral blood smear morphology demonstrated multiple red blood cells infected with *Plasmodium vivax*, showing both trophozoite and gametocyte forms. The infected erythrocytes appeared enlarged and contained fine reddish Schüffner's dots. Various stages of the parasite were observed, including ring and amoeboid forms of trophozoites, as well as gametocytes (Figures 1 a,b). Bone marrow analysis also revealed the presence of malarial parasites. The marrow was normocellular, and no atypical cells were identified (Figures 1 c,d). (Informed consent was obtained from the patient.)

Following the detection of *Plasmodium vivax* on microscopy, details of the patient's residence and travel history were obtained. She

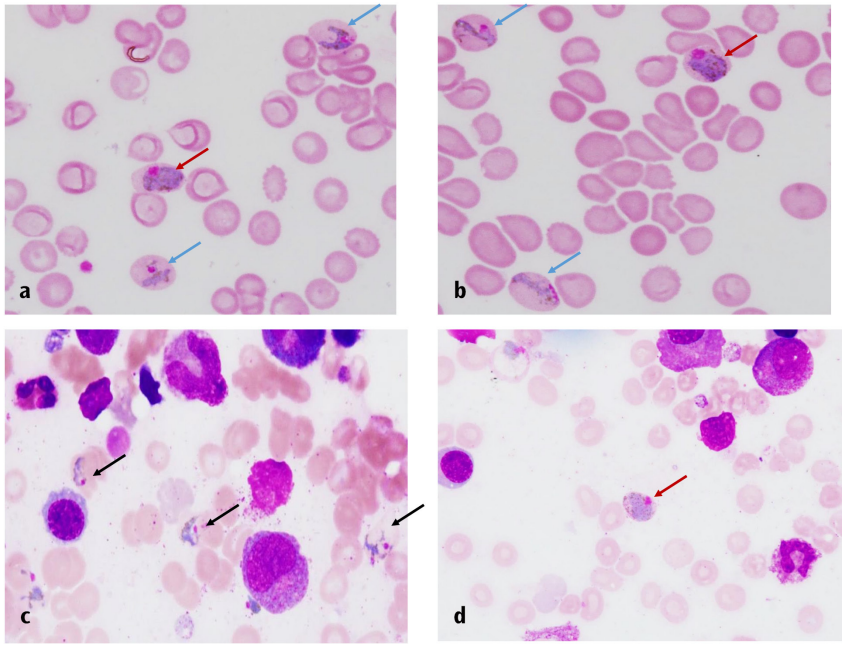

FIG. 1. Peripheral blood (a, b) and bone marrow aspirate (c, d) smears showing multiple red blood cells infected with *Plasmodium vivax*. The infected cells are enlarged and exhibit fine eosinophilic stippling (Schüffner's dots). Observed parasite stages include ring-form trophozoites, characterized by a round nucleus, central vacuole, and pale blue cytoplasm (black arrow); amoeboid trophozoites, displaying irregular cytoplasm, a prominent nucleus or chromatin dot, and fine yellowish-brown pigment (blue arrow); and gametocytes, which nearly fill the enlarged erythrocytes and have an eccentric, compact nucleus or chromatin along with diffuse pigment (red arrow).

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resides in Chandigarh, India, and reported no recent international travel. Additionally, she had no prior history of malaria, indicating this was not a recurrent infection.

Although malaria remains a public health concern in various regions of India, its prevalence in Chandigarh is relatively low, though sporadic cases continue to be reported.[1] According to the National Center for Vector Borne Diseases Control, of the six vector-borne diseases monitored-malaria, filariasis, dengue, Japanese encephalitis, kala-azar, and chikungunya-only malaria and dengue are currently prevalent in Chandigarh.[2]

Malaria is a protozoal disease caused by species of the genus *Plasmodium*. Five species are known to infect humans: *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*, and *P. knowlesi*. Globally, an estimated 300-500 million clinical episodes of malaria occur annually, primarily due to *P. falciparum* and *P. vivax* infections.[1] *P. vivax* remains the second most significant cause of malaria, notable for its potential to relapse due to the reactivation of dormant hypnozoites in hepatocytes.[2] Common hematological abnormalities associated with malaria include anemia, thrombocytopenia, leukopenia, leukocytosis, neutropenia, neutrophilia, monocytosis, and, less frequently, disseminated intravascular coagulation.[3]

Examination of peripheral blood smear remains the gold standard for diagnosing malaria. In this case, multiple parasitized red blood cells were clearly observed on microscopy.

Despite the availability of advanced diagnostic tests, peripheral smear morphology continues to play a vital role and should be performed early in all cases of pancytopenia before proceeding with more invasive investigations. In this patient, who presented with generalized weakness, bone pain, and pancytopenia, the clinical impression was initially of aplastic anemia or malignancy, leading to a bone marrow study that might have been avoided had a peripheral smear been examined first. Malaria should therefore be considered in the differential diagnosis of patients presenting with fatigue, bone pain, and pancytopenia.

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