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Retinal haemorrhage: An unusual presentation of vivax malaria

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Malaria is an acute febrile illness caused by infection by mainly two *Plasmodium* species—*Plasmodium falciparum* and *P. vivax*. It is presently endemic in 104 countries with approximately 3.3 billion people at risk[1]. Out of these, 2.48 billion people are at risk of *P. vivax* infection, and half of these reside in India. *Plasmodium vivax* and *P. falciparum* are known to occur with equal frequency in India[1]. In case of malaria, traditionally severe manifestations have been considered to be due to *P. falciparum* infection with rosetting, agglutination, cytoadherence, sequestration, and micro circulatory changes being the pathogenic mechanisms. Malarial retinopathy consisting of retinal whitening, vessel changes (discolouration), retinal haemorrhages and papilledema, is an established clinical entity in severe *P. falciparum* malaria, especially in cerebral malaria in African children[2]. However, retinal haemorrhages in cases of *P. vivax* malaria have been very rarely reported. Occurrence of severe and complicated manifestations has been increasingly recognized in cases of vivax malaria[3]. Presence of retinal haemorrhage in a case of *P. vivax* malaria assumes significance in light of increased recognition of severe manifestations associated with *P. vivax* malaria. We report a case of retinal haemorrhage in *P. vivax* malaria along with the fundus photograph.

Case report

A 42-yr old male hailing from northwestern Rajasthan was admitted to a tertiary care hospital in October 2012 with the history of painless diminution of vision in right eye for five days, which was sudden in onset and non-progressive. Prior to development of this diminution of vision, patient had an acute febrile episode for a period of six days. The patient was diagnosed as having *P. vivax* malaria by rapid diagnostic test as well as peripheral blood smear and was treated accordingly.

On examination, his best corrected visual acuity (BCVA) in right eye was 20/80 (confirmed by pinhole) and N-10 compared to 20/20 and N-5 in left eye. Amsler chart showed central scotoma. External ocular examination and anterior segment were normal. Pupils of both eyes were round, regular and reacting to direct and consensual light stimulus. No anisocoria was noted.

Fundus examination revealed haemorrhages in right eye, one each over foveal and perifoveal area, and a large flame-shaped haemorrhage along supero-nasal vascular arcade near the optic disc. Left fundus was normal. No retinal whitening, vascular changes, exudates, edema, cotton wool spots or disc edema were seen. Fundus photography was done and is shown in Fig. 1.

Major systemic illnesses like diabetes mellitus, hypertension, chronic kidney disease, chronic liver disease, etc. were over-ruled out by history and relevant laboratory investigations. On physical examination, his BP was 130/80 mm of Hg, pulse rate 86/min, regular, respiratory rate was 16/min, and body temperature was 37.8°C. There was no icterus, but definite pallor was noted. There was no evidence of any complication of malaria, except anaemia and thrombocytopenia.

PCR was done to confirm the diagnosis of vivax malaria and to rule out co-infection with *P. falciparum*. Laboratory investigations showed severe anaemia (Hb = 5.6 g%), severe thrombocytopenia (thrombocyte count = 40,000/mm^3), normal white blood cell count (8000/mm^3) (polymorphs = 55% and lymphocyte = 44%) and normal liver function tests and (AST = 40 IU/L, ALT = 35 IU/L, ALP = 120 IU/L, serum bilirubin = 1.1 g%). Peripheral blood film showed normocytic normochromic anaemia. Bleeding time was 3 min 10 sec, clotting time was 4 min 40 sec, and prothrombin time (I.N.R.) was 1.1.

Retinal haemorrhages in a case of malaria were first described by Poncet[4]. Since then, retinal manifestations have been reported by various researchers in cases of *P. falciparum* malaria. The retinal changes were well-characterized and found to be of prognostic significance in cerebral malaria in African children. Histopathological correlation and fluorescein angiography showed that the pathogenic mechanisms were similar to those causing other severe manifestations in *P. falciparum* malaria such as cytoadherence, sequestration and microcirculatory changes. Other studies showed that retinal changes may be associated with non-cerebral severe malaria and in adult

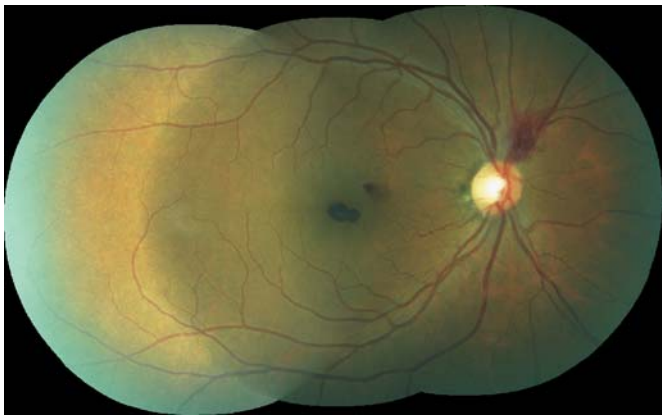

Fig. 1: Retinal image showing haemorrhages.

population as well. The retinal changes are known to resolve spontaneously with no significant retinal sequel in survivors. Even though the mechanism is uncertain, severe manifestations of *P. vivax* malaria have been increasingly recognized in the last decade or so[3].

Very few cases have been reported with retinal haemorrhages in *P. vivax* malaria (from India and South Korea)[5–6]. One report from India had found schizonts and gametocytes of *P. vivax* to be present in retinal vessels along with haemorrhages on autopsy[4]. Cotton wool spot has also been reported in a case of *P. vivax*[5], but no report has mentioned the presence of retinal whitening, vessel changes and papilledema in *P. vivax* malaria so far.

The mechanism of retinal haemorrhage is uncertain in *P. vivax* infection. Cytoadhesion, rosetting and sequestration of infected RBCs are the pathogenic processes found in *P. falciparum* infections. These processes have not been considered important in *P. vivax* malaria. However, cytoadhesion had been demonstrated experimentally for RBCs infected with *P. vivax*[7]. Moreover, increased incidence of low birth weight babies in pregnant women suffering from *P. vivax* malaria has been reported, which may be an indirect evidence of sequestration of RBCs in placenta.

The presence of retinal haemorrhages in cases with severe manifestations of *P. vivax* malaria (in our case severe anaemia and thrombocytopenia) might have previously been over looked, as severe manifestations were not believed to occur due to it. This is the first case of retinal haemorrhage in vivax malaria from this region. We agree with Lee *et al*[6] that attending physician should consider the possibility of retinal haemorrhage in *P. vivax* malaria and hence, the diagnosis of *P. vivax* malaria in a case of febrile illness with retinal haemorrhage.

Large prospective ophthalmologic studies in cases of *P. vivax* malaria especially with severe manifestations should be undertaken to further enhance our knowledge regarding this rarely reported entity.

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