CASE REPORT

CONCURRENT SALMONELLA BACTEREMIA IN *P. VIVAX* INFECTION - A REPORT OF 2 CASES AT THE HOSPITAL FOR TROPICAL DISEASES, THAILAND

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Abstract. Malaria and concurrent bacteremia has been described in many reports, most of them with *P. falciparum*. Concurrent bacteremia with *P. vivax* infected patients is very rare. We reported 2 cases of salmonella bacteremia with *P. vivax* infection. Both patients presented with fever and the diagnosis of *P. vivax* was confirmed microscopically. The first patient presented with fever, jaundice, shock and renal failure which rarely occurs with *P. vivax* infection. The second patient had no clinical response after receiving standard antimalarial drugs. Hemoculture was positive for *Salmonella* spp in both cases. They recovered completely after appropriate antibiotics and antimalarial treatment.

INTRODUCTION

Malaria and salmonellosis are important causes of disease in the tropics. Concurrent infection with these two diseases has been reported for many years, but most are in *P. falciparum* cases (Mabey *et al*, 1987; Gophinath *et al,* 1995; Ammah *et al*, 1999). Coinfection is rarely seen with *P. vivax.* We report two cases of *P. vivax* malaria with salmonella bacteremia at the Bangkok Hospital for Tropical Diseases.

CASE REPORTS

Case 1

A 40-year-old Myanmar man gave an 8-day history of high-grade fever, chills, anorexia, nausea and vomiting. Four days after onset, he developed jaundice and his symptom worsened. He was admitted to the Bangkok Hospital for Tropical Diseases on June 22, 2006 which was day 8 of his illness.

On physical examination, his temperature was 37.2ºC. pulse rate was 95/minute, blood pressure was 80/50 mmHg and respiratory rate was 20/minute. He was alert and had marked icteric sclera. The rest of the physical examination was within normal limits.

Intravenous fluid and inotropic drugs were given to resuscitate him. We found 5 ameboid forms of *P. vivax* per 200 white blood cells on peripheral blood smear. On CBC his hemoglobin was 12.7 g/dl, white blood cell was 8,000/µl and platelet count was 12,000/mm^3. There was evidence of renal and liver impairment (BUN 76 mg/dl, creatinine 2.7 mg/dl, total bilirubin 13 mg/dl, direct bilirubin 10.8 mg/dl, SGOT 69 U/l, SGPT 43 U/l).

P. vivax infection rarely presents as shock with multiple organ failure. Mixed infection

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with *P. falciparum* and co-infection with other pathogens were our main concern. Initially, we gave artesunate 120 mg IV at 0, 12, and 24 hours, then once daily, together with ceftriaxone 2 g IV once daily and doxycycline 100 mg orally bid. Laboratory tests including PCR for *P. falciparum*, dengue antibody, a leptospirosis titer, IFA for scrub typhus and hemoculture were sent to exclude co-infection.

After 3 days of treatment, he was improving, and the parasites were clearing. PCR for *P. falciparum* and serologic tests for other tropical diseases were all negative. We found both specimens on hemoculture grew Salmonella group D. The definite diagnosis was *P. vivax* infection with salmonella septicemia. We continued antibiotics for 2 weeks and primaquine 15 mg per day for 14 days after artesunate treatment. The patient recovered fully, and his renal and liver functions returned to normal.

Case 2

A 25-year-old Myanmar woman developed fever and chills lasting 3 days. She also had headache, myalgia, anorexia, nausea and vomiting. She came from the Thai-Myanmar border 3 days before admission to the Bangkok Hospital for Tropical Diseases. She was admitted on May 17, 2006.

On physical examination, her temperature was 38ºC, and the rest of the physical examination was normal. Her peripheral blood smear revealed 3 ring forms and 2 ameboid forms of *P. vivax* per 1,000 red blood cells.

She received 1,000 mg of chloroquine initially, 500 mg at 6, 24, and 48 hours and primaquine 30 mg per day for 14 days. On day 3 of treatment, her temperature increased to 40ºC, although her peripheral blood smear showed a marked decrease in *P. vivax*. Overall, patient's condition did not improve. Ceftriaxone 2 grams IV was given once daily as empiric treatment. After 3 days of antibiotic, her fever improved. Hemoculture showed *Salmonella* group C, being positive by 1 day of incubation. We continued intravenous antibiotic for 6 days then switched to oral antibiotic. There were no complications and she recovered fully.

DISCUSSION

The association between severe malaria and bacteremia has been reported for many years. Most cases have falciparum malaria. In one study, up to 16% of blood cultures from Nigerian children with cerebral malaria were positive for gram-negative organisms (Prada *et al,* 1993). Many organisms, include *E. coli*, *P. aeruginosa* and *Salmonella* spp have been reported as causes of septicemia in complicated falciparum malaria patients (Bygbjerg *et al*, 1982). However, concurrent infection with *P. vivax* malaria and bacteremia is rarely found.

In general, *P. vivax* infection is thought to be a mild, uncomplicated disease. Severe presentations with *P. vivax*, as in patient 1, usually lead the clinician to consider a mixed-infection with *P. falciparum* and/or co-infection with another pathogen. Although severe infections *P. vivax* alone have been reported, they are rare (Mohapatra *et al*, 2002). Treatment with antimalarial drugs that cover both *P. falciparum* and *P. vivax*, and the empiric use of antibiotics is usually required while additional tests excluding co-infection are pending. Apart from atypical or severe presentations with *P. vivax* infection, delay in clinical response while parasitemia is markedly decreased raises the possibility of co-infection, as in patient 2.

In our study, the definite diagnosis of salmonella bacteremia was made after empiric treatment with antibiotics. The outcomes were excellent in both cases. Salmonella was cleared from the blood with treatment. Unfortunately, we could not specify the serotype of salmonella in our study.

Immunosuppression in the acute phase of malaria is thought to be the predisposing

cause of bacteremia in severe malaria (Greenwood *et al*, 1972). Salmonella is among the most common pathogens. The real incidence of concurrent salmonella bacteremia in malaria patients is not known. Although it is commonly seen in *P. falciparum* cases, it can occur in *P. vivax* cases also.

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