

Episodes of Concurrent Dengue and Malaria[†]

**Subhash C. Arya[✉], Lalit K. Mehta, Nirmala Agarwal, Bharat K. Agarwal,
George Mathai and Arun Moondhara**

Sant Parmanand Hospital, 18 Alipore Road, Delhi - 110054, India

During 2003 the Indian capital faced an outbreak of dengue. From 1 June to 28 October 2003, 1723 laboratory-confirmed cases of dengue fever were reported in Delhi and surrounding areas. Four deaths among laboratory-confirmed cases had been reported on 28 October 2003^[1]. During molecular investigations on serum aliquots yielding a satisfactory RNA quantum, seven specimens were processed for automated nucleotide sequencing. Five showed DNA sequence homology with Guate 96-98 strains of DENV-3, whereas two were genotype IV of DENV-2^[2]. During the outbreak, two cases with concurrent dengue and malaria were encountered at the Sant Parmanand Hospital, a private tertiary care hospital catering to local inhabitants.

A 35-year-old woman was hospitalized in October 2003 with fever and body ache over the past one week with vomiting, and abdominal pain for a day. There had been no chills or rigor. Clinically, her temperature on admission was 37.4 °C, without any skin rashes or haemorrhagic manifestations. Her total leukocyte count was 4400/μL, erythrocyte sedimentation rate was 75 mm for the first hour, and the platelet count was 39 000/μL. Her serum, tested for dengue antibodies using

AccuSpot™ Dengue Fever Rapid test (AccuDx, Inc. San Diego), was positive both for IgM and IgG. She received antipyretics, antacids and infusion fluids.

On two subsequent days, the patient was afebrile in the mornings but developed high fever in the evenings; the temperature was 37.4 °C on both the days. On the second afternoon, the peripheral blood smear collected in the febrile phase showed ring forms of *Plasmodium vivax*. She was prescribed parenteral chloroquine. There was a remarkable improvement with no subsequent bouts of prexia. On the fifth day of hospitalization, prior to discharge, her platelet count was 131 000/μL.

During October 2003, yet another dual dengue and malaria infection was encountered in a 63-year-old male, who had been suffering from fever, chills and rigor for the past four days. During the past two days, he had vomiting and abdominal pain. Upon admission his temperature was 38.9 °C with tenderness all over the abdomen. There was no skin rash or any haemorrhagic manifestation. The platelet count was 28 000/μL. The serum, tested for dengue antibodies using AccuSpot™ Dengue Fever Rapid test (AccuDx, Inc. San Diego), was

[†]In tropical countries, concomitant infection of dengue, malaria, leptospirosis or enteric fever is a common occurrence. However, what is more important is the exclusion of *P. falciparum* infection which is life-threatening over a short course of illness. This can be done by simple microscopy/rapid diagnostic tests (RDTs) even in peripheral hospitals – Editor

[✉]subhashji@hotmail.com



positive both for IgM and IgG. He received analgesics, antipyretics and antacids. Next day four mega units of platelets were administered.

On the second day of hospitalization, there was shivering with a temperature of 40.5 °C. The peripheral blood smear drawn during shivering was positive for schizonts and trophozoites of *Plasmodium vivax*. He was prescribed chloroquine intramuscularly. There was a noteworthy progress with no subsequent bouts of prexia. On the fifth day of hospitalization, prior to discharge, the platelet count was 58 000/ μ L.

There have not been very many reported cases of concurrent dengue and malaria infection. During 2004, a solitary episode of concurrent dengue and *Plasmodium falciparum* infection was reported in Marseille, France. Malaria was diagnosed during microscopy on the peripheral blood smear in a 37-year-old woman following travel to Guinea, Senegal and Sierra Leone. Apart from enzyme-linked immunosorbent assay from anti-dengue virus IgM and IgG, phylogenetic analysis performed with patient sequence together with homologous sequences from dengue viruses and other flavivirus showed that it corresponded to DENV-3 species^[3].

The two patients reported in the present communication have been among several others

afflicted with dengue. While their serum aliquots were not examined for dengue virus RNA, in all probability, they were afflicted with DENV-2 or the Guate 96-98 strains of DENV-3^[2].

Currently, examination of a peripheral blood smear for *Plasmodium* diagnosis and species identification is being practised universally. Molecular investigations employing a real-time PCR assay to detect and distinguish four *Plasmodium* species that cause human disease by using a single amplification reaction and melting curve analysis are intriguing. Patient specimens infected at 0.01% to 0.02% parasitemia densities were detected, and analytical sensitivity was estimated to be 0.2 genome equivalent per reaction. Furthermore, it was feasible to label three specimens with mixed *P. falciparum*-*P. vivax* infections^[4]. Certainly, simpler formats for such PCR assays would establish if any of the concurrent dengue and malaria infections among these two cases, or the 37-year-old woman following a trip to Guinea, Senegal and Sierra Leone^[3], had indeed been caused by simultaneous infection by two or more *Plasmodium* species.

Acknowledgement

The secretarial assistance of Ms Sarita Kumar and the technical assistance of Ms Kamini Singh are gratefully acknowledged.

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