

## Laboratory and Epidemiology Communications

### Dual Infection by Dengue Virus and *Plasmodium vivax* in Alappuzha District, Kerala, India

P. S. Thangaratham\*, M. K. Jeevan<sup>1</sup>, R. Rajendran, P. Philip Samuel and B. K. Tyagi

Centre for Research in Medical Entomology, Tamil Nadu and

<sup>1</sup>Kerala State Institute of Virology and Infectious Diseases, T. D. Medical College, Kerala, India

Communicated by Ichiro Kurane

(Accepted May 15, 2006)

Dengue fever (DF) is one of the most serious emerging viral infections in India. Frequent outbreaks of DF have been documented in South India. Dengue virus infection may be asymptomatic or lead to undifferentiated fever, DF or dengue hemorrhagic fever (DHF). In a recent dengue epidemic survey in Kerala, we came across with a patient who showed dual infection with malaria and dengue. The case report details are shown below.

A 22-year-old male businessman visited the Primary Health Centre (PHC), Alappuzha district, with high-grade fever,

chills, rigors, cough and a 3-day history of passing high-colored urine. The patient had traveled to Tamil Nadu state 2 weeks prior. He was provisionally diagnosed for affliction with leptospirosis, and his case was referred to the T. D. Medical College Hospital, Alappuzha, for further confirmation and management. A complete clinical investigation was carried out; the detailed findings, as shown in Fig. 1, were as follows: (i) Abdominal examination showed a tender, palpable liver about 2 cm in size with smooth edges and mild splenomegaly; (ii) Respiratory-system examination showed

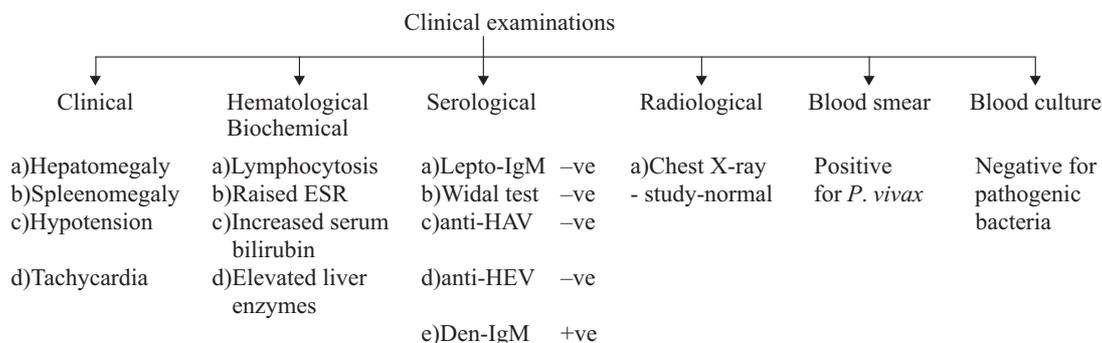


Fig. 1. Details of clinical examinations of the patient after presentation.

\*Corresponding author: Mailing address: Centre for Research in Medical Entomology (ICMR), 4, Sarojini Street, Chinna Chokkikulam, Madurai - 625 002, Tamil Nadu, India. Tel: +91-452-2520565, 2530746, Fax: +91-452-2530660, E-mail: crmeicmr@icmr.org.in

Table 1. Details of laboratory investigations

Laboratory test	Results
Hb %	12.6 gms %
Total count	6,100 cells/ $\mu$ l
Differential count	P 60%, L 38%, E 2%
ESR	30/h
Platelet count	1,00,000/ $\mu$ l
SGOT	37.1 u/l
SGPT	32.4 u/l
Serum bilirubin	1.4 mg/dl
Serum alkaline phosphatase	155 u/l
Total protein	6.8 mg/dl
Serum albumin	3.4 mg/dl
Serum creatinine	0.74 mg/dl

normal vesicular breath sounds with occasional bilateral rhonchi; (iii) Cardiovascular examination showed increased heart rate and hypotension; and (iv) Central nervous system examination was normal.

Bleeding and clotting time was normal. Urine and motion examination was normal. Chest skiagram was normal. The patient was treated with penicillin, acetamenophen (paracetamol) and other supportive measures. The serological test showed that leptospira-specific IgM antibodies were negative.

The patient exhibited aggravation of symptoms and his blood sample showed increased serum bilirubin and liver enzymes (Table 1). To rule out other infections like viral, bacterial and parasitic infections, further serological tests were carried out. Widal, anti-HAV and anti-HEV tests showed negative results. His peripheral smear showed a trophozoite form of *Plasmodium vivax*. Blood culture showed no pathogenic bacterial growth. After treatment with anti-malarial drugs, penicillin and other supportive measures, the patient completely recovered. Dengue Duo-IgM capture ELISA (Panbio, Brisbane, Australia) showed dengue IgM positive and IgG negative (1,2). Dengue virus was isolated by the *Toxo*-IFA technique (3). The isolated dengue virus was confirmed as DEN-2 by an immunofluorescence antibody test using a type 2-specific monoclonal antibody supplied by Dr. D. J. Gubler, Centers for Disease, Control and Prevention, Atlanta, Ga., USA (4).

Dengue and Weil's disease is endemic in most districts of Kerala including Alappuzha (5,6). Concurrent infections of dengue virus with other viral and bacterial infections (7-9) have been reported. Concurrent dengue and *P. falciparum* infection of African origin has recently been reported in France (10). Although malaria in Kerala is mostly imported, the patient under investigation is more likely to have contracted it during one of his visits to Tamil Nadu, which is endemic for malaria (11). Some cases of *P. vivax* at the liver stage of the parasite become asymptomatic after the primary attack. During the long latent stage, asymptomatic carriers show dual infection by *P. vivax* and other pathogenic organisms.

To the best of our knowledge, this is the first case of concurrent infection of dengue and *P. vivax* in a single patient from any state in India. Dual infection with dengue and malaria can possibly change the clinical spectrum of the disease; consequently, specific treatment may also be affected. Dual infection by dengue-malaria is rare and requires urgent attention. Investigation of epidemiological and immunological aspects of patients with concurrent infection is worth pursuing.

We thank the Director General, Indian Council of Medical Research, New Delhi for his support and facilities.

## REFERENCES

- Gubler, D. J. and Sather, G. E. (1990): Laboratory diagnosis of dengue and dengue hemorrhagic fever. Proceedings of International Symposium on Yellow Fever and Dengue. Rio de Janeiro, Brazil.
- Kuno, G., Gomez, I. and Gubler, D. J. (1991): An ELISA procedure for the diagnosis of dengue infections. *J. Virol. Methods*, 33, 101-113.
- Gajanana, A., Philip Samuel, P., Thenmozhi, V. and Rajendran, R. (1996): An appraisal of some recent diagnostic assays for Japanese encephalitis. *Southeast Asian J. Trop. Med. Public Health*, 27, 673-679.
- Henchal, E. A., McCown, J. M., Seguin, M. C., et al. (1983): Rapid identification of dengue virus isolates by using monoclonal antibodies in an indirect immunofluorescence assay. *Am. J. Trop. Med. Hyg.*, 32, 164-169.
- Kuriakose, M., Eapen, C. K., Punnoose, E. and Koshi, G. (1990): Leptospirosis-clinical spectrum and correlation with seven simple laboratory tests for early diagnosis in the Third World. *Trans. R. Soc. Trop. Med. Hyg.*, 84, 419-421.
- John, T. J., Rajappan, K. and Arjunan, K. K. (2004): Communicable diseases monitored by disease surveillance in Kottayam district, Kerala State, India. *Indian J. Med. Res.*, 120, 86-93.
- Kaur, H. and John, M. (2002): Mixed infection due to leptospira and dengue. *Indian J. Gastroenterol.*, 21, 206.
- Sudjana, P. and Jusuf, H. (1998): Concurrent dengue hemorrhagic fever and typhoid fever infection in adult: case report. *Southeast Asian J. Trop. Med. Public Health*, 29, 370-372.
- Myers, R. M. and Carey, D. E. (1967): Concurrent isolation from patient of two arboviruses, Chikungunya and Dengue type 2. *Science*, 157, 1307-1308.
- Charrel, R. N., Brouqui, P., Foucault, C. and de Lamballerie, X. (2005): Concurrent malaria and dengue. *Emerg. Infect. Dis.*, 11, 1153-1154.
- Sitalakshmi, S., Srikrishna, A., Devi, S., Damodaar, P., Mathre, T. and Varghese, J. (2003): Changing trends in Malaria – a decade's experience at a referral hospital. *Indian J. Pathol. Microbiol.*, 46, 399-401.