

Rare concurrent infection with scrub typhus, dengue and malaria in a young female

Susheel Kumar, P. Sathish Kumar, Gurmeet Kaur, Ashish Bhalla, Navneet Sharma & Subhash Varma

Department of Internal Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh, India

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Tropical infections due to dengue, malaria, leptospira, scrub typhus and many other vector borne diseases are commonly seen in South Asia including Indian subcontinent. These infections have overlapping clinical manifestations and season of presentation. Scrub typhus or tsutsugamushi disease is a febrile illness caused by bacteria *Orientia tsutsugamushi* of the family Rickettsia. It is being reported from all parts of the Indian subcontinent though it is more prevalent in sub-Himalayan regions of north India^{1–2}. Malaria is highly endemic in India³. Dengue is prevalent throughout India and outbreaks of dengue have been seen from months of October to December⁴. Although concurrent infections are reported, they are not very common^{5–6}. These infections being vector borne diseases, the reason for simultaneous infection can be the same breeding period of the vectors in post-monsoon season. Diagnosis of concurrent infections becomes difficult for a physician leading to delay in institution of appropriate treatment. We hereby report a rare case of a patient having concurrent infection with dengue, malaria and scrub typhus.

Case report

A 25-yr old female presented with complaints of high grade fever associated with chills and rigors of seven days duration during post-monsoon season. She also complained of headache and generalized myalgias. She noticed yellowish discolouration of eyes and reported progressively worsening shortness of breath over three days before admission to the hospital. Investigations done in outside hospital revealed anaemia with thrombocytopenia. Peripheral blood smear showed asexual forms of *Plasmodium vivax* and her rapid malaria antigen (QDx, Piramal Healthcare) test was positive for *P. vivax*. She was started on injection artesunate. Patient didn't show significant improvement after 48 h of artesunate and was referred to our hospital. On examination, she was febrile, had pallor, icterus and splenomegaly. She was tachypnic with respiratory rate of 38/min and an eschar was found on anterolateral aspect of thigh as well (Fig. 1). Laboratory investigations showed presence of



Fig. 1: Anterolateral aspect of thigh showing an eschar, a necrotic lesion induced by a mite bite.

hemolytic anaemia and thrombocytopenia with platelet count of $< 6000/\mu\text{l}$. Peripheral blood smear repeated did not show any malarial parasite. Rapid malaria antigen (QDx, Piramal Healthcare) retested was positive for *P. vivax*. She also had hepatic involvement in the form of raised bilirubin, predominantly conjugated and transaminitis. Her chest X-ray showed bilateral interstitial and alveolar infiltrates with arterial blood gases (ABG) suggestive of mild acute respiratory distress syndrome. Although malaria can have such presentation, but non-responsiveness to artesunate and presence of eschar made us to investigate her for other tropical infections. There was high diagnostic possibility of coinfection with scrub typhus; so Weil-Felix and PCR for scrub typhus were sent. Weil-Felix test was positive in high titres ($\geq 1:320$) and PCR for scrub typhus was also positive, which confirmed the diagnosis of scrub typhus. She also tested positive for NS1Ag and IgM antibody for dengue virus. Patient was started on doxycycline and injection artesunate was continued. Supportive management with intravenous fluids, platelet transfusion and oxygen inhalation was also given. Patient became afebrile, platelet count and liver function test showed improvement. Her oxygen requirement decreased with significant improvement in ABG and chest X-ray. A final diagnosis of concurrent-infection with malaria, dengue and scrub typhus with multiple organ involvement was made.

DISCUSSION

Fever is a non-specific manifestation of many infections. In a tropical country like India, the most common tropical infections causing acute febrile illness are malaria, leptospira, scrub typhus, dengue, typhoid and many others. Scrub typhus or tsutsugamushi disease transmitted by chigger bite is a febrile illness caused by *Orientia tsutsugamushi* bacteria of family Rickettsia. Malaria and dengue are two arthropod borne tropical infections, which are prevalent throughout India³⁻⁴. Most of outbreaks of dengue are also seen in post-monsoon season and early winters³. These infections present with non-specific manifestations like acute onset of fever with leucopenia, thrombocytopenia and hepatic involvement. Some cases have also shown to have neurological involvement and acute respiratory distress syndrome⁷. Although coinfections with scrub typhus, dengue and malaria have been reported, these are still not very common⁵⁻⁶. Mixed infections are of concern for a clinician including unexpected clinical findings and apparent poor response to treatment. Role of coinfections in the severity of the disease is not clearly identified. It has also been seen that coinfections of dengue and malaria seems to be more severe with greater risk of thrombocytopenia⁷. Response to treatment is of diagnostic significance. Hence, a patient with acute febrile illness not responding to appropriate therapy within 48 h must be investigated for concurrent infection with other tropical infective diseases. Laboratory tests with varied sensitivity and specificity are available for investigating these infections. Dengue NS1Ag has a sensitivity of 45–94.3% and specificity of 93–100%. IgM for dengue by ELISA has a sensitivity of 85–90% and specificity of 88–100%⁸⁻⁹. Rapid malaria antigen QDx for malarial parasite has a sensitivity of 96.6% and specificity of 100%¹⁰. Weil-Felix for scrub typhus has low sensitivity and specificity of 33 and 46%, respectively¹¹. Polymerase chain reaction (PCR) for scrub typhus also has low sensitivity of 44.8% but is highly specific up to 100%¹². These tests are though highly sensitive; specificity is an issue especially with antibody-based serological tests. Hence, the role of cross-reactivity between antibodies and influence of antibodies borne out of earlier infections on the antibody-based serological assays should always be considered. In index case, confirmation of con-

current infections was made with the help of antigen-based serological tests and PCR.

To conclude, patients in tropical countries presenting in post-monsoon season with acute febrile illness with multiple organ involvement not responding to appropriate and adequate therapy aimed for a suspected tropical infection should be evaluated for concurrent infections with other microorganisms. This possibility of concurrent infection should be thought early enough to decrease morbidity and possibly mortality as well.

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Correspondence to: Dr Susheel Kumar, Assistant Professor of Internal Medicine, Department of Internal Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh–160 012, India.
E-mail: sk_bhutungru1977@yahoo.co.in