



## Original Research Article

# Rare Co-infection of Malaria, Scrub Typhus and Dengue virus in an Immunocompetent Patient

Sohaib Ahmad<sup>1\*</sup>, Minakshi Dhar<sup>1</sup>, Nowneet Kumar Bhat<sup>2</sup>,  
Nadia Shirazi<sup>3</sup> and Garima Mittal<sup>4</sup>

<sup>1</sup>Departments of Medicine, Himalayan Institute of Medical Sciences, Dehradun, India

<sup>2</sup>Pediatrics, Himalayan Institute of Medical Sciences, Dehradun, India

<sup>3</sup>Pathology Himalayan Institute of Medical Sciences, Dehradun, India

<sup>4</sup>Microbiology; Himalayan Institute of Medical Sciences, Dehradun, India

\*Corresponding author

## ABSTRACT

### Keywords

Mixed infection, Immune-competent, Scrub typhus, Malaria, Dengue

The newly created Indian state of Uttarakhand is being increasingly recognised as a hot-bed of infections and that too with atypical presentations. Here, we report a case of co-infection of three arthropod-borne infections bereft of the expected multi-organ involvement. Similar clinical and laboratory features, and curability make the recognition of the presence of these infections important. The potential beneficial or harmful effects of the co-infections may be better appreciated if similar cases are diagnosed prospectively.

## Introduction

Scrub Typhus is a febrile rickettsial illness caused by *Orientia tsutsugamushi* and has recently been detected as endemic in sub-Himalayan region of India (Ahmad *et al.*, 2010, Sharma *et al.*, 2012). Malaria is highly endemic in rest of India but its prevalence is low in sub-Himalayan region because of the altitude. Recently, complications of *Plasmodium vivax* malaria have also been reported from this part of India (Srivastava *et al.*, 2011) These arthropod borne infections including dengue seen mainly during rainy season have overlapping

clinical and laboratory features. Simultaneous infections with multiple pathogens have received most attention in the context of human immunodeficiency virus type 1 infection (HIV-1), where opportunistic infections with both harmful (Mussini *et al.*, 2004) and beneficial interactions (Xiang *et al.*, 2004) have been described.

We report a rare case of a patient having co-infection with *Plasmodium falciparum*, *Orientia tsutsugamushi* and dengue virus.

## Case report

A 35 year old male presented with fever of 8 days duration, associated with chills and rigors and malaise. He had not suffered from any infection in the past. On examination, he was pale, febrile and had splenomegaly; rest of the examination was unremarkable. His haemoglobin was 9.82 gm/dl, total leucocyte count was 5050/cu.mm while the platelet counts were 94,600/cu.mm. *Plasmodium falciparum* was detected in the peripheral blood smear as well as on rapid malaria LDH card test. The liver and kidney functions were within normal limits. His peripheral blood smear became free of the plasmodium 3 days later after he received a combination of arthemether and lumefantrine. However, the fever persisted for two days albeit at a lower intensity and frequency. Also, platelet counts declined progressively to 30,000/cumm.

Serological testing for other possible infections demonstrated positivity for dengue (NS1 and IgM) and for scrub typhus (IgM). He received doxycycline; clinical and haematological improvement occurred within 48 hours following which he was discharged. Also, the rapid malaria test became negative after 1 month of follow-up suggesting complete cure.

The present case was atypical because triple infection occurred in an immune-competent person without organ dysfunction. Malaria and dengue virus co-infection has already been reported from the same centre. (Singhsilarak *et al.*, 2006) It might be contested that antibodies from previous exposures of scrub typhus, rather than from an acute infection, was responsible for positive test results. Also, testing was done on a single, acute specimen rather than on paired samples. However, the detection in and treatment of other patients during the same time interval and response to

doxycycline within 48 hours supports our diagnosis.

Whether malaria induces antibodies that cross-react with scrub typhus is unknown. Cross reactivity, infection with the as yet unrecognised viruses and other microorganisms and evolution of newer species and serotypes of the already recognised organisms due to ecological changes, may be responsible for the atypical presentations being frequently reported from this region. Presence of clinical and laboratory features, not typically seen in malaria, and unresponsiveness to the anti-malarials should prompt investigations for other co-infections which if left untreated may have serious and life-threatening implications for the patients. Some compounds used in the treatment of malaria, such as doxycycline, also have activity against scrub typhus, murine typhus and leptospirosis. Though the presence of co-infection of scrub typhus and malaria has been reported in Thai patients with fever (Singhsilarak *et al.*, 2006) and in a single case from Shimla (Sharma *et al.*, 2012), no case with triple infection has ever been published from India to the best of our knowledge.

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