



George M. Varghese

Dr. George M. Varghese is a faculty member in the Department of Medicine & Infectious Diseases at the Christian Medical College, Vellore. Dr. Varghese received his postdoctoral fellowship training in Infectious Diseases from Wayne State University, USA where he currently has an adjunct faculty position. He is also trained in Tropical Medicine from the London School of Hygiene & Tropical Medicine after graduate and postgraduate training in Medicine from Christian Medical College, Vellore. He has a special interest in rickettsial infections and has made significant contribution to the discovery and control of re-emerging scrub typhus in India. His current research includes genotyping and studying the immunopathogenic mechanisms in rickettsial infections and development of biomarkers in tuberculosis.

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ISID Small Grant Program Report

Scrub Typhus: Clinical and Laboratory Manifestations, Genetic Variability and Outcome

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Background

Scrub typhus is an acute febrile illness caused by an obligate intracellular bacterium *Orientia tsutsugamushi* belonging to the family Rickettsiaceae. This zoonosis is endemic in Asia especially in the region known as the 'tsutsugamushi triangle' and was described since the late 19th century. It was a major concern in the pre-antibiotic era due to its high case fatality rate that approached almost 60% and subsequently the importance of this disease diminished for decades in many parts including India. Recent reports from several parts of India, clearly documents a reemergence of scrub typhus (1–4). This study was done evaluate the clinical and laboratory manifestations, genetic variability of causative strains and assess the outcome of scrub typhus caused by *Orientia tsutsugamushi* in India.

Methods

Patients admitted with scrub typhus confirmed by IgM ELISA and/or pathognomonic eschar, to a university teaching hospital in India between August 2009 and March 2010, were evaluated. Detailed clinical examination including a careful search for eschar and laboratory parameters were documented in all patients. The sequences of a 483-base pair region of the 56-kD type-specific antigen gene from 10 *Orientia tsutsugamushi* eschar samples were compared with isolates from other regions in Asia (5,6).

Results

One hundred and thirty eight cases (Males 76 and females 62) of scrub typhus were seen during this 6 months period. The mean age of patients was 46 years and agricultural workers and housewives formed majority of cases (75%). Common symptoms were fever (mean duration 9 days), breathlessness, cough, nausea, vomiting, headache and myalgia. Eschar was present in 51% of cases and the common sites were groin, axilla, neck and breast fold. Liver enzymes were elevated in majority (72.5%). On phylogenetic analysis, 4 strains clustered with Karp while the remaining six clustered with the Kato group (Fig. 1). Multiple Organ Dysfunction Syndrome was present in more than one third of patients (40.6%). ARDS (44.9%), hypotension requiring ionotropic support (26.8%), hepatitis with total bilirubin >2.5 gm/dl (24.6%), meningitis or meningoencephalitis (21%) and renal impairment with creatinine >2.5 gm/dl (13%) were the important complications. Case fatality rate was 7.9%. There was a dramatic response to doxycycline in nearly all the patients who survived with mean fever defervescence duration of 2 days.

Conclusion

Scrub typhus is a multi-system infection causing significant morbidity and mortality in South India. The 10 Indian strains sequenced in this study are grouped in two distinct clusters. Strategies for early diagnosis and control of this infection are warranted.

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ISID Small Grant Program Report *continued*

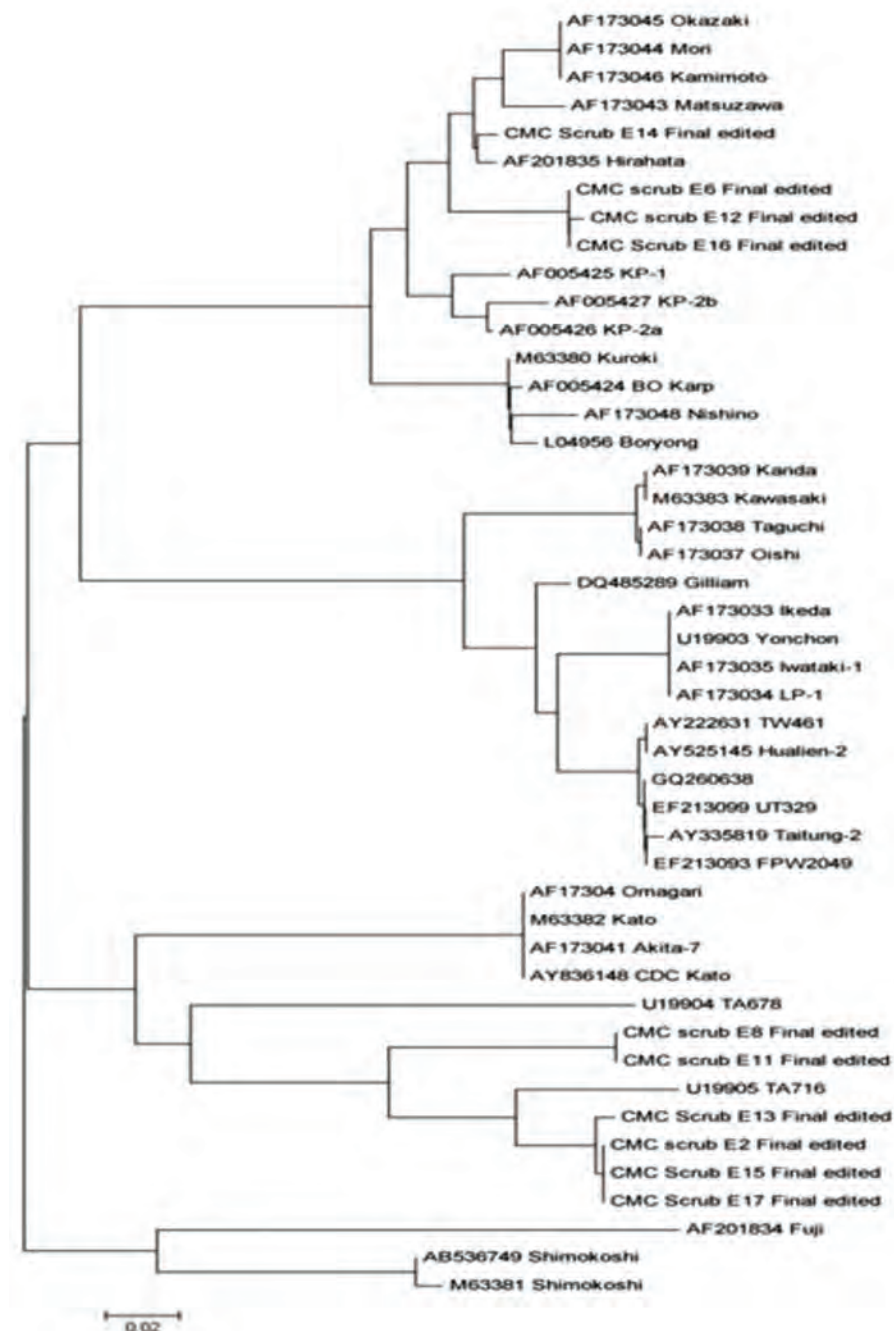


Fig. 1: Phylogenetic analysis of the sequences

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