

CUTANEOUS MANIFESTATIONS OF SPOTTED FEVER RICKETTSIAL INFECTIONS IN THE CENTRAL PROVINCE OF SRI LANKA

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Rickettsiae are a group of alpha-proteobacteria found as an obligatory intracellular parasite of eukaryotic cells. Rickettsia cause human infections giving rise to wider array of clinical features. Rickettsial infections are well established in Sri Lanka where three known disease entities namely, spotted fever group (SFG), typhus group and scrub typhus group have been reported from different parts of the island^{1,2}. Clinical features of the infection could be nonspecific or atypical. Of the clinical features, cutaneous lesions play a major role in its diagnosis. These cutaneous lesions tend to have varying patterns influenced by many factors. Thus, clinicians need to get used to these variations to make a presumptive diagnosis of rickettsial infection. Being a treatable infection, early diagnosis based on clinical features is important. Delaying of treatment could lead to high morbidity and mortality as routine laboratory diagnostic facilities are not available in the hospitals. The aim of this study was to describe the cutaneous manifestations of rickettsial infections along with basic histological features among patients presented to the Teaching Hospital, Peradeniya.

Patient recruitment and sample collection for the study were done in the Medical Unit, Teaching Hospital, Peradeniya from of November, 2009 to October, 2011. All patients admitted to the unit during the study period, with clinical features suggestive of rickettsial infection, were included in the study. The clinical case definition was based on the presence of fever for more than five days, associated skin rash and rapid defervescence with an anti-rickettsial antibiotic treatment. The patients were interviewed, examined and followed up while in the hospital and after discharge. All clinical details were recorded on individual formatted data sheets, after obtaining the in consent. The details of the skin rash such as its distribution, size, shape, presence of eschar and colour variations were recorded on printed figures of the human body in the data sheet. Each figure was divided into eight zones as, head and neck, anterior trunk, posterior trunk, arms and forearms, palms, thigh and gluteal regions, legs and soles. A score was given to each zone and a total score with a percentage was calculated for individual patient to indicate the severity and extent of the skin rash. Seropositivity of the infection was confirmed using immunofluorescent antibody assays (IFA). IFA was done to detect antibodies of the three groups of Rickettsiae, namely spotted fever group, scrub typhus and murine typhus with the use of antigens of *Rickettsia conori*, *Orientia tsutsugamushi* and *R. typhi*, respectively. Cutaneous biopsy samples were obtained from six patients, from areas with definitive maculopapular or vasculitic rash. The selection was dependant on the severity and the type of skin lesion. A covered part of the body with the skin lesion was selected and the biopsy specimen was obtained under local anesthesia using a punch biopsy needle. Formaline fixed samples were processed and microscopic slides were prepared. Sections were stained with Haematoxylin and Eosin and were observed under microscope at magnifications of x100, x400, x1000.

Individual data points were stored in a computerized data base (Excel,[™] Microsoft) and the basic descriptive analyses were done by means of central tendency. The data were analyzed by Minitab, version 14.

A total of 210 patients were clinically diagnosed to have rickettsial infections during the two year study period. Of them, 134 had high titers of IgM and IgG in the acute sera tested with IFA for *R. conorii* antigen. This included 69 (51.5%) males and 65 (48.5%) females. Mean age of the group was 44 years (range, 12-84). All 134 patients had fever and skin rash. Average duration of fever on admission was six days (range, 2-21 days) and that of skin rash was two days (range, 1-7 days). Of this group, 119 (88.8%) had experienced skin rash following the onset of fever and average duration of the time gap between the appearance of these two symptoms was three days. Rest of the 15 (11.2%) patients had noticed fever and skin rash together. Of the cutaneous lesions, eight (6%) patients had possible tick bite marks apart from the skin rash. The skin rash was maculopapular in 132 (98.5%), macular in one patient and papular in another one. Eight patients (6%) of the group had fern leaf type skin necrosis and the rest had erythematous rash. Mean age of the patients who had necrotic skin rash was 64 years. Appearance of the erythematous lesions varied depending on the innate skin colour of the subjects. Lesions were distinctively erythematous in fair skinned patients, whereas those were more of dusky red in dark skinned patients. Furthermore, in some patients the rash was visible only if the skin was visualized from an angle in the daylight. Average size of a skin lesion was 5 mm and it ranged from 2-10 mm. In general, the rash was discrete, and the shape of the lesions varied. Commonly they were either ovular or round in shape. Necrotic rash had a fern leaf like pattern. In general, the entire skin of the patient seemed slightly oedematous. Average extent of the skin involvement with the rash was 51.6% (range, 12.5 -100%). Out of the eight regions considered, majority of patients had the skin rash in their arms and forearms (n=108; 80.6%), legs (n=90; 67.2%), palms (n=74, 55.2%), soles (n=75, 56%), anterior trunk (n=61, 45.5%), thighs and gluteal region (n=53, 39.6%), head and neck (n=45, 33.6%) and posterior trunk (n=44, 32.8%). Apart from the skin rash, particularly old aged patients had cutaneous oedema around the ankles and puffiness of face with the skin becoming dusky colouration. Main histopathological features in skin biopsy specimen were the foci of basal cell vacuolation with exocytosis and lymphocytic infiltrates in perivascular spaces. Furthermore, some showed ectatic upper dermal blood vessels, focal swelling of endothelium, fibrinoid necrosis of vessel wall, extravasated red cells and presence of fibrin thrombi.

Serological evidence confirmed the presence of spotted fever group rickettsioses, as the seroreactivity was noted only against *R. conorii* antigen. None of the patients had classical eschars and had only possible tick bite marks. Classic eschars with thick and dry necrotic tissue have been described in some SFG rickettsioses such as mediterranean spotted fever, African tick bite fever and rickettsial pox. Most of the symptoms were evident in this study and there were small vessel ectasis and focal swelling of endothelium which are also supportive of the vasculitis. Cutaneous manifestations has a pivotal role in supporting the diagnosis of SFG. Histological features like disruption of small vessels by inflammatory cells, deposition of fibrin thrombi within the lumen and leucocytic infiltrates in perivascular spaces suggest vasculitis caused by infecting organism.

REFERENCES:

1. Kularatne SA, Edirisingha JS, Gawarammana IB, Urakami H, Chenchittikul M, Kaiho I. Emerging rickettsial infections in Sri Lanka: the pattern in the hilly Central Province. *Trop Med Int Health*. 2003 ;8(9):803-11.