

ACUTE SCRUB TYPHUS IN NORTHERN THAILAND: EKG CHANGES

George Watt¹, Pacharee Kantipong² and Kompoj Jirajarus³

¹Department of Retrovirology, Armed Forces Research Institute of Medical Sciences, Bangkok; ²Chiang Rai Regional Hospital, Thailand; ³Surat Thani Hospital, Surat Thani Province, Thailand

Abstract. The electrocardiographic (EKG) manifestations of scrub typhus were prospectively evaluated in 29 adult patients who acquired *Orientia tsutsugamushi* infection in Chiang Rai, Northern Thailand. EKGs were normal in 22 of the 29 patients (76%); minor non-specific changes were found in the other 7 patients; *ie* ST segment/T wave changes (10%), U waves (7%), and premature ventricular contractions (4%). These results suggest that EKG changes in scrub typhus acquired in areas of diminished antibiotic susceptibility are similar to those observed in *O. tsutsugamushi* infection acquired elsewhere.

INTRODUCTION

A twenty-nine year old male patient presented to Chiang Rai Regional Hospital with a two-day history of fever, chest pain, and irregular pulse. Scrub typhus was diagnosed by dot blot immunoassay; frequent premature ventricular contractions (PVCs) were noted on the electrocardiogram (EKG). After two days of antibiotic treatment, the patient's fever had resolved and the EKG showed fewer PVCs.

This case prompted us to review the literature to determine whether cardiac dysrhythmias were commonly associated with *Orientia tsutsugamushi* infection. We found that only one prospective study had been conducted since the pre-antibiotic era (Fang *et al*, 1977) and that no investigations had been reported within the last 20 years. No studies had been conducted in Northern Thailand, where drug-resistant strains of *O. tsutsugamushi* are found (Watt *et al*, 1996). In order to gather data on the electrocardiographic manifestations of *O. tsutsugamushi* infection in Northern Thailand, we recorded the EKGs of patients with acute scrub typhus; we repeated the EKG once patient's signs and symptoms had resolved.

MATERIALS AND METHODS

Adult patients (aged ≥ 21 years) with fever who presented to Chiang Rai Regional Hospital, Northern Thailand, were evaluated. *O. tsutsugamushi* infection was diagnosed on the basis of a clear positive dot blot immunoassay result (Dip-s-Ticks[®], Integrated Diagnostics Inc, Baltimore, Maryland, USA) (Watt *et al*, 1998) in the presence of a clinical picture consistent with acute scrub typhus infection. Standard 12-lead electrocardiograms with a rhythm strip (60 seconds) were made on the day of presentation to hospital (acute tracings) and were repeated 7-10 days later after confirming that patients were afebrile and asymptomatic (convalescent tracings). EKGs were subjected to blinded interpretation by one member of the study team (KJ), who had no knowledge of the clinical condition of the patients.

RESULTS

Tracings were obtained from 12 male and 17 female patients who had been febrile for

Table 1
Abnormal electrocardiographic findings in 29 adults with scrub typhus.

	Acute stage No. (%)	Convalescence No. (%)
ST segment/T wave changes	3 (10)	0
Prominent U wave	0	2 (7)
Premature ventricular contractions	1 (4)	1 (4)

a median of 4 days (range 2-7 days); the mean age of the patients was 39 (± 11) years. No serious cardiac complications were observed. Significant EKG abnormalities were absent in both the acute and convalescent tracings of 22 of the 29 patients (79%). Only minor changes were seen in the electrocardiograms of the remaining 7 individuals (Table 1): three patients had ST segment/T wave changes during symptomatic infection - these changes resolved within one week; U waves appeared during convalescence in two cases; PVCs were noted in one patient both during and after acute infection.

DISCUSSION

Cardiovascular complications of scrub typhus were frequently reported before the antibiotic era (Sayen *et al*, 1946); however, complications such as palpitations and PVCs were rare during the acute phase of scrub typhus and developed usually during the second or third week of illness in untreated patients (Sayen *et al*, 1946). Our index case and one other patient had PVCs on admission: the latter's dysrhythmia could not be linked to scrub typhus, since it was present on both acute and convalescent electrocardiograms. Other EKG changes were nonspecific (Table 1) and similar in frequency to the changes reported in the only other prospective study of the electrocardiogram in treated scrub typhus (Fang *et al*, 1977). No serious cardiac complications were observed.

The few EKG changes recorded were those expected in acute infectious diseases that feature fever and increased cardiac output. There was no evidence that EKG changes in patients who acquired scrub typhus in an area where drug-resistance has been reported were different to the EKG manifestations of *O. tsutsugamushi* infection acquired in other areas. The changes observed in our Thai patients were similar to those reported from the Pescadore Islands (Fang *et al*, 1977). We agree with Fang *et al*. that the prompt treatment of scrub typhus with antibiotics prevents serious cardiac complications of the type often reported in the pre-antibiotic era.

REFERENCES

- Fang RCY, Dennis DT, Lee JB. Electrocardiographic changes in scrub typhus patients. *Southeast Asian J Trop Med Public Health* 1977; 8: 503-9.
- Sayen JS, Pond HS, Forrester JS, Wood FC. Scrub typhus in Assam and Burma: A clinical study of 616 cases. *Medicine* 1946; 25: 155-214.
- Watt G, Chouriyagune C, Ruangweerayud R, *et al*. Scrub typhus infections poorly responsive to antibiotics in Northern Thailand. *Lancet* 1996; 348: 86-9.
- Watt G, Strickman D, Kantipong P, *et al*. Prospective evaluation of a dot blot immunoassay for the rapid diagnosis of scrub typhus. *J Infect Dis* 1998; 177: 800-2.