

FATAL SCRUB TYPHUS FROM LITCHFIELD PARK, NORTHERN TERRITORY

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Abstract

A 38 year old man died with multiorgan failure from scrub typhus (infection with *Rickettsia tsutsugamushi*). His infection was acquired in the rainforest fringes of Litchfield National Park, Northern Territory. This is the eighth documented case of scrub typhus acquired in Litchfield National Park since it was first recognised as a focus of infection in 1990. To date the Park is the only known focus of scrub typhus in the Northern Territory. A possible focus in rainforest in the Kimberley region of northern Western Australia also exists. As tourism increases, other remote foci of vectors, endemic rodent hosts and rickettsiae may be recognised in northern Australia. *Comm Dis Intell* 1996;20:420-421.

Introduction

Scrub (mite) typhus (infection with *Rickettsia tsutsugamushi*) has long been recognised as endemic in north-eastern Australia, as well as in a wide area of eastern Asia and the western Pacific region¹. Between August 1990 and November 1991, there were five confirmed cases of scrub typhus acquired in Litchfield National Park, an area of rainforest 140 kilometres south of Darwin, Northern Territory, which was opened to the public as a park in 1986². A further case from Litchfield Park, acquired in October 1993, was diagnosed in a Western Australian tourist (Dr Liam O'Connor, personal communication). A seventh case occurred in June 1996 in a Darwin resident who camped in the park³. We describe here a fatal case of scrub typhus also from Litchfield Park.

Case report

In mid-August 1996, a 38 year old man was working on the construction of a tourist path in the rainforest fringes of Litchfield Park. During his second week of work he became unwell, with fevers, sweats, headache, sore throat cough, lethargy and some confusion. Despite requests by friends he was reluctant to seek medical attention as he became progressively more sick over at least a week. He eventually received amoxicillin/clavulanate from a local

medical practitioner, but developed diarrhoea and was admitted to Royal Darwin Hospital.

On admission he was febrile, with rigors and no evident focus of infection. A diagnosis of septicaemia was made and he was commenced on ceftriaxone and gentamicin.

Over the next day he became increasingly confused and his fever persisted. He became hypotensive, hypoxaemic and oliguric and was transferred to the intensive care unit. At that stage his work history was ascertained from relatives and a six millimetre sore with a necrotic dark centre was noted on his upper right buttock. He was commenced on intravenous doxycycline to cover scrub typhus. His condition continued to deteriorate with hypotension, renal failure and adult respiratory distress syndrome. He developed mucosal and gastrointestinal bleeding and died six and a half days after admission. Paired serology results confirmed the diagnosis of scrub typhus (Table) and no other pathogens were identified.

Discussion

Before the cases from Litchfield Park, it was generally considered that scrub typhus in Australia did not extend west of north-east Queensland. A mammal trapping survey in December 1990 in areas of Litchfield Park visited by

Table. *Rickettsia* serology by immunofluorescence¹

	Test	Test 1	Test 2 (1 week later)
<i>R. australis</i> (spotted fever group)	Total titre	< 64	< 64
	IgM	Not detected	Not detected
<i>R. tsutsugamushi</i> (scrub typhus group)	Total titre	512	> 2048
	IgM	Equivocal	Detected

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the last two cases showed a high prevalence of the Australian vector mite *Leptotrombidium deliense* infesting three native rat species⁴. Previously this mite had not been found in the Northern Territory. In July 1993 a case of scrub typhus occurred in a man who travelled through remote rainforest pockets of the West Kimberley region of Western Australia⁵.

Scrub typhus virulence varies between strains of *R. tsutsugamushi*. Two of the earlier cases from Litchfield Park were critically ill, suggesting a virulent organism². All eight cases have had a primary eschar, corresponding to the site of mite attachment. The mites are under 0.4 millimetres in length, so are not usually seen. The eschars, as in this case, were not always initially distinctive. Sizes were 4-8 millimetres and locations were the genitals, buttocks or lower abdomen. The Kimberley case had an axillary eschar⁵. Incubation period has been 7-14 days.

Scrub typhus is an acute febrile illness with headache, profuse sweating, lethargy and sometimes myalgia, encephalopathy, conjunctival injection, lymphadenopathy, splenomegaly and a delayed maculopapular rash (usually truncal)^{1,2,5,6}. Cough and chest X-ray infiltrates are common. White cell count may be normal, but thrombocytopenia and abnormal liver function tests are common. Diagnosis is made by paired serology showing a rise in specific antibodies to *R. tsutsugamushi*. The traditional Weil-Felix agglutination test (looking for antibodies to *Proteus* OX-K for scrub typhus) may not be as sensitive or specific. The treatment of choice is doxycycline. Mortality is higher in older patients, those with underlying chronic illness and with delays in treatment. Death can be due to heart failure, circulatory collapse, pneumonia, bleeding or (as in the case reported here) multiorgan failure. Without treatment, virulent strains may have a mortality rate as high as 60%⁶, although generally it is much lower.

The geographic distribution of scrub typhus is usually patchy; in north Queensland most of the circumscribed foci ('mite islands') have been humid rainforest areas with annual rainfall exceeding 1,500 millimetres⁷. The Litchfield Park and Kimberley cases conform with this pattern. This is in contrast to the scrub typhus foci in Asia of mixed vegetation in a previously cleared area, and to the association of scrub typhus in Papua New Guinea with kunai grass and with overgrown abandoned gardens. Of interest, in Queensland, virgin rainforest used to be called 'scrub'⁷. All the Litchfield Park cases have occurred in the

dry season, when tourist numbers are greatest. In contrast, in Asia there is often a monsoonal relationship with scrub typhus⁷.

It is possible that *R. tsutsugamushi* and its vector mite, *L. deliense*, have been infesting native mammals in the Litchfield rainforest for millennia. There may well be other circumscribed foci of vectors, rodents and rickettsiae in discrete rainforest habitats of northern Australia where humans have so far rarely visited.

Our investigations suggest multiple locations within Litchfield Park are infecting sites for scrub typhus. With around 250,000 visitors to Litchfield Park annually, the risk of scrub typhus is evidently low. Sitting or lying on the ground without a groundsheet or mat in grassy areas near creeks, especially away from the established day use areas at public amenities locations, is a likely scenario for inoculation. DEET-containing insect repellents will help reduce contact with the mite vectors and permethrin impregnated clothing is recommended for those working in areas of scrub typhus transmission.

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