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Scrub typhus $\frac{3}{4}$ Palau

Since October 2001, 15 patients (11 males and 4 females) from the outer (southwest) islands of Palau have been taken to the Belau National Hospital for treatment of a distinctive febrile illness. All patients had prolonged fever (averaging 12 days), abdominal pain and/or vomiting.

The mean age of cases is 15 years (range 3–58). There has been no clear seasonal pattern. On two occasions siblings residing together got ill at the same time. Three patients had diarrhoea. A rash on the trunk and upper limbs, lasting one to two days, was noted in 40% of cases, though none had a rash by the time they were examined at the national hospital. Mild elevations in liver function tests were also noted in 40 per cent. Proteinuria occurred in three patients. None had anaemia. White blood cell and platelet counts were normal in all patients except in one with a white cell count of 24,000/microlitre. Most (80%) had headache and two had meningeal signs and cerebrospinal fluid pleocytosis. Cases appeared not to respond to antibiotics administered in the field (including ampicillin, cephalosporins, metronidazole and gentamycin). Two patients had abdominal pain that prompted laparotomy, with post-surgical diagnoses given of “mild appendicitis” in one and “ileitis” for the other.

All but one of the 15 patients came from a single island that has only 40 inhabitants. Evacuations over the 300 miles between the Southwest Islands and the national hospital by boat are expensive and take several days to accomplish. Four of the Southwest Islands of Palau are inhabited. They are low limestone islands without central lagoons. Phosphate mining in the early 20th century has left numerous brackish ponds which breed mosquitoes on the island from which most cases have come. Numerous bird species inhabit the islands. Mammals are limited to humans, fruit bats, rats and cats. Drinking water is collected in rain catchment tanks. Small garden plots and local seafood supplies most of the diet. Each island has a dispensary with basic medications. Sometimes there is a resident dispensary nurse. The islands receive periodic visits from small fishing vessels from Indonesia.

Standard cultures, and dipstick serology tests (including those for dengue, leptospirosis and hepatitis) available at the national hospital failed to reveal the cause of the illness, though all patients had received antibiotics before cultures could be taken. An investigation was launched in December of 2002. A case was defined as a resident or recent visitor to the Southwest Islands with fever of 100.4°F or higher lasting more than 4 days and abdominal pain or vomiting.

With the assistance of the Centers for Disease Control and Prevention (CDC), serological testing was arranged for specimens collected from four patients. Testing was negative or indeterminate for typhoid fever (by Typhidot IgG and IgM and Tubex). The sera of the four patients tested positive to antibodies IgG and IgM for *Orientia tsutsugamushi* (the agent of scrub typhus) when assayed using the immune fluorescent antibody. Only a single serum specimen was available for two patients, at 10 and 36 days into their illness, respectively. IgG titres for these two patients were 2048 and 32,768 with IgM titres of 16,384 and 2048. One patient with paired sera had acute and convalescent titres of 65,535–65,535 for IgG and 1024–2048 for IgM. Another patient with paired sera had acute and convalescent titers of 262,144–262,144 for IgG

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and 4096–1024 for IgM. In the context of the patients' clinical presentations, results were considered to be suggestive of scrub typhus for the non-paired specimens, probable for the third patient and conclusive for the last patient.

Scrub typhus has not been reported previously in Micronesia. It is known to be endemic in much of Indonesia, the Philippines and mainland Southeast Asia¹²³⁴. It has also been reported in the Solomon Islands. *Orientia tsutsugamushi* is a rickettsial disease for which rats (and perhaps other mammals) are the reservoir and the biting larval trombiculid mite is the vector. Abdominal distress is often a prominent feature, as it has been in our cases. Unusually, none of our patients was found to have an eschar (which is usually seen at the site of inoculation, Figure 1), including the two cases that were examined after we became aware of the presence of the disease in the Southwest Islands. The high attack rate (33% of the population of one island has had the syndrome, though not all have been confirmed as scrub typhus) and the occurrence of all but one case in children and young adults are other remarkable features of this outbreak. Vector and sero-surveys are ongoing in the Southwest Islands as well as in Koror, the capital city, to better define the distribution and dynamics of the outbreak.

After recognition of this cluster of scrub typhus cases, a campaign to educate the local community about the disease has been launched, both in the Southwest Islands and in the hamlet in the capital where Southwest Islanders commonly reside. Rat control, the use of clothing and repellants and the elimination of brush near households to decrease contact with biting mites are being stressed. The public and health care workers are also being taught the importance of early recognition and treatment (with doxycycline, chloramphenicol or azithromycin) of possible cases.

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¹ Rapmund, G. 1984. Rickettsial diseases of the Far East: new perspectives. *Journal of Infectious Diseases* Mar.149(3):330–338.

² 1973. Some epidemiological considerations of scrub typhus (*Rickettsia tsutsugamushi*) in a natural focus in the Zambales Mountains, Luzon, Republic of the Philippines. *American Journal of Tropical Medicine and Hygiene* Jul.;22(4):503–508.

³ Takada, N., Khamboonruang, C., Yamaguchi, T., Thitasut, P., Vajrasthira, S. 1984 Scrub typhus and chiggers in northern Thailand. *Southeast Asian Journal of Tropical Medicine and Public Health* Sep.:15(3):402–406.

⁴ Rodhain, F. 2000. The state of vector-borne diseases in Indonesia. *Bulletin de la Société de Pathologie Exotique* Jan.;93(5):348–352.

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Figure 1: Typical appearance of an eschar in scrub typhus



(from Faa, A.G., McBride, W.J.H., Garstone, G., Thompson, R.E. and Holt, P. 2003. Scrub typhus in the Torres Strait Islands of North Queensland, Australia. *Emerging Infectious Diseases* [serial online] 2003 Apr [date cited]. Available from: URL: <http://www.cdc.gov/ncidod/EID/vol9no4/02-0509.htm>) This finding was not seen in the reported cases in Palau.