

ISG is effective in preventing infection among contacts of hepatitis A cases⁷, however, because protection is brief, ISG is not a practical means of preventing infection in populations where HAV is highly endemic. ISG was used in the two villages to bring the outbreak under control and re-establish calm. In the absence of a vaccine which confers long-term immunity, the control of hepatitis A in these villages, as in the rest of Taiwan, depends on improving basic sanitation and hygiene.

References

- 1 Chen DS, Sung JL, Lai MY, et al. An outbreak of hepatitis A in junior college students verified by IgM hepatitis A antibody testing. *J Formosan Med Assoc* 1983;82:1018-27.
- 2 Hsu HM, Lin SR, Hsu ST, et al. An outbreak of hepatitis A in Lin-Ko, Taipei County in 1982. *J Formosan Med Assoc* 1984;83:1222-31.
- 3 Hadler SC, Erben JJ, Francis DP, et al. Risk factors for hepatitis A in day-care centers. *J Inf Dis* 1982;145:255-61.
- 4 Hsu HY, Chang MH, Chen DS. Changing epidemiology of hepatitis A virus infection in Taiwan - a study in children in Taipei, 1984. *J Med Virology* (in press).
- 5 Hwang LY, Beasley RP, Yang CS, et al. Incidence of hepatitis A virus infection in children in Taipei. *Intervirology* 1983;20:149-54.
- 6 Dienstag JL, Szmuness W, Stevens CE, Purcell RH. Hepatitis A virus infection: new insights from seroepidemiologic studies. *J Inf Dis* 1978;137:328-40.
- 7 ACIP. Immune globulins for protection against viral hepatitis. *MMWR* 1981;30:423-8, 433-5.

Scrub Typhus - Lan-Yu Island

In June and July 1985, two cases of scrub typhus were reported among travelers to Lan-Yu (Orchid) Island located 60 kilometers off the southeastern coast of Taiwan.

Case 1: A 24-year-old Taipei City woman worked in Lan-Yu Island from September 1, 1984 to June 4, 1985. Several days before leaving Lan-Yu, she took a tour of the island during which she received many insect bites. On June 15, she developed fever (40.0°C), chills, severe headache, sore throat, myalgias, lymphadenopathy, rash, and a non-productive cough. She was treated by a physician for a common cold. Her symptoms persisted, and on June 19 she was admitted to Tri-Service General Hospital where, in addition to the above findings, a brown eschar was noted on her left ankle. A complete blood count, chemistries, urinalysis, and chest x-ray on admission were normal except for elevation of liver enzymes (SGOT 184 units/l, SGPT 214 units/l, and alkaline phosphatase 123 units/l). Because the patient had recently lived in an endemic area, a diagnosis of scrub typhus was suspected. Therapy with oral tetracycline was begun on June 21, and she recovered within 5 days. Acute and convalescent sera showed a ≥ 4 -fold rise in both Weil-Felix OXK titres and indirect immunofluorescent antibody (IFA) titres against Karp and Gilliam prototype strains of *Rickettsia tsutsugamushi*.

Case 2: A 25-year-old Taipei City woman vacationed on Lan-Yu Island from July 2-8. She traveled throughout the island and hiked in areas with tall grasses. On July 15 she became ill with fever (40.3°C), chills, headache, myalgias, eye pain, conjunctivitis, lymphadenopathy, skin rash, and a non-productive cough. She also noticed a black eschar on her left flank. During the following week she was seen by six physicians and treated for a common cold, German measles, and tuberculosis. On July 21, she was admitted to Veterans' General Hospital with a diagnosis of fever of undetermined origin. While un-

dergoing diagnostic tests, her symptoms subsided without specific therapy. On July 24, she was discharged on oral tetracycline pending diagnostic tests for scrub typhus. Serum specimens drawn on July 27 and August 7 showed Weil-Felix OXK titres of 1:640 and IFA titres of $\geq 1:5120$ against Karp and $\geq 1:1280$ against Gilliam and Kato strains of scrub typhus.

Reported by Tri-Service General Hospital, Veterans' General Hospital, Taiwan Provincial Institute of Infectious Diseases; Bureau of Disease Control, Department of Health, the Executive Yuan.

Editorial Note: Scrub typhus, or tsutsugamushi disease, is indigenous in central, eastern, and southeastern Asia. It is caused by *Rickettsia tsutsugamushi* (or *R. orientalis*) which is transmitted to humans by the bite of larval mites of the *Leptotrombidium* genus (most commonly, *L. deliensis* in Taiwan and its surrounding islands). The mites parasitize several species of rodents and birds found in grassy vegetation.

The two cases reported in this article had classical features of scrub typhus. The patient usually does not notice the bite of an infected mite. The incubation period is usually 10 to 12 days. Initial symptoms include severe headache, fever, chills, conjunctivitis, anorexia, and painful lymphadenopathy. A 2-4 mm, dark, firmly adherent eschar forms around the initial site of the bite. Eschars are frequently overlooked except on careful physical examination. A maculopapular rash appears on the trunk and extremities after 6 or 7 days. Without treatment, the fever lasts for about two weeks. Complications in severe cases include melena, coma, pneumonia, cardiac and renal failure. The diagnosis is confirmed by inoculating mice with the patient's blood and isolating the rickettsia organisms. The most commonly used serologic tests are the Weil-Felix agglutination of Proteus OXK strain and IFA test. Both tests have low sensitivity, however, the probability of a correct diagnosis in a patient with both an OXK titre of $\geq 1:320$ and an IFA titre of $\geq 1:400$ is 96%. The treatment of choice is tetracycline; response to therapy is prompt, usually within 24-48 hours.

The disease has been extensively studied on the Penghu (Pescadores) Islands of Taiwan^{2,4} where it is endemic, occurring from May through October. The severity of infection is dependent on the infective dose of rickettsia organisms and host immunity from previous infection. Among rural inhabitants of the Pescadores 30 years of age and older, the prevalence of antibody against *R. tsutsugamushi* is $>50\%$ ⁴. Immunity can last for up to several years for homologous strains but usually lasts only several months for heterologous strains.

Although scrub typhus is a reportable disease in Taiwan, there is significant underreporting. Between 1955 and 1983 only 71 cases were reported for the entire Taiwan Area⁵. However, military physicians stationed in Penghu estimate a much greater annual incidence. In one study among military personnel the annual incidence was 1%⁶. Mortality rates as high as 10% were reported before treatment was available⁷, however, with adequate treatment mortality is $<1\%$.

More than 200,000 tourists visit Penghu and Lan-Yu islands each year⁸. Tourists should prevent contact with mites by using insect repellants and impregnating clothing and blankets with miticidal chemicals. Mites may be eliminated from camp sites and other areas by using insecticides and reducing the rodent population.

Physicians throughout the Taiwan Area should be aware of scrub typhus and elicit appropriate travel histories from patients presenting with fever. Free serological testing to confirm the diagnosis is available from the Taiwan Provincial Institute of Infectious Dis-

eases (TPIID). Two serum samples (2-3 ml each) drawn at least 7 days apart should be sent along with a brief clinical history to the Bacterial Section of the TPIID, or contact (TEL:02-785-6229) for more information.

References

1. Brown GW, Shirai A, Rogers C, Groves MG. Diagnostic criteria for scrub typhus: probability values for immunofluorescent antibody and Proteus OXK agglutinin titers. *Am J Trop Med Hyg* 1983;32:1101-7.
2. Santana FJ, Lien JC, Van Peenen PFD, See R. Annotated bibliography of scrub typhus in Taiwan and the Pescadore Islands (1911-1975). Taipei, Taiwan, R O C : U.S. Naval Research Unit No. 2, 1976.
3. Fang RY, Lin WP, Chao PS, Kuo NT, Chen CM. Clinical observations of scrub typhus on Penghu (The Pescadore Islands) *Trop Geogr Med* 1975;27:143-50.
4. Olson JG, Bourgeois AL. Changing risk of scrub typhus in relation to socioeconomic development in the Pescadore Islands of Taiwan. *Amer J Epidemiol* 1979;109:236-43.
5. Department of Health. Health statistics (1): General health statistics. Republic of China, 1983.
6. Olson JG, Bourgeois AL. *Rickettsia tsutsugamushi* infection and scrub typhus incidence among Chinese military personnel in the Pescadore Islands. *Amer J Epidemiol* 1977;106:172-5.
7. Morishita K. The distribution and prevalence of tsutsugamushi disease in Formosa. *Contributions from the Department of Hygiene, Government Research Institute, Formosa*, No. 216, 1934.
8. Ministry of Communication. Report on tourism statistics, 1984. Tourism Bureau, Ministry of Communication, Republic of China, 1984.

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