Acute Hearing Loss Due to Scrub Typhus: A Forgotten Complication of a Reemerging Disease

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Received 19 July 2005; accepted 3 September 2005; electronically published 29 November 2005 by the Infectious Diseases Society of America. All rights reserved.

We describe 6 patients with hearing impairment or deafness (6 [19%] of 32 ) who were admitted to the professorial medical unit at North Colombo Teaching Hospital, Ragama, Sri Lanka, over a period of 8 months, and highlight the importance of suspecting scrub typhus in patients who present with fever and altered hearing of acute onset, a forgotten predictor of a reemerging disease.

During the most recent outbreak of scrub typhus in Sri Lanka (from November 2003 to May 2004) 32 patients were suspected of having scrub typhus; several patients who presented after 9–10 days of clinical illness exhibited pneumonitis, myocarditis, hearing impairment or deafness, and encephalitis. A delay in diagnosis was thought to have resulted in these complications. We describe 6 patients with hearing impairment or deafness (6 [19%] of 32 ) who were admitted to the professorial medical unit at North Colombo Teaching Hospital, Ragama, Sri Lanka, over a period of 8 months, and highlight the importance of suspecting scrub typhus in patients who present with fever and altered hearing of acute onset, a forgotten predictor of a reemerging disease.

Case reports. Patient 1 was a 47-year-old schoolteacher who was admitted to the hospital with a 2-week history of intermittent high fever, with a temperature that varied from 38.5°C to 41°C. She had clinical evidence of pneumonitis and myocarditis. After 2 days, she complained of hearing impairment, and she developed complete deafness during the next 24 h. Later, she became delirious and restless. She had hepatomegaly (liver palpable 3 cm below the costal margin) but had no papilledema. Extensive investigation, including MRI of the brain, revealed no apparent cause of her illness. She did not respond to empirical treatment with ceftriaxone, parenteral quinine, or acyclovir. A careful clinical examination revealed an eschar on the
right axilla, which led to the diagnosis of scrub typhus. She was treated with intravenous chloramphenicol and oral doxycycline and had a rapid and complete recovery. An indirect fluorescent antibody assay was used to test acute-phase and convalescent-phase serum samples for the presence of both IgG and IgM antibodies against *O. tsutsugamushi*. The assay was performed using the *O. tsutsugamushi* “Karp” strain as antigen, and antibodies were detected using goat antihuman γ-specific IgG or μ-specific IgM antibodies labeled with FITC (Kirkegaard & Perry Laboratories). A 4-fold rise in IgG titer between acute-phase and convalescent-phase serum samples was detected, which confirmed the clinical diagnosis of scrub typhus. There was complete recovery of hearing, confirmed by audiometry, in 6 months.

Patients 2–5 were women aged 57–58 years who presented with clinical illnesses similar to that of patient 1 but without features of myocarditis or encephalitis. They presented on days 12–15 of their illness. At the time of admission to the hospital, all had variable hearing impairment, ranging from tinnitus to reduced hearing. Because of our recent experience, we examined the 4 patients carefully for eschars, which we detected under the left breast, in the right groin area, on the left buttock, and on the left axilla, respectively. The patients responded rapidly to treatment with oral tetracycline. Indirect fluorescent antibody assay results revealed that 2 of these patients had >4-fold increase in IgG titer against *O. tsutsugamushi* between acute-phase and convalescent-phase serum samples and that 2 patients had high IgM titers in the acute-phase samples (convalescent-phase serum samples were not available); these findings were consistent with the diagnosis of scrub typhus. Objective hearing improvement was noted in 2 weeks to 3 months.

Patient 6 was a 52-year-old mother of 5 children who was transferred from a district hospital in the northwestern region of the country with a 14-day history of high fever and confusion. Her fever pattern was similar to the previously-discussed patients. On admission, she was confused and had hearing loss. She had abnormal movement in all 4 limbs, and her eyes rapidly oscillated in all directions. She also had clinical evidence of pneumonitis and myocarditis. This patient had been treated with intravenous quinine, intravenous ceftrioxone, and intravenous acyclovir. We entertained a diagnosis of scrub typhus because of our recent experience with febrile patients who had hearing impairment. Although we could not locate an eschar on this patient, we administered chloramphenicol and tetracycline in addition to the previously-mentioned drugs. This patient did not show any improvement, and she died within 48 h of admission. On inquiry from the hospital from which she was transferred, we learned that she had complained of tinnitus on about day 9 of her illness, prior to starting treatment with intravenous quinine, and she had developed impaired hearing 2 days later. A serum sample collected at the time of admission to our hospital revealed a high titer of IgM against *O. tsutsugamushi* (table 1), a finding consistent with the clinical diagnosis of scrub typhus infection.

**Discussion.** In Sri Lanka, we consider scrub typhus in the differential diagnosis of patients admitted with pyrexia of unknown origin. However, in patients with clinical features suggestive of multiorgan involvement following an acute febrile illness, the differential diagnoses typically include diseases such as leptospirosis, atypical pneumonia, falciparum malaria, and typhoid. If there is no improvement with treatment, the cases are investigated to exclude the diagnoses of connective tissue disorders and infections such as miliary tuberculosis. We sometimes commence empirical treatment for these illnesses, pending investigation results, if the patient presents with severe illness. Although such an approach may not be acceptable in developed countries, lack of facilities for confirmatory investigations and/or the deterioration of the patient’s condition compel us to employ this type of patient management.

With regard to the patients described here, when the patients’ initial presentations were considered, it could be argued that if the eschars had been detected at the beginning of the illness,
many or all the complications could have been prevented. However, it should be noted that the early stages of eschars frequently go unnoticed in dark-skinned people. Furthermore, the patients are usually unaware of the bite, the eschar is painless and does not itch, and the bite may be in a location that is difficult to examine, such as the groin [11]. The eschar is not easily detectable until the scab falls off, after 10–12 days, leaving a crater with a yellow base. Moreover, the eschar may mimic another wound, or it may be very small.

The other problem with rickettsial diseases is that there is no readily available test that confirms the diagnosis at an early stage of the disease. The Weil-Felix test, which was previously used for diagnosis, is nonspecific and has a low sensitivity. It is no longer recommended for the diagnosis of rickettsial infections [12]. The more appropriate tests, such as indirect fluorescent antibody assay, use antigen from in vitro cultivation of rickettsial agents, and are available only at reference centers. The only other clue to clinical diagnosis is the rapid clinical improvement of a patient who receives appropriate treatment [7]; this is retrospective and nonspecific.

Therefore, we stress the importance of suspecting rickettsial infections in patients who present with pyrexia of unknown origin, especially with complications that were previously documented in the literature. We believe that, if the relationship between scrub typhus and hearing impairment had been considered, we could have prevented the costs incurred in the investigations and treatment in patient 1 and the death of patient 6.

Acknowledgments

We thank Mr. M.Y.D. Dayanath, Mr. K.B.A.T. Bandara, and Mr. S. Abey-sundara of the Department of Parasitology, Faculty of Medicine, University of Kelaniya, Sri Lanka; Mr. Janaka Munasinghe and Ms. Pushpa Fernando at SriLankan Airlines; and Mr. Mark Simmerman and Mr. Sunmedh Amo-rasin of the Thailand Ministry of Health/Centers for Disease Control and Prevention collaborating International Emerging Infections Program center in Bangkok, Thailand, for their kind cooperation during our study.

Potential conflicts of interest. All authors: no conflicts.

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