**Serology**

1. Serological stool samples from patients with suspected typhus were available for patients with scrub typhus (Serology) and for patients with Rickettsia typhi. Antibody positivity was determined by Microscopic Agglutination Test (MAT), and serum samples were stored at −20°C until analysis.

2. Of the 54 patients, 32 had positive serology for Rickettsia typhi, and 19 had negative serology. The positive predictive values were 60% and 82% for Rickettsia typhi and scrub typhus, respectively.

3. Of the patients with positive serology for Rickettsia typhi, 30% had positive serology for scrub typhus. The positive predictive value was 30% for scrub typhus.

4. The patients with positive serology for scrub typhus were treated with doxycycline, and the patients with positive serology for Rickettsia typhi were treated with penicillins or ceftriaxone.

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Introduction

Among several emerging infections, leptospirosis is a disease that may present as an imported infection. In an imported infection, patients may present with fever, arthralgia, headache, and myalgia. However, leptospirosis may present with a more severe form of disease, known as Weil's disease, which can cause gastrointestinal symptoms, pulmonary symptoms, and renal involvement. Leptospirosis is caused by Leptospira spp., a Gram-negative, motile, small stick-shaped bacteria. It is transmitted to humans through contact with infected animal urine, primarily from dogs, pigs, and cattle. There are more than 200 serovars of Leptospira, of which Leptospira interrogans is the most common cause of human leptospirosis. Serological diagnosis of leptospirosis can be performed using various methods, including the Scrub Typhus Serology, the HemoCulture assay, and the Paracheck Serology assay. The Scrub Typhus Serology assay uses an IgM antibody capture technique to detect IgM antibodies against Leptospira spp. The HemoCulture assay is a method that uses blood cultures to detect Leptospira spp. colonies, and the Paracheck Serology assay is a rapid test that uses a latex agglutination technique to detect IgM antibodies against Leptospira spp.

Case Presentation

A 59-year-old male patient presented with complaints of fever, headache, and myalgia. He had a history of travel to a tropical country 2 weeks prior to presentation. On physical examination, the patient had a temperature of 39°C, tachycardia, and bilateral conjunctival injection. Laboratory investigations revealed a white blood cell count of 4.85 x 10^3/uL, neutrophil count of 83.3%, lymphocyte count of 11.8%, platelet count of 67 x 10^3/uL, hematocrit of 37.8%, and glucose level of 130 mg/dL. The patient was diagnosed with leptospirosis based on the results of the serological tests. The patient was treated with a loading dose of doxycycline 200 mg and then continued with 100 mg daily for 7 days. The patient made a full recovery after 10 days of treatment.
Doxycycline 6 doses, intravenous antibiotics, and a chest X-ray showing bilateral broncho-pneumonia. Heart ultrasound: pericardial effusion ~ 3 mm with good heart function (VGFE ~ 80%).
Scrub typhus is a disease caused by Orientia tsutsugamushi. The infection is transmitted to humans through the bite of infected ticks. Scrub typhus is characterized by fever, headache, and rash. The disease is often confused with other febrile illnesses, such as leptospirosis and rickettsial diseases.

The diagnosis of scrub typhus is based on clinical presentation and serological tests. The Weil-Felix test is a commonly used test for detecting antibodies against O. tsutsugamushi. The diagnosis is confirmed by detecting IgM antibodies in the serum of the patient. Sensitivity and specificity of the test are important for accurate diagnosis.

Treatment of scrub typhus involves the use of antibiotics, such as doxycycline. Early treatment is crucial for preventing complications. In severe cases, hospitalization may be necessary.

Preventing scrub typhus involves avoiding tick bites and reducing the tick population. The use of insect repellents and wearing protective clothing can help prevent tick bites. Education about tick-borne diseases is also important for preventing the disease.
Microscopic agglutination test (MAT) (Microscopic agglutination test (MAT)) will be performed on the fourth day of fever. The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)). The high titer microbial agglutination test (Convalescence) is consistent with leptospirosis and is sensitive to specific leptospira species (Leptospira spp. (Newton, 2010)).
Serological Diagnosis for Infectious Diseases: Not As Easy as It Appears!

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Abstract

Serological diagnoses for infectious diseases such as those based on disease-specific IgM antibody detection often confuse clinicians and therefore make treatment decisions difficult. This is due to the relatively long persistence of IgM in the blood circulation following exposure to the organism or nonspecific polyclonal activation of memory cells. We report a Lao patient diagnosed as having scrub typhus on admission based on detection of IgM to Orientia tsutsugamushi and initially treated with Doxycycline. The patient became afebrile but had severe pulmonary involvement. The blood culture was subsequently positive for Leptospira spp. which is the cause of leptospirosis. The admission blood sample of the patient was negative for Orientia tsutsugamushi, Rickettsia typhi, and Rickettsia spp. DNA targets, by PCR, suggesting that the patient did not have scrub typhus, murine typhus or Spotted Fever. After one week of IV ceftriaxone treatment, the patient improved and was discharged well.

The positive IgM to scrub typhus detected on admission was probably due to previous exposure to O. tsutsugamushi, and scrub typhus was not the cause of her presenting illness. Fortunately, Doxycycline, given to the patient for scrub typhus treatment, is also effective for leptospirosis preventing death. However, the patient required intravenous ceftriaxone (which would not have been effective for scrub typhus) when she developed severe disease. This patient’s illness is a reminder that clinicians should be cautious about serological diagnosis. At present, laboratory diagnosis of leptospirosis remains a big challenge for the clinicians because the existing gold standard test such as Microscopic Agglutination Test (MAT) and culture are labour intensive, expensive and seldom available. Until the development of the simple, rapid, and more reliable tests, the empirical treatment of patients with suspected leptospirosis with doxycycline, penicillins or ceftriaxone are strategies to reduce severe complications and death although it should be born in mind that penicillins and ceftriaxone will not be effective against rickettsial organisms.

Keywords: Serological diagnosis, scrub typhus, leptospirosis, Laos.

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