

Scrub Typhus Pericarditis: A Case Report

Wisit Chanprasertpinyo, M.D., Jaruwan Diewsurin, M.D., Tomon Thongsri, M.D.

Department of Internal Medicine, Buddhachinaraj Hospital, Phitsanulok, Thailand.

ABSTRACT

Scrub typhus is a common cause of acute febrile illness in Asian countries including Thailand. It is caused by gram-negative bacteria, *Orientia tsusugamuchi*, which is transmitted by the bites of chiggers. Clinical manifestations can be various ranging from asymptomatic to multiorgan involvement. Cardiac involvements such as pericarditis and myocarditis are unusual manifestations that can lead to fatal complications. We reported a case of a 64-year-old woman who was diagnosed with scrub typhus pericarditis which was confirmed by indirect immunofluorescences assay (IFA) in both pericardial fluid and blood samples. Due to treatable life-threatening complication, early diagnosis and prompt investigation including proper management in scrub typhus pericarditis should be emphasized considerably. (*J Infect Dis Antimicrob Agents* 2019;36:103-7.)

CASE REPORT

A 64-year-old woman, who lived in an urban area of the north of Thailand, was admitted to Buddhachinaraj Hospital due to high grade of fever for two days. Headache and myalgia were developed on the second day of her fever. She was housewife and denied traveling to rural areas or jungles. She was previously healthy and had no known underlying disease. Physical examinations showed a body temperature of 38.3°C, blood pressure of 141/98 mmHg, a heart rate of 98/minute, and a respiratory rate of 20/minute. Other significant positive findings including eschar, lymphadenopathy, petechiae, pericardial friction rub and hepatomegaly were not detected. Pulse oximetry showed an oxygen

saturation of 100% on room air. Her complete blood count revealed thrombocytopenia (platelet 23,000/mm³) with no anemia (hemoglobin of 15 g/dL, hematocrit of 45%) and leukocytosis (white blood cell 6,910/mm³; neutrophil 90%, lymphocyte 7%, and monocyte 3%). The renal function test was normal (BUN 10 mg/dL, creatinine 0.55 mg/dL). The liver function test showed mild transaminitis (AST 62 U/L, ALT 102 U/L, ALP 51 U/L, total bilirubin 1.1 g/dL, direct bilirubin 0.3 mg/dL, albumin 3.8 g/dL, Globulin 2.9 g/dL). Hepatitis viral profiles showed negative results of hepatitis B and hepatitis C virus infection. Anti-human immunodeficiency virus was non-reactive.

Keywords: pericarditis, pericardial effusion, *Orientia tsusugamuchi*, Indirect immunofluorescences assay, echocardiography, pericardiocentesis

Corresponding author: Wisit Chanprasertpinyo, M.D., 90 Sriathamatripidok Road, Department of Internal Medicine, Buddhachinaraj Hospital, Nai Mueang, Mueang Phitsanulok, Phitsanulok 65000, Thailand.

Email: chanprasertpinyo.w@gmail.com

A chest radiography revealed cardiomegaly without infiltration of both lungs or pleural effusion. The investigations to determine a cause of fever with thrombocytopenia and cardiomegaly were carried out. Sinus rhythm at a rate of 99/minute with low QRS voltage, but no electrical alternans by a 12-lead electrocardiogram (ECG) was leading to a suspicion of tropical infection with pericardial effusion. Echocardiography was performed and showed pericardial effusion of about 2 cm in subcostal view and bright pericardium without signs of cardiac tamponade.

Her tropical infection serology from blood showed Scrub typhus IgM positive, Scrub typhus IgG negative, and Dengue NS1Antigen negative. Her diagnosis was Scrub typhus infection with pericarditis. A treatment of doxycycline (100 mg twice daily) was administrated and then the fever abruptly decreased. Doxycycline was changed to azithromycin due to side effects of severe nausea and vomiting. The appropriate antibiotic duration of 7 days was administered. The hemoculture showed no growth. Pericardiocentesis was performed for defining the cause of pericardial effusion because it is not a common complication of scrub typhus infection. The pericardial fluid was clear yellowish; RBC 0 cells/ μL , and WBC 3 cells/ μL with exudative profile, and 500 mL in amount (Figure 1). Her clinical status improved.

The laboratory investigation showed serum indirect immunofluorescences assay (IFA) IgM for scrub typhus 1:200, serum IFA IgG for scrub typhus 1:400, pericardial fluid IFA IgM for scrub typhus 1:200, pericardial fluid IFA IgG for scrub typhus 1:400, negative results for IFA both IgM and IgG for Murine typhus, and Tick typhus (*Rickettsia spotted fever*), negative results for PCR for both Murine typhus and *Rickettsia spotted fever*

groups, negative result for PCR tuberculosis, and pathological examination of pericardial fluid showed negative for malignancy.

The patient was discharged from the hospital on day 10 of admission without fever and complications. Four weeks after discharge, clinical outcome and echocardiography were followed. Pericardial effusion decreased as indicated by echocardiogram. Therefore, scrub typhus infection with scrub typhus pericarditis was confirmed.

DISCUSSION

Scrub typhus is one of the rickettsial infections caused by *Orientia tsutsugamushi*, a gram-negative intracellular bacterium. It has been increasingly recognized as a common cause of fever in Asia.^{1,2} The majority of scrub typhus cases occur in the Asia-Pacific area; especially “the Tsusugamuchi Triangle” (Asia, Australia and islands in the Indian and Pacific oceans).³ Scrub typhus patients have been reported to the Bureau of Epidemiology which data shows a high prevalence in the north region of Thailand.⁴ Clinical manifestations can range from self-limiting acute febrile illness to fatal disease. Common signs and symptoms are fever, headache, muscle pain, lymphadenopathy, and rash.⁵ An eschar, which commonly occurs at the intertriginous areas such as axilla and inguinal regions, is an useful sign to diagnose scrub typhus infection.⁶ The common cardiovascular manifestations in scrub typhus infection are tachycardia, abnormal ECG findings, atrial fibrillation, and relative bradycardia, whereas uncommon but lethal manifestations including pericardial effusion, acute myocardial infarction, myocarditis, and pericardial effusion should be considered (Table 1). In patients without eschar,



Figure 1. Yellowish pericardial fluid of our patient

Table 1. Frequencies of cardiovascular manifestation in scrub typhus infection.

	Hollander G, et al. ¹⁴ (n=78) (%)	Thipmontree W, et al. ¹⁵ (n=146) (%)	Aronoff DM, et al. ¹⁶ (n=100) (%)	Chin JY, et al. ¹⁷ (n=89) (%)	Karthik G, et al. ¹⁸ (n=81) (%)	Case reports ^{12,19,20}
ECG changes	73	49.4	-	-	-	-
Sinus tachycardia	46.1	21.5	-	-	46.9	-
Relative bradycardia	-	-	57	-	-	-
Atrial fibrillation	-	-	-	23	3	-
Myocardial infarction	-	-	-	-	-	2
Myocarditis	-	-	-	14	12.3	-
Pericardial effusion (Not performed pericardiocentesis)	-	-	-	20	51	-
Pericarditis	-	-	-	-	-	1

a history of living in an endemic area is a crucial clue for diagnosis.⁷ Similar to our patient, a history of fever and living in northern Thailand is a clinical clue to suspect scrub typhus infection.

Common laboratory findings in scrub typhus are leukocytosis, thrombocytopenia, and elevation of aspartate transaminase.^{8,9} Rare complications caused by disseminated vasculitis such as pneumonitis, myocarditis, and pericarditis can occur in some patients, especially in untreated

patients.¹⁰⁻¹² Laboratory confirmation of scrub typhus is serologic testing with the IFA as a diagnostic gold standard.¹³ In our case, scrub typhus pericarditis was confirmed by IFA test of both pericardial effusion and blood samples. However, rapid test and IFA test for the detection of antibody to *O. tsutsugamuchi* (scrub typhus) should be paired serum samples. The pericardial effusion profile was exudate with few white blood cells (Table 2). Therefore, other causes should

Table 2. Characteristics of pericardial effusion in scrub pericarditis.

Case reports, Year of diagnosis	Pericardial fluid profiles						
	Color	RBC (cells/ μ L)	WBC (cells/ μ L)	Cells predominate	Exudate/ Transudative	Fluid amount (mL)	Immuno- fluorescence antibody titer in pericardial effusion
Chang JH, et al. ¹² , 1998	Straw- colored	2,800	70	96% lymphocyte	Not reported	2,755	1:3,200
Our case	Yellowish	0	3	-	Exudative	500	1:200 (IFA IgM) 1:400 (IFA IgG)

be excluded; e.g. tuberculosis, malignancy especially lymphoma, and dengue fever. The diagnosis can be confirmed with the IFA in effusion.

In conclusion, scrub typhus pericarditis is a rare but serious complication of rickettsial disease. Clinical suspicion of scrub typhus pericarditis in patients, who live in endemic regions presenting with fever, thrombocytopenia, and pericardial effusion, might be life-saving. Paired serum samples for serodiagnosis (IFA) are considered as a confirming diagnostic investigation for scrub typhus infection. Recognition of atypical manifestations including early diagnosis and prompt treatment should be underlined encouragingly.

Consents: written informed consent was obtained from the patient for the publication of this case report and its accompanying images.

Conflict of Interest: no conflict of interest to declare.

Funding source: none

References

1. Paris DH, Day NPJ. Tropical rickettsial infections.

In: Farrar J, Hotez PJ, Junghanss T, Kang G, Lalloo D, White NJ, editors. Manson's tropical infectious diseases. 23rd ed. Philadelphia: Elsevier Saunders; 2014.p. 273-91.e275.

2. Taylor AJ, Paris DH, Newton PN. A systematic review of mortality from untreated scrub typhus (*Orientia tsutsugamushi*). PLoS Negl Trop Dis 2015;9:e0003971.

3. Xu G, Walker DH, Jupiter D, Melby PC, Arcari CM. A review of the global epidemiology of scrub typhus. PLoS Negl Trop Dis 2017;11:e0006062.

4. Bureau of Epidemiology D, Ministry of Public Health. Scrub typhus [Internet]. 2018 [cited 2018 Dec 30]. Available from: <http://www.boe.moph.go.th/boedb/surdata/disease.php?dcontent=situation&ds=44>.

5. Watt G, Parola P. Scrub typhus and tropical rickettsioses. Curr Opin Infect Dis 2003;16:429-36.

6. Jeong YJ, Kim S, Wook YD, Lee JW, Kim KI, Lee SH. Scrub typhus: clinical, pathologic, and imaging findings. Radiographics 2007;27:161-72.

7. Julanon N, Chularojanamontri L. Time spent in an endemic area is a crucial clue to diagnose scrub typhus without eschar. Clin Exp Dermatol

- 2019;44:331-3.
8. Tsay RW, Chang FY. Serious complications in scrub typhus. *J Microbiol Immunol Infect* 1998;31:240-4.
 9. Su TH, Liu CJ, Shu PY, Fu YH, Chang CH, Jao P, et al. Associated factors and clinical implications of serum aminotransferase elevation in scrub typhus. *J Microbiol Immunol Infect* 2016;49:941-6.
 10. Wu KM, Wu ZW, Peng GQ, Wu JL, Lee S-Y. Radiologic pulmonary findings, clinical manifestations and serious complications in scrub typhus: experiences from a teaching hospital in eastern Taiwan. *Int J Gerontol* 2009;3:223-32.
 11. Sittiwangkul R, Pongprot Y, Silvilirat S, Oberdorfer P, Jittamala P, Sirisanthana V. Acute fulminant myocarditis in scrub typhus. *Ann Trop Paediatr* 2008;28:149-54.
 12. Chang JH, Ju MS, Chang JE, Park YS, Han WS, Kim IS, et al. Pericarditis due to *Tsutsugamushi* disease. *Scand J Infect Dis* 2000;32:101-2.
 13. Blacksell SD, Bryant NJ, Paris DH, Doust JA, Sakoda Y, Day NP. Scrub typhus serologic testing with the indirect immunofluorescence method as a diagnostic gold standard: a lack of consensus leads to a lot of confusion. *Clin Infect Dis* 2007;44:391-401.
 14. Hollander G. Electrocardiographic changes in scrub typhus fever. *Am Heart J* 1946;31:481-9.
 15. Thipmontree W, Tantibhedhyangkul W, Silpasakorn S, Wongsawat E, Waywa D, Suputtamongkol Y. Scrub typhus in Northeastern Thailand: Eschar distribution, abnormal electrocardiographic findings, and predictors of fatal outcome. *Am J Trop Med Hyg* 2016;95:769-73.
 16. Aronoff DM, Watt G. Prevalence of relative bradycardia in *Orientia tsutsugamushi* infection. *Am J Trop Med Hyg* 2003;68:477-9.
 17. Chin JY, Kang KW, Moon KM, Kim J, Choi YJ. Predictors of acute myocarditis in complicated scrub typhus: an endemic province in the Republic of Korea. *Korean J Intern Med* 2018;33:323-30.
 18. Karthik G, Sudarsan TI, Peter JV, Sudarsanam T, Varghese GM, Kundavaram P, et al. Spectrum of cardiac manifestations and its relationship to outcomes in patients admitted with scrub typhus infection. *World J Crit Care Med* 2018;7:16-23.
 19. Kim DG, Kim JW, Choi YS, Kim SH, Kim SM, Park CG, et al. Acute myocardial infarction following scrub typhus infection. *Int J Cardiol* 2007;114:e18-20.
 20. Dhiman P, Sharma A, Raina R, et al. Scrub typhus presenting as acute myocardial infarction. *Online J Health Allied Sci* 2012;11:11-2.

