e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(6); 1116-1119

Original Research Article

Clinicoepidemiological Profile of a Fatal Case of Scrub Typhus: Our Experience

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Received: 25-03-2024 / Revised: 23-04-2024 / Accepted: 26-05-2024
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Conflict of interest: Nil

Abstract:

Worldwide, scrub typhus poses a threat to 1 billion people. In the absence of appropriate antibiotic treatment, clinical symptoms vary from acute undifferentiated febrile illness to multiorgan failure. The case of scrub typhus was admitted and subjected to a detailed epidemiological and clinical investigation. History of having worked in a farm and itching over the left forearm was elicited. On admission the patient had a saturation of 92 % on BIPAP ventilation. Chest examination revealed reduced breath sounds in the right lower zone. Maculopapular rash on the face, trunk and extremities, tender hepatomegaly, splenomegaly; and lymphadenopathy were observed. Investigations revealed reduced haemoglobin, deranged renal and liver function tests and compensated metabolic acidosis. Weil-Felix test for antibody against OX-K was reactive with a titre of 1:640. Scrub typhus IgM ELISA was positive with a titre of 1:160. Blood culture revealed serratia growth. Radiology chest revealed bilateral pulmonary effusion; and right middle and lower zones consolidation. Based on the clinic-epidemiological and laboratory profile a preliminary diagnosis of scrub typhus with ARDS, sepsis and multi organ dysfunction syndrome was made. She was initially given Meropenem, doxycycline and artesunate with respiratory and ionotropic support. Later tigecycline, caspofungin were added in view of serratia related gram bacteremia and she was intubated in view of poor GCS. However, unfortunately on the second day she succumbed to her illness. Final diagnosis of Scrub Typhus induced severe ARDS with severe sepsis with septic shock was given.

Keywords: Scrub Typhus, Maculopapular Fever, Rash.

Introduction

Scrub typhus caused by Orientia tsutsugamushi; and transmitted by the bite of an infected vector, Leptotrombidium deliense mite, and presents as an acute febrile illness. [1] Worldwide, scrub typhus poses a threat to 1 billion people, besides affecting 1 million people annually. [2] Its original name "Tsutsugamushi disease," was given by Hashimoto in 1810. [3]

In the absence of appropriate antibiotic treatment, clinical symptoms vary from acute undifferentiated febrile illness to multiorgan failure. High fatalityrates are notedin patients with central nervous system involvement (13.6%) and multiorgan dysfunction (24.1%). [2,4]

In this study, we present a fatal case of scrub typhus with MODS and discuss its diagnosis and treatment.

Case report

The case of scrub typhus was admitted and subjected to detailed epidemiological investigation including history regarding personal information, presenting symptoms, time of onset of symptoms, medical care provided before reporting to this hospital.

A 37 year old married woman from a rural background with no known comorbidity reported with complaints of high grade fever and headache of 10 days duration. Fever was intermittent and associated with chills and rigors. She also gave history of breathlessness of MRC Class II to Class III for 4 days which was associated with dry cough increasing with change in posture, without history of haemoptysis. She was initially managed with BIPAP ventilation at a local hospital for three days as she was detected to have low saturation of 70 %.

Further details of treatment at the local hospital were not available.

She was brought to the emergency department of our hospital which is a large tertiary care hospital in North India. There was also history of reduced urine output for 2 days prior to admission in this hospital. She denied history of alcohol and tobacco consumption. However, history of having worked in the field as part of routine agricultural activity was elicited. One week prior to the onset of symptoms, the patient had severe itching over the left forearm, which was dismissed as probably due to an insect bite. There was no history of travel to any other area outside her village in last one month.

At the time of admission to our hospital, the patient had a toxic look, and dyspnoea. She was semiconscious with a Glasgow coma scale (GCS) of 9/15, febrile (101.4^{o}F), tachycardia 110/min and her blood pressure were 100/70 mm of Hg. Tachycardia and tachypnoea were present.

She was maintaining saturation of 92 % on BIPAP ventilation. Chest examination revealed reduced breath sounds in the right lower zone, and bilateral scattered inspiratory crackles. Other relevant findings were aculopapular rash on the face, trunk and extremities, tender hepatomegaly (3 cm), splenomegaly, inguinal, cervical and axillary lymphadenopathy. Laboratory investigations revealed reduced haemoglobin, deranged renal and liver function tests and raised serum inflammatory markers. Serology for malaria, HIV 1 and 2, HBsAg, HCV, Dengue, leptospirosis and typhoid was negative. Weil-Felix agglutination test for antibody against OX-K was strongly reactive with a titre of 1:640. Scrub typhus IgM ELISA was positive with a titre of 1:160. On blood culture serratia growth, sensitive to Tigecycline was obtained. Details of laboratory investigations are tabulated in Table 1. X Ray and CT scan chest revealed bilateral pulmonary effusion, and consolidation of right middle and lower zones. Ultrasound abdomen revealed mild to moderate ascites, 2D echo revealed normal cardiac chamber with ejection fraction 50%, no pulmonary thromboembolism, clot or pulmonary arterial hypertension. ABG revealed metabolic acidosis with compensated metabolic acidosis.

Table 1: Laboratory reports of the case of scrub typhus

Investigation	Report on date of admission	Report on second day
Haematology		
Hb	**9.5 gm%**	**8.3 gm%**
RBCs	**2.94 x 10^6/mm^3**	**2.4 x 10^6/mm^3**
WBCs	**27.1 x 10^3/mm^3**	9.8 x 10^3/mm^3
DLC		
Neutrophils	**84.8%**	**85.8%**
Lymphocytes	**11.4%**	**9.2%**
Monocytes	3.8%	4.8%
Eosinophils	0.0%	0.2%
Basophils	0.0%	0.0%
Platelets	345 x 10^3/mm^3	234 x 10^3/mm^3
Neutrophils (Absolute count)	**23 x 10^3/mm^3**	**8.4 x 10^3/mm^3**
Lymphocytes (Absolute count)	3.1 x 10^3/mm^3	0.9 x 10^3/mm^3
Monocytes (Absolute count)	1 x 10^3/mm^3	0.5 x 10^3/mm^3
Eosinophils (Absolute count)	0x 10^3/mm^3	0x 10^3/mm^3
MCV	**106.4 fl**	**106.4 fl**
MCH	32.2 pg	34.7pg
MCHC	**30.3**	**32.6**
MPV	12.8 fl	11.7fl
RDW-CV	**23.1%**	**-**
PCV	**31.3**	**25.6**
Biochemistry		
Renal function tests with serum electrolytes		
Blood urea	**60 mg%**	**61 mg%**
Serum creatinine	**1.3 mg%**	**1.8 mg%**
Sodium	145 meq/L	146meq/L
Potassium	4.7 meq/L	4.1 meq/L
Liver function tests		
Serum bilirubin (total)	**1.3 mg%**	0.9 mg%
Direct bilirubin	**0.7 mg%**	0.3 mg%
SGOT/AST	**338 IU/L**	**265 IU/L**
SGPT/ALT	**131 IU/L**	**164 IU/L**

Total proteins	**5.2 gm%**	**5.1 gm%**
Albumin	**1.9 gm%**	**3.4 gm%**
Globulin	3.3 gm%	**1.7 gm%**
Serum amylase	74 IU/L	**122 IU/L**
Serum lipase	208 IU/L	**613 IU/L**
LDH	**1490 IU/L**	**1253 IU/L**
Plasma Glucose Random	62 mg%	**247 mg%**
Uric acid	-	3.2 mg%
Serology		
Viral markers		
HIV 1 & 2	Negative	-
HBsAg	Negative	-
Anti HCV	Negative	
Typhidot		
IgG	Negative	-
IgM	Negative	-
Dengue serology		
Dengue IgG	Negative	-
Dengue IgM	Negative	-
Dengue NS1Ag	Negative	-
Leptospira		
IgM	Negative	-
IgG	Negative	-
Scrub typhus		
IgM	Positive (1:160)	-
IgG	Negative	-
Weil Felix agglutination test	Positive (OX-K, 1:640)	-
Inflammatory markers		
Procalcitonin	**14.92 ng/ml**	**10.86 ng/ml**
N-terminal pro-brain natriuretic peptide (NT-proBNP2)	-	**>25000 pg/ml**

Note: Figures in bold font indicate deranged values of the respective tests.

Based on the clinicoepidemiological and laboratory profile a preliminary diagnosis of scrub typhus with ARDS, sepsis and multi organ dysfunction syndrome was made; and the case was aggressively managed accordingly. Six hours after admission, the patient developed severe dyspnea and tachypnea requiring high PEEP. She was sedated, intubated and taken up for lung protective ventilation and central vein catheterization. On the same day she developed hypotension and was started on ionotropic infusions.

Repeat X Ray chest revealed progression of bilateral pulmonary effusion. GCS had also deteriorated from 9/15 admission to 6/15. In view of severe metabolic acidosis, and high lactate prone ventilation was carried out. She was treated with iv Meropenem, cap doxycycline, iv artesunate and supportive treatment. Considering severe gram negative sepsis later tigecycline and caspofungin were added. She was treated with all best available resources. However, unfortunately on the second day after admission to this hospital she developed refractory cardiopulmonary arrest and succumbed to her illness. Post mortem was not carried out as the husband did not give consent. Final diagnosis of Scrub Typhus induced severe ARDS with severe sepsis with septic shock was given.

Discussion

Scrub typhus is prevalent in many parts of India. Nonspecific pulmonary infiltrates with lower zone predilection is also a common radiological finding. [5,6] Scrub typhus can present with varied symptoms, with its common complications including pneumonia, meningoencephalitis, acute kidney injury and acute respiratory distress syndrome. [7,8,9,10,11] Varied clinical manifestations and lack of clinical suspicion at the time of presentation hinder timely diagnosis of scrub typhus. Some manifestations are serious and potentially life threatening. Even though eschar is pathognomonic, scrub typhus cases seldom have it identified. [12] Scrub typhus should be invariably considered in the differential diagnosis of cases with fever, especially with consolidation, and deranged liver and renal profile. This is of utmost importance after the monsoon i.e. between the months of August and October. [13]

In our case, the patient had a history of insect bite, though the classical eschar was conspicuous by its

absence. Our patient neglected her symptoms in the early stages. The disease could not be diagnosed at the local hospital due to lack of diagnostic facilities.

Consequently, her condition deteriorated, she developed MODs and unfortunately she succumbed to her illness. Rodent control and habitat modification are key measures for disease control and prevention. Rodent control strategies vary from trapping, to poisoning, and use of natural predators.

Public education is a priority intervention for rodent and mite control. Modification of habitat modification including good sanitation in and around buildings, clearing vegetation around fields, and secures grain storage, can make areas less habitable for rodents.

The great clinical and public health challenge of scrub typhus lies in its difficulty in early diagnosis. Early diagnosis and management can significantly reduce the complications and fatality rate due to scrub typhus. [2]

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