CASE REPORT

An Eschar Beyond the Skin: A Case Series of Scrub Typhus Presenting with Diverse Life-Threatening Emergencies

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ABSTRACT

Background: Scrub typhus, caused by Orientia tsutsugamushi, remains an under-recognized yet highly treatable cause of acute febrile illness in endemic regions. Its protean manifestations frequently mimic life-threatening emergencies, leading to delayed diagnosis and preventable mortality.

Methods: Prospective case series of four consecutively admitted patients presenting to the Emergency Department of a tertiary care teaching hospital in South India with severe atypical presentations of scrub typhus. Diagnosis was confirmed by positive IgM ELISA. Clinical, laboratory, radiological, and outcome data were systematically analyzed.

Results: Patients (ages 52–75 years; 2 males, 2 females) presented with status epilepticus (n=1), severe ARDS with septic shock (n=1), acute surgical-mimic abdomen with hepatitis (n=1), and fulminant myocarditis with refractory ventricular tachycardia (n=1). Thrombocytopenia, transaminitis (AST predominant), acute kidney injury, hyponatremia, and metabolic acidosis were universal. Eschar was detected in 3/4 cases (Figure 1). All received early empirical doxycycline (200 mg stat followed by 100 mg BD). Three patients recovered fully with supportive care; one died from cardiac arrhythmia.

Conclusion: In endemic settings, scrub typhus should be considered early in any undifferentiated febrile illness with multiorgan dysfunction. Prompt recognition of eschar and immediate doxycycline initiation can be life-saving.

Keywords: Scrub typhus; Orientia tsutsugamushi; status epilepticus; acute respiratory distress syndrome; multiple organ dysfunction syndrome; eschar; doxycycline

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Introduction:

Scrub typhus is a vector-borne zoonotic rickettsial infection caused by the obligate intracellular Gram-negative bacterium *Orientia tsutsugamushi*. It is transmitted to humans through the bite of infected larval trombiculid mites (chiggers) of the genus *Leptotrombidium*. The disease is endemic across the "tsutsugamushi triangle," encompassing much of the Asia-Pacific region and affecting an estimated >1 billion people at risk, with approximately 1 million new cases annually [1,5].

The hallmark pathological process is endothelial cell infection leading to diffuse small-vessel vasculitis, increased vascular permeability, microvascular thrombosis, cytokine release, and capillary leak syndrome. This underlies the broad clinical spectrum—from self-limited febrile illness to fulminant multiple organ dysfunction syndrome (MODS) [6,13]. Classical features include fever, headache, myalgia, maculopapular rash, and eschar at the bite site (present in 7–46% of cases depending on geographic region and strain virulence) [17–19]. However, atypical and severe presentations—particularly in non-immune individuals or those with delayed presentation—are increasingly recognized and frequently mimic sepsis, meningoencephalitis, acute surgical abdomen, myocarditis, or ARDS [7–10,14].

Untreated mortality can exceed 30%, yet doxycycline or azithromycin produces rapid defervescence and excellent outcomes when started early [4,6]. Despite this, diagnostic delay remains common in emergency departments due to non-specific symptoms and overlap

with dengue, malaria, leptospirosis, and enteric fever.

This prospective case series describes four rare, life-threatening emergency presentations—including status epilepticus, which is exceptionally uncommon—to raise awareness among emergency physicians and reinforce the critical importance of early empirical therapy in endemic areas.

Methods:

This study was designed as a prospective observational case series conducted in the Emergency Department of a tertiary care teaching hospital in South India over a one-year period (August 2025 to February 2026). The study included patients presenting with acute febrile illness accompanied by evidence of multiorgan involvement, in whom the diagnosis of scrub typhus was confirmed by positive IgM ELISA serology. Only patients who presented directly to the emergency department or were referred within 48 hours of symptom onset were included to ensure early-phase clinical evaluation.

Patients were excluded if there was evidence of confirmed co-infection with other tropical illnesses, including dengue, malaria, leptospirosis, or enteric fever, to avoid diagnostic confounding. Additionally, cases with incomplete clinical records, missing laboratory data, or undocumented outcomes were excluded from the analysis. All eligible patients were followed through their hospital course to document clinical progression, management, and outcomes.

Data collection Standardized proforma captured demographics, comorbidities, symptom timeline, vital signs, physical findings (with particular attention to eschar search), laboratory results, imaging, treatment, complications, and hospital outcome. Ethical approval was obtained from the institutional ethics committee; informed consent was waived due to retrospective data analysis of routinely collected clinical information with strict de-identification.

Results:

Table 1. Baseline demographic and clinical characteristics

Parameter	Case 1	Case 2	Case 3	Case 4
Age / Sex	52 / Male	67 / Female	75 / Male	61 / Female
Comorbidities	Type 2 diabetes	Type 2 diabetes + HTN	None	None
Duration of fever (days)	15	6	3	6
Eschar location	Left chest	Right inframammary	Right axilla	Absent
Primary ED presentation	Status epilepticus	Severe ARDS + septic shock	Acute abdomen	Myocarditis + VT

Table 2. Key laboratory abnormalities common to all cases

Parameter	Typical finding	Notes
Platelet count	Thrombocytopenia (<150,000/mm³)	Universal
Liver function tests	Transaminitis (AST > ALT)	AST often 2–5× ULN
Renal function	Acute kidney injury (↑ creatinine)	Stage 1–3 AKI
Serum sodium	Hyponatremia (particularly severe in Case 1)	Na 112 mEq/L in Case 1
Arterial blood gas	Metabolic acidosis + elevated lactate	pH <7.30, lactate >4 mmol/L common
Inflammatory markers	Elevated CRP and procalcitonin	Consistent with systemic inflammation

Table 3. Clinical course and outcomes

Outcome	Number (%)
Complete recovery	3 (75%)
In-hospital mortality	1 (25%)
Required ICU admission	3 (75%)
Required mechanical ventilation	2 (50%)
Duration of hospital stay (median, range)	9 days (7–14)

Case 1: Status epilepticus with multiorgan involvement:

A 52-year-old male with poorly controlled type 2 diabetes presented with recurrent generalized tonic-clonic seizures and progressive decrease in responsiveness. He reported 15 days of high-grade intermittent fever and poor oral intake. On arrival GCS was E2V1M5, airway threatened with secretions, bilateral coarse crepitations, SpO_2 85% on 15 L/min oxygen, HR 104/min, BP 130/70 mmHg. Immediate rapid sequence intubation was performed.

Laboratory evaluation revealed severe hyponatremia (112 mEq/L), hypokalemia (2.4 mEq/L), metabolic acidosis (pH 7.266, lactate 4.5 mmol/L), AKI (creatinine 2.44 mg/dL), and thrombocytopenia (90,000/mm^3). Point-of-care ultrasound showed bilateral B-lines without regional wall motion abnormality (EF 60%). CT brain was normal. CT chest demonstrated extensive bilateral ground-glass opacities, fine reticular markings, and patchy consolidation consistent with interstitial pneumonitis (Figure 2). A characteristic black necrotic eschar was identified over the left chest wall during secondary survey (Figure 1).

Empirical therapy included IV levetiracetam, doxycycline 200 mg stat then 100 mg BD, broad-spectrum antibiotics, aggressive electrolyte correction, and lung-protective ventilation. Scrub typhus IgM ELISA returned positive on day 3. The patient improved steadily, was extubated on day 7, transferred to ward on day 9, and discharged on day 14 with normalizing renal function and platelets.

Case 2: Severe ARDS with septic shock:

A 67-year-old female with diabetes and hypertension presented with 6 days of fever and 2 days of rapidly progressive dyspnea. She was hypotensive (86/54 mmHg), tachycardic (118/min), and profoundly hypoxemic (SpO_2 84% room air). An eschar was noted in the right inframammary region. She required escalation from NIV to invasive mechanical ventilation for PaO_2/FiO_2 ratio <150. Chest radiograph showed bilateral diffuse alveolar infiltrates. Laboratory profile matched Table 2. Despite progression to MODS (ARDS, AKI, transaminitis, septic shock), she recovered with doxycycline, noradrenaline, renal-supportive care, and lung-protective ventilation.

Case 3: Acute abdomen mimicking surgical emergency:

A 75-year-old previously healthy male presented with 3 days of fever and 2 days of severe diffuse abdominal pain with right upper quadrant guarding. Ultrasound revealed hepatomegaly, periportal edema, and minimal ascites; CT abdomen excluded perforation or obstruction. Thrombocytopenia and rising bilirubin (peak 4.76 mg/dL) were prominent. Re-examination revealed a small painless eschar in the right axilla. Positive IgM ELISA confirmed diagnosis. Symptoms resolved within 48 hours of doxycycline; liver enzymes trended down and the patient was discharged after 7 days.

Case 4: Fulminant myocarditis with refractory ventricular tachycardia:

A 61-year-old female presented with 6 days of fever and 2 days of breathlessness. She developed hypotension, hypoxemia, and bilateral crepitations. Echocardiography demonstrated global hypokinesia suggestive of myocarditis. ARDS and AKI ensued. Despite early doxycycline and supportive care, sustained ventricular tachycardia with hemodynamic collapse developed and proved refractory to lidocaine and electrolyte optimization. The patient succumbed on day 2.

Figure 1: Eschar Lesion

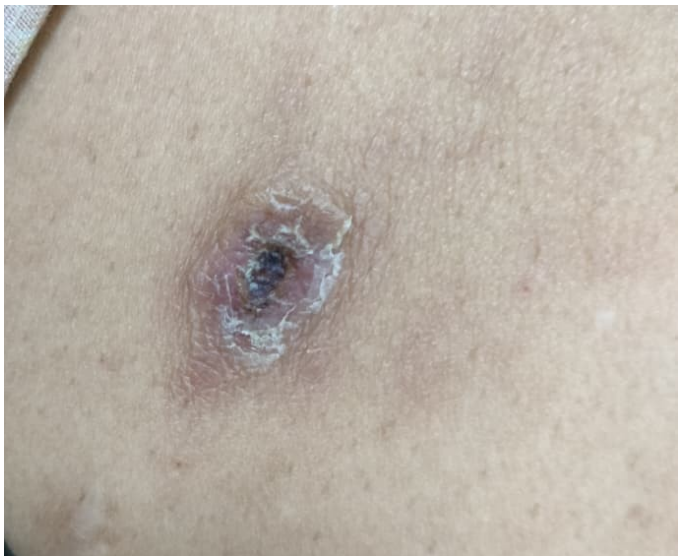


Figure 1. Representative eschar (Case 1) – classic "cigarette-burn" necrotic black crust with erythematous

halo over the left anterior chest wall.

Figure 2: CT Chest Findings

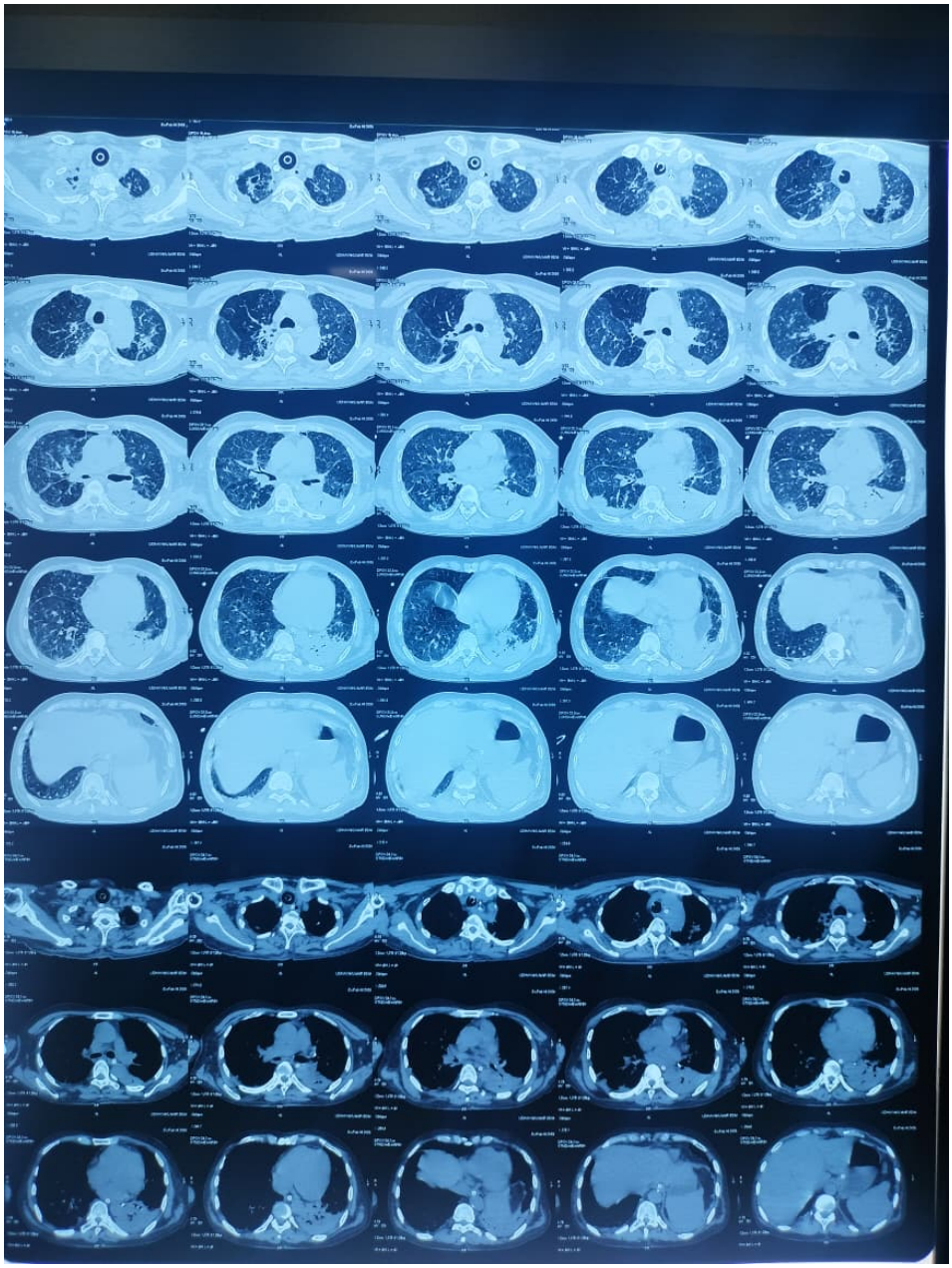


Figure 2. CT thorax (Case 1) – bilateral multifocal ground-glass opacities, fine reticular interstitial markings, and patchy areas of consolidation, consistent with scrub typhus-associated interstitial pneumonitis.

Figure 3. Schematic pathophysiology of severe scrub typhus – chigger bite → endothelial invasion → systemic vasculitis → capillary leak → cytokine storm → multiorgan dysfunction (seizures, ARDS, AKI, myocarditis).

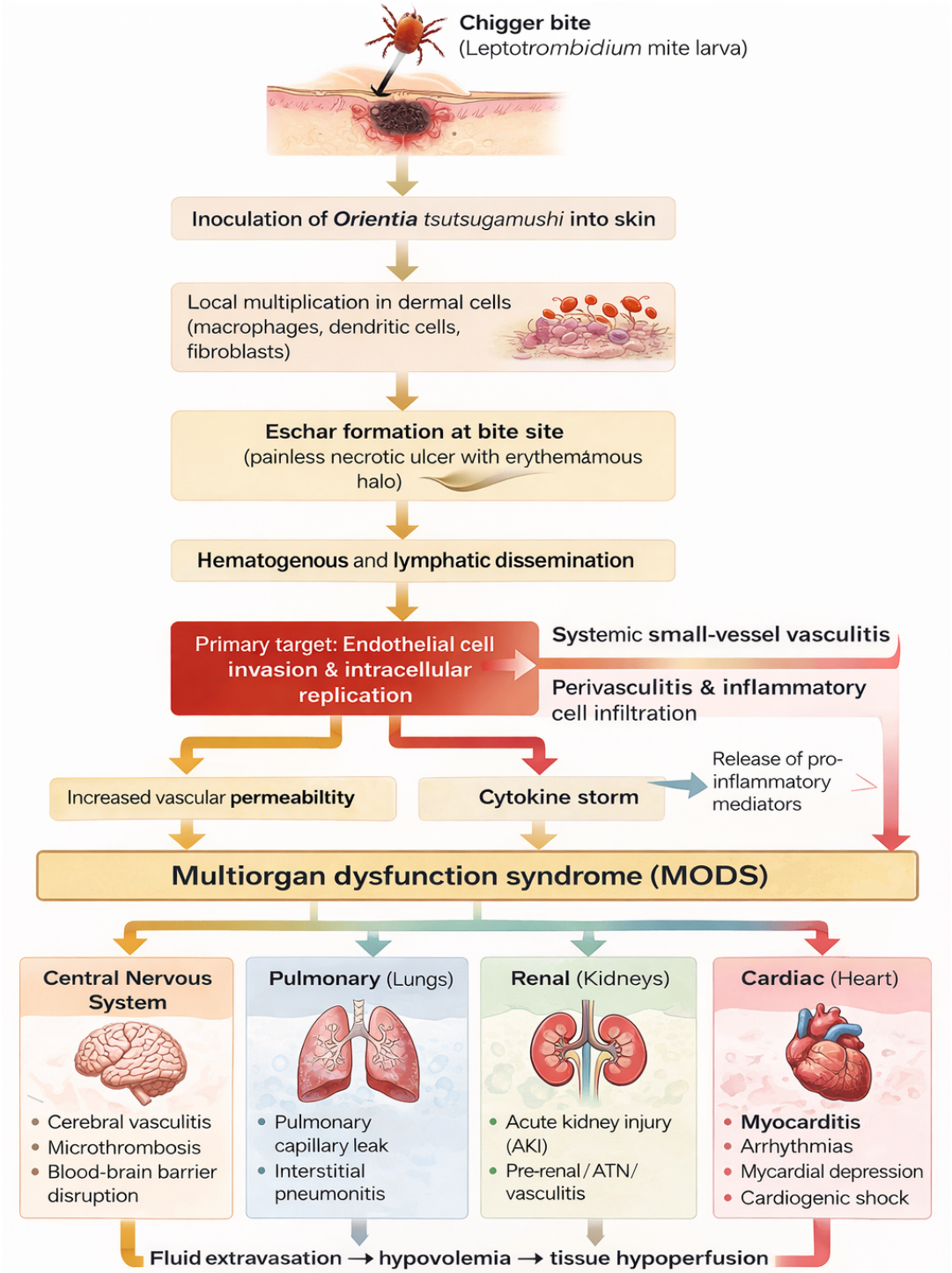
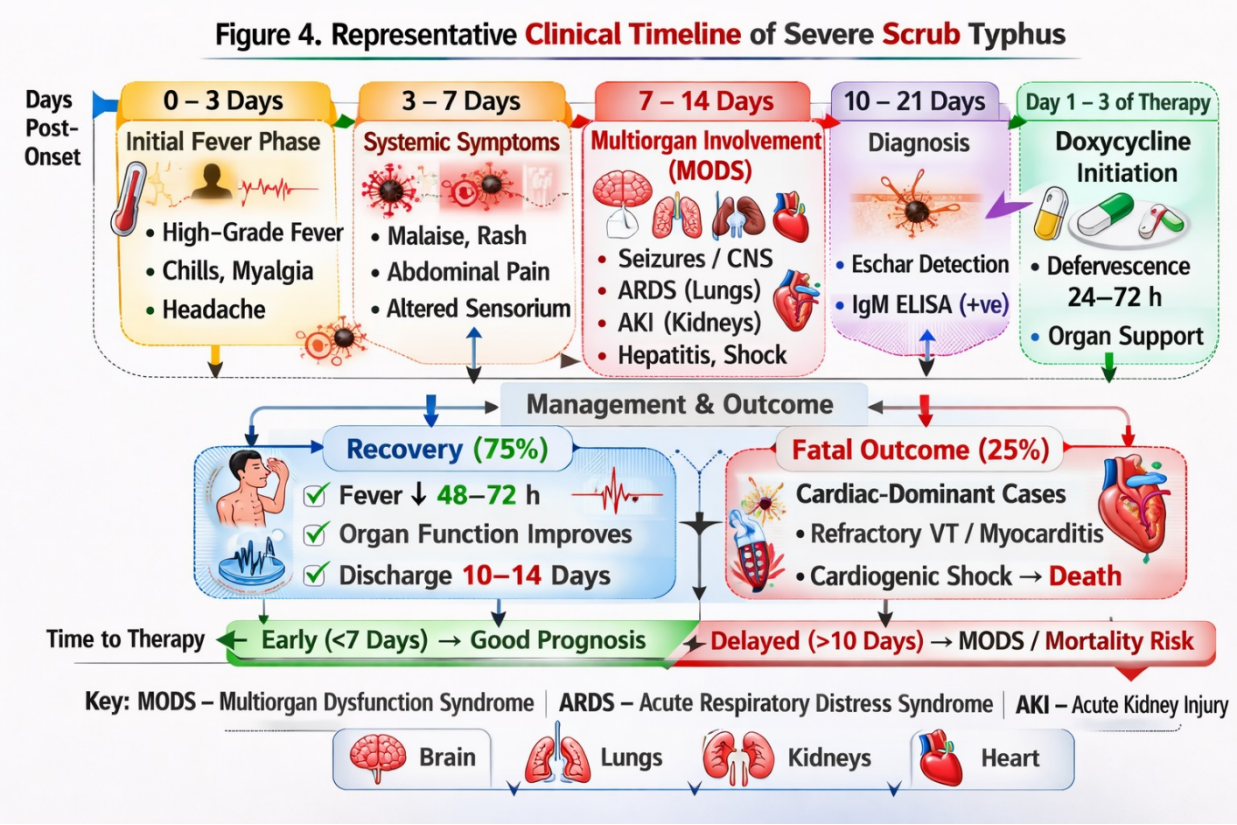


Figure 3. Schematic representation of the pathophysiology of severe scrub typhus. The disease begins with chigger bite inoculation of *Orientia tsutsugamushi*, leading to endothelial invasion as the central pathogenic event. This triggers systemic vasculitis, **capillary leak; and a cytokine storm,** culminating in **multiorgan dysfunction** syndrome (MODS). Key organ-specific manifestations include seizures/*status epilepticus*.

Figure 4. Representative clinical timeline – fever phase → multiorgan decompensation → eschar recognition + serological confirmation → doxycycline initiation → resolution (or fatal arrhythmia in cardiac-dominant cases).



Discussion:

Scrub typhus is a **protean tropical infection with a wide spectrum of clinical presentations**, ranging from mild febrile illness to rapidly progressive multiorgan dysfunction. In endemic regions, it constitutes a **key differential diagnosis in acute undifferentiated fever**, particularly in patients presenting to emergency departments with atypical or severe manifestations.

A major challenge in clinical practice is the **heterogeneity of presentation**, which often leads to misdiagnosis as more common tropical infections such as dengue, malaria, or leptospirosis [13]. The present case series highlights this variability by demonstrating four distinct and severe clinical phenotypes, reinforcing the need for a **syndromic approach to diagnosis**.

1. Febrile illness with non-specific systemic features

The most common initial presentation of scrub typhus includes **acute onset fever, headache, myalgia, and malaise**, often indistinguishable from viral or other bacterial infections. However, progression to **multisystem involvement typically occurs after 4–7 days**, especially in untreated cases. In our series, all patients had a preceding febrile illness, underscoring its role as a key diagnostic entry point[14].

2. Neurological manifestations

Neurological involvement is increasingly recognized and ranges from **headache and altered sensorium to seizures and meningoencephalitis**. Status epilepticus, as observed in our study, is rare but clinically significant. The underlying mechanisms include **cerebral vasculitis, microthrombi formation, metabolic disturbances (notably hyponatremia), and direct inflammatory injury**, all of which contribute to acute neurological deterioration[15].

3. Respiratory involvement

Pulmonary manifestations are common and may vary from **mild cough and interstitial pneumonitis to severe ARDS**. The progression to ARDS reflects **capillary leak and diffuse alveolar damage**, often resembling severe sepsis or viral pneumonia. In emergency settings, such patients frequently require early ventilatory support, as seen in our case with severe hypoxemia and shock[16].

4. Gastrointestinal and hepatic presentation

Abdominal symptoms, including **pain, vomiting, and hepatomegaly**, are frequently reported but often under-recognized. In some cases, as demonstrated here, scrub typhus can mimic **acute surgical abdomen**, leading to potential diagnostic dilemmas. Hepatic involvement is common and typically presents as **transaminitis with AST predominance**, along with hyperbilirubinemia in severe disease[17].

5. Cardiovascular manifestations

Cardiac involvement ranges from **subclinical myocarditis to severe myocardial dysfunction and arrhythmias**. Fulminant myocarditis, as seen in this series, is a rare but often fatal complication. Clinical features may include **hypotension, heart failure, and malignant arrhythmias**, reflecting direct myocardial inflammation and microvascular injury[18].

6. Hematological and metabolic abnormalities

Certain laboratory abnormalities provide important diagnostic clues. These include:

- **Thrombocytopenia** (almost universal in severe disease)
- **Transaminitis (AST > ALT)**
- **Hyponatremia**, often severe and associated with neurological symptoms
- **Acute kidney injury**
- **Metabolic acidosis with elevated lactate**

While non-specific, the **combination of these findings in a febrile patient in endemic areas should strongly raise suspicion of scrub typhus[19]**.

7. Eschar – a key but inconsistent clinical sign

The presence of an **eschar remains the most specific clinical finding**, often described as a painless necrotic lesion with an erythematous halo. However, its prevalence varies widely, and **absence does not exclude the diagnosis**, as seen in one of our cases. Careful and systematic examination, including hidden areas, is essential in all suspected cases.

Clinical Implications for Emergency Practice

From an emergency medicine standpoint, scrub typhus should be approached as a **syndromic chameleon**, capable of presenting as:

- Acute encephalopathy or seizures
- Severe pneumonia/ARDS
- Septic shock
- Acute abdomen
- Cardiac arrhythmias or myocarditis

This overlap necessitates a **high index of suspicion and early empirical therapy**, particularly when common tropical infections have been excluded.

Early initiation of doxycycline remains the cornerstone of management and is associated with **rapid clinical improvement and reduced mortality**, especially when started before progression to advanced organ dysfunction.

Strengths and limitations:

Strengths include real-world ED perspective, detailed imaging correlation, and inclusion of rare presentations. Limitations are small sample size, single-center design, and lack of long-term follow-up.

Conclusion:

Scrub typhus is a treatable “great mimicker” of critical emergencies in endemic regions. Emergency physicians must maintain a high index of suspicion in febrile patients with multiorgan dysfunction, diligently search for eschar, and initiate doxycycline empirically without awaiting confirmation. Heightened awareness can convert a potentially fatal illness into a rapidly reversible condition.

Scrub typhus is a well-recognized cause of acute febrile illness with multisystem involvement in endemic regions and is associated with significant mortality if left untreated. However, early diagnosis remains challenging due to its non-specific clinical presentation, often leading to delays in appropriate therapy.

This study adds to the existing literature by documenting uncommon and severe manifestations of scrub typhus, including status epilepticus and fatal refractory

ventricular tachycardia, thereby expanding the spectrum of its emergency presentations. Furthermore, it reinforces the critical importance of maintaining a high index of suspicion in the emergency department, emphasizing early identification of clinical clues such as eschar and prompt initiation of doxycycline therapy, both of which are pivotal in improving patient outcomes.

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