

A Study of Myocardial Damage and Left Ventricular Impairment in Scrub Typhus Cases

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Abstract: *Scrub typhus, often elusive in its presentation, can range from a vague febrile episode to a life-threatening multi-organ crisis. In my view, the recognition of its cardiac complications—particularly myocarditis—remains underappreciated, despite their potential to shape patient outcomes. This hospital-based prospective cohort study, conducted at SRG Hospital & Medical College, Jhalawar between June 2024 and July 2025, followed 99 adults with confirmed scrub typhus to evaluate the frequency and profile of myocardial injury and left ventricular dysfunction. It is evident that nearly one in three patients (32.32%) developed myocarditis, with smokers, diabetics, and hypertensives showing a disproportionately higher risk. The myocarditis group demonstrated markedly reduced left ventricular ejection fraction, elevated cardiac biomarkers (Troponin-T, CPK-MB), and increased need for vasopressors compared to their counterparts, with differences reaching strong statistical significance. This suggests that myocardial involvement is not a rare complication but a meaningful clinical reality that demands early suspicion, particularly in patients with pre-existing cardiometabolic risk factors. Taking this further, timely echocardiographic assessment and biomarker evaluation could help avert progression to severe cardiac dysfunction, ultimately influencing prognosis in a disease where hours often count.*

Keywords: scrub typhus, myocarditis, left ventricular dysfunction, cardiac biomarkers, febrile illness

1. Introduction and Rational

Scrub typhus presents with a wide range of clinical manifestations — from a non-specific febrile illness with no localized features to severe, multi-organ failure that may prove fatal.

One notable complication is **myocardial dysfunction**. The proposed mechanisms for myocarditis in scrub typhus include:

- 1) Direct endothelial infection damage to small vessels (Vasculitis)
- 2) Immune mediated damage- TNF- α , IL-1, IL-6 to cardiac Myocytes
- 3) Microvascular Ischemia – Vasculitis & Increase vascular permeability impair myocardial blood flow Microcirculation level

AIM - To evaluate the occurrence of myocardial injury and left ventricular dysfunction, and to document cardiac manifestations in patients diagnosed with scrub typhus

A total of **99 patients** diagnosed with scrub typhus were admitted to the Department of Medicine, IPD, JMC.

Inclusion Criteria:

- 1) Adults aged **18–65 years** presenting with acute febrile illness (AFI) and testing positive for scrub typhus by IgM ELISA.
- 2) Willingness to participate, with informed consent obtained.
- 3) No identifiable alternative source of infection following initial clinical assessment.

Patients excluded from study-

- 1) Patients with previous history of cardiac disease.
- 2) Febrile illness attributed to causes other than scrub typhus or associated with other system disease
- 3) Co-infection with scrub typhus and any other febrile illness

2. Methodology

Study Design: Hospital-based prospective cohort study

Setting: Department of Medicine, SRG Hospital & Medical College, Jhalawar

Duration: June 2024 – July 2025

Sample Size: 99 patients with confirmed scrub typhus

Analysis - Chi square test used, student –t test and one way ANOVA were used

Diagnostic Criteria for Myocarditis in Scrub Typhus:

Presence of **myocardial injury** (elevated cardiac biomarkers such as CPK-MB and/or Troponin-T) Associated with **global left ventricular systolic dysfunction** on echocardiography

3. Results

- Of 99 patients, **32 (32.32%)** developed myocarditis, while 67 showed no evidence of myocardial involvement.
- Myocarditis prevalence was significantly higher among **smokers, diabetics, and hypertensive patients**.
- Median values in the myocarditis group:
- **LVEF: 47.5% Troponin-T: 2.8 ng/mL CPK-MB: 124 U/L**

In the non-myocarditis group:

- **LVEF: 55% Troponin-T: 0.011 ng/mL CPK-MB: 12 U/L**
- These differences were **statistically significant** ($p < 0.001$).

Results

Distribution and comparison of myocardial outcomes in two groups

Variable	Myocarditis (N= 32)	Non- Myocarditis (N=67)	p value
Median LVEF %	47.5	55	< 0.001
Median Trop T (ng/ml)	2.8	0.011	< 0.001
Median CPK- MB (U/L)	124	12	< 0.001
Vasopressor Requirement, count (%)	14	4	< 0.001

4. Conclusion

- Myocarditis occurred in approximately **one-third (32.32%)** of scrub typhus patients in this study.
- The condition was more prevalent among individuals with **diabetes, hypertension, and smoking history**.
- Early recognition and targeted cardiac evaluation in high-risk patients may improve clinical outcomes

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