



ROLE OF HYPERTRIGLYCERIDEMIA IN COMPLICATIONS AND PROGNOSIS OF SCRUB TYPHUS IN A TERTIARY CARE CENTRE IN SOUTH-EASTERN RAJASTHAN

General Medicine

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ABSTRACT

Scrub typhus is an important acute febrile illness that can cause severe multiorgan complications, while hypertriglyceridemia may reflect systemic inflammation and altered lipid metabolism. This prospective observational study included 100 adults with IgM ELISA-confirmed scrub typhus admitted to the Department of General Medicine, Jhalawar Medical College, Rajasthan, during 2023–2024. Clinical features, laboratory parameters, serum triglyceride levels, complications, and outcomes were assessed. The mean age was 37.05 ± 15.39 years, 54% were females, and 74% were from rural areas. Hypertriglyceridemia was present in 78% of patients, with a mean triglyceride level of 213.22 ± 34.58 mg/dL. Major complications included MODS (19%), ARDS (15%), and AKI (13%). Hypertriglyceridemia was significantly associated with MODS, ARDS, AKI, and mortality. The study suggests that hypertriglyceridemia is common in scrub typhus and may serve as a simple marker of disease severity and poor prognosis.

KEYWORDS

Scrub Typhus, Hypertriglyceridemia, Multiorgan Dysfunction, Prognosis

INTRODUCTION

Scrub typhus is a re-emerging zoonotic infection caused by *Orientia tsutsugamushi* and transmitted by infected chigger mites. It commonly causes fever, headache, myalgia, rash, and lymphadenopathy, while severe disease may lead to AKI, ARDS, hepatitis, myocarditis, shock, and MODS.^{1,2} Diagnosis is challenging due to nonspecific presentation, with ELISA, immunofluorescence, rapid tests, and PCR being useful.³ Hypertriglyceridemia may occur due to altered lipid metabolism and systemic inflammation and could indicate disease severity and poor prognosis.⁴ Therefore, this study evaluated hypertriglyceridemia and its association with complications and outcomes in scrub typhus patients at a tertiary care centre in south-eastern Rajasthan.

MATERIAL AND METHODS

Study Design:- It was prospective Observational study.

Study Place:- The study was conducted on the patients admitted in Department of General Medicine, Jhalawar Medical College, Jhalawar, Rajasthan.

Study Duration: Six Months

Study Population: All the adults (>18 years of age) with IgM ELISA positive for scrub typhus admitted in general Medicine ward and ICU.

Sampling Technique: Simple random sampling method.

Inclusive Criteria

- Those subjects of age >18 years, with acute febrile illness with scrub typhus IgM ELISA positive, that consented to participate in the study were recruited.

Exclusive Criteria

- Acute febrile illness patients with IgM ELISA negative for scrub typhus.
- Patients with co-infection with dengue or malaria.
- Patients having co-morbid condition like chronic renal failure, chronic liver disease and patients with known neoplastic diseases etc.
- Patients who were unwilling to consent.

Sample Size

- The study involved 100 patients diagnosed with scrub typhus who were admitted to the Department of General Medicine at Jhalawar Medical College, Jhalawar. All participants met the established inclusion and exclusion criteria.

Examination and Investigations

- Clinical History:** A comprehensive clinical history was recorded for each patient, including symptoms, duration of illness, and any relevant medical history.
- Physical Examination:** A thorough physical examination was conducted, focusing on vital signs such as blood pressure, pulse rate, respiratory rate, and oxygen saturation levels.
- Laboratory Investigations:** Routine investigations included urine analysis, CBC (Hb, TLC, hematocrit, and platelets), renal and

liver function tests, serum electrolytes, and lipid profile (total cholesterol, triglycerides, HDL, LDL, and VLDL).

- Specific Tests:** Scrub typhus IgM ELISA, blood and sputum cultures, relevant serological tests, RBS, serum uric acid, CRP, and cardiac enzymes (CPK, CK-MB, and LDH) were performed as clinically indicated.
- Imaging Studies:** ECG, USG abdomen and pelvis, and chest X-ray (PA view) were performed for cardiac, abdominal, and pulmonary assessment, while HRCT thorax and NCCT head were done when clinically indicated.

Statistical Analysis

The data were entered and analyzed using SPSS version 24.0. Descriptive statistics were used, with the unpaired t-test for continuous variables and Chi-square/Fisher's exact tests for categorical variables. Results were expressed as mean $\pm$ SD or frequency and percentage. A p-value <0.05 was considered statistically significant.

RESULTS AND DISCUSSION

The study included 100 participants with a mean age of 37.05 ± 15.39 years. Nearly half (49%) were below 30 years, and 54% were females. Most participants (74%) belonged to rural areas. The mean systolic and diastolic blood pressures were 122.69 ± 19.93 mmHg and 75.83 ± 12.68 mmHg, respectively.

Rural predominance in the present study is consistent with the epidemiology of scrub typhus in India, where agricultural and vegetation exposure increases infection risk. Verma et al. reported 82.7% rural patients with a mean age of 35.17 ± 16.90 years, comparable to the present study.⁵ Sharma et al. reported a median age of 35 years with nearly equal sex distribution.⁶ Similar rural predominance was also reported in studies from the Western Himalayas.⁷

Clinical Characteristics

In the present study, fever was universal (100%), followed by headache (70%), rash (50%), jaundice (41%), and myalgia (38%). Hepatomegaly (46%), eschar (37%), and lymphadenopathy (27%) were common findings. Laboratory abnormalities showed hepatic and renal involvement, including elevated AST/ALT, creatinine, anemia, and hypoalbuminemia. The mean triglyceride level was 213.22 mg/dL, with hypertriglyceridemia in 78% of patients, consistent with its reported association with severe scrub typhus and MODS.¹¹ ECG showed tachycardia in 30%, while chest X-ray abnormalities occurred in 20%, mainly bilateral infiltrates. These findings reflect the multisystem involvement and severity of scrub typhus.^{6,8-10}

Outcome Characteristics

In the present study, MODS (19%) was the most common complication, followed by ARDS (15%) and AKI (13%), while encephalitis and shock occurred in 6% and 4% of participants, respectively. Similar studies have identified AKI, ARDS, and MODS

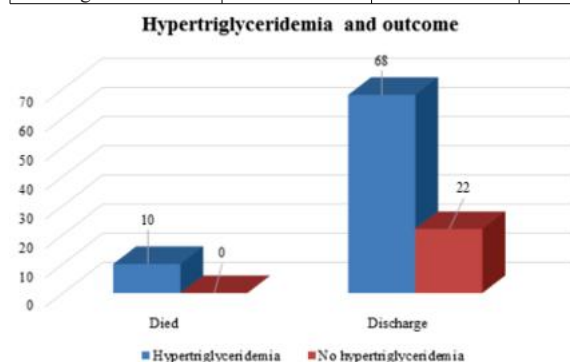
as major complications of severe scrub typhus and important determinants of poor outcome.^{6,12} Overall, 90% of patients were discharged and 10% died. Mortality was significantly higher among patients with hypertriglyceridemia (12.8% vs. 0%, $p=0.001$), suggesting that hypertriglyceridemia may be a marker of severe disease and adverse outcome. However, this association should be interpreted cautiously because of the small number of deaths.

A significant association was observed between hypertriglyceridemia and several clinical manifestations, complications, and outcomes. Patients with hypertriglyceridemia showed significantly higher frequencies of rash (55.1%), jaundice (48.7%), eschar (43.6%), lymphadenopathy (30.7%), and confusion (23.1%) compared with those without hypertriglyceridemia. Swelling, burning micturition, decreased urine output, shortness of breath, and pallor were also significantly more common in the hypertriglyceridemia group ($p=0.001$).

Among complications, MODS (21.8%), ARDS (17.9%), and AKI (16.7%) were significantly more common in patients with hypertriglyceridemia. Mortality was also significantly higher (12.8% vs. 0%, $p=0.001$), while discharge was lower (87.2% vs. 100%, $p=0.001$). These findings suggest an association between hypertriglyceridemia and greater disease severity and poorer outcomes.

Table 1 Association of Hypertriglyceridemia with Clinical Features, Complications and Outcome

Parameter	Hypertriglyceridemia	No Hypertriglyceridemia	p-value
Swelling	5.1%	0%	0.001
Burning micturition	12.8%	4.5%	0.001
Decreased urine output	14.1%	4.5%	0.001
Rashes	55.1%	31.8%	0.001
Jaundice	48.7%	13.6%	0.001
Shortness of breath	16.7%	0%	0.001
Confusion	23.1%	4.5%	0.001
Pallor	21.8%	9.1%	0.001
Lymphadenopathy	30.7%	13.6%	0.001
Eschar	43.6%	13.6%	0.001
MODS	21.8%	9.1%	0.001
ARDS	17.9%	4.5%	0.012
AKI	16.7%	0%	0.001
Encephalitis	7.7%	0%	0.076
Shock	5.1%	0%	0.098
Myocarditis	3.8%	0%	0.112
Death	12.8%	0%	0.001
Discharge	87.2%	100%	0.001



The present study demonstrates a significant association between hypertriglyceridemia and a more severe clinical course of scrub typhus. Patients with hypertriglyceridemia had a higher frequency of rashes, jaundice, eschar, lymphadenopathy, confusion, and other systemic manifestations. Importantly, complications such as MODS, ARDS, and AKI were significantly more frequent in this group. These findings are consistent with the study by Sarswat et al., which reported elevated triglyceride levels in 71% of patients with severe scrub typhus and found that high triglycerides were significantly associated with MODS and septic shock with MODS.¹¹

Higher mortality among patients with hypertriglyceridemia suggests that elevated triglycerides may serve as a marker of disease severity

and poor prognosis. Gaba et al. reported AKI, hepatic dysfunction, and ARDS as important complications associated with adverse outcomes in scrub typhus, supporting the role of multi-organ involvement in mortality.¹³ Hypertriglyceridemia may reflect the inflammatory and metabolic response to severe infection. However, causality cannot be established, and larger prospective studies are needed to confirm its prognostic value.

SUMMARY AND CONCLUSION

This prospective observational study of 100 scrub typhus patients found a mean age of 37.05 ± 15.39 years, with 54% females and 74% from rural areas. Fever was universal, while headache, rash, and jaundice were common. Major complications included MODS (19%), ARDS (15%), and AKI (13%), with 10% overall mortality. Hypertriglyceridemia was present in 78% of patients, with a mean triglyceride level of 213.22 ± 34.58 mg/dL. It was significantly associated with MODS, ARDS, AKI, and higher mortality, suggesting that hypertriglyceridemia may be a useful marker of disease severity and poor outcome in scrub typhus.

The study concluded that Hypertriglyceridemia is common in scrub typhus and is significantly associated with severe clinical manifestations, organ dysfunction, and mortality. Serum triglyceride levels may therefore serve as a simple prognostic marker for early identification of patients at higher risk of complications and poor outcomes.

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