

Seroprevalence of Scrub Typhus among Pyrexia of Unknown Origin Patients: A Study from a Tertiary Care Hospital in Odisha

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Abstract: Scrub typhus is a crucial rickettsial infection caused by *Orientia tsutsugamushi* and a significant cause of acute undifferentiated febrile illness in India. Due to limited diagnostic facilities, the disease often remains underdiagnosed, leading to increased risk of morbidity and mortality. The present investigation was under taken in a Tertiary Care Hospital to assess the seroprevalence of scrub typhus and to compare the diagnostic performance of immunochromatographic test (ICT) with IgM ELISA. The study reported good correlation between ICT and ELISA. IgM ELISA demonstrated higher sensitivity (92.41%) and specificity (91.29%) compared to ICT. Investigation concluded that for Scrub typhus IgM ELISA remains a reliable diagnostic modality.

Keywords: Scrub typhus, Pyrexia of unknown origin, IgM ELISA, ICT, *Orientia tsutsugamushi*

1. Introduction

Scrub typhus is an acute febrile illness caused by *Orientia tsutsugamushi*, an obligate intracellular Gram-negative bacterium belonging to the family Rickettsiaceae. The infection is transmitted to humans through the bite of larval trombiculid mites (chiggers), primarily of the genus *Leptotrombidium*. According to national surveillance data, the seroprevalence of scrub typhus in India ranges from 9.3% to 27.9%, with mortality rates reaching up to 30% in untreated individuals. Clinical manifestations usually appear after an incubation period of 5–14 days and include fever, chills, headache, myalgia, rash, lymphadenopathy, gastrointestinal symptoms, and occasionally the presence of a characteristic eschar at the site of mite bite. Due to its nonspecific presentation and overlap with other febrile illnesses such as malaria, dengue, and typhoid fever, scrub typhus is often overlooked. Early diagnosis using serological methods is essential for timely treatment and prevention of complications. This study was undertaken to evaluate the seroprevalence of scrub typhus among PUO (pyrexia of unknown origin) patients and to compare ICT with IgM ELISA as diagnostic tools.

2. Materials and Methods

Study Design and Setting:

A prospective observational study was conducted in the Department of Microbiology at a tertiary care hospital in Odisha from January 2024 to June 2024.

Study Population:

A total of 250 patients presenting with pyrexia of unknown origin were included. Patients aged more than 10 years attending or admitted to the Medicine and Paediatrics departments were enrolled.

Inclusion Criteria:

- Patients with undifferentiated fever
- Age >10 years

- PUO cases after exclusion of common febrile illnesses

Exclusion Criteria:

- Confirmed cases of dengue, malaria, typhoid, leptospirosis, or tuberculosis
- Immunocompromised patients (HIV/AIDS, malignancy, lymphoma)
- Patients on chemotherapy or long-term steroid therapy
- Pregnant women
- Fever duration more than three weeks

Laboratory Methods:

- Serum samples were tested for scrub typhus IgM antibodies using:
- Immunochromatographic test (ICT)
- IgM Enzyme-Linked Immunosorbent Assay (ELISA)

Statistical Analysis:

Sensitivity, specificity, and correlation between ICT and ELISA were calculated using standard statistical methods.

3. Results

Out of 250 PUO cases, 73 (29.2%) were positive for scrub typhus by IgM ELISA, while 72 (28.8%) were positive by ICT.

Age-wise Distribution (Table-1): The most commonly affected age group was 31–40 years (28.77%), followed by 21–30 years (24.66%).

Clinical Features (Table-2):

Fever with chills and rigor was present in all patients (100%). Other common symptoms included headache (60.27%), vomiting (52.05%), body pain (47.95%), cough (43.84%), and skin rash (31.51%). Eschar was observed in only one patient (1.36%).

Diagnostic Performance:

A strong correlation (98.6%) was observed between ICT and IgM ELISA. IgM ELISA showed a sensitivity of 92.41% and

specificity of 91.29%, whereas ICT showed a sensitivity of 91.14% and specificity of 88.89%.

Table 1: Age wise distribution of Scrub Typhus patients

Age group	IgM ELISA positive	% over total IgM ELISA positive (n=73)	ICT Positive	% over total ICT Positive (n=72)
11-20 yr	2	2.74	2	2.78
21-30 yr	18	24.66	18	25.00
31-40 yr	21	28.77	21	29.17
41-50 yr	15	20.55	15	20.83
51- 60 yr	5	6.85	5	6.94
> 60 yr	12	16.44	11	15.28
Total	73		72	

Table 2: Clinical features

Clinical features	Number of patients	Percentage (%)
Fever	73	100.00
Vomiting	38	52.05
Rigor	73	100.00
Cough	32	43.84
Chills	73	100.00
Headache	44	60.27
Eschar	1	1.36
Pain abdomen	17	23.29
Skin Rash	23	31.51
Body Pain	35	47.95

4. Discussion

Scrub typhus accounted for nearly one-third of PUO cases in the present study, highlighting its emerging importance as a cause of acute febrile illness in eastern India. Fever with chills and rigor was the most consistent clinical feature, similar to findings reported by Tiwari and Nanda (2020).

The low incidence of eschar observed in this study correlates with previous Indian studies, where eschar is often absent or missed due to darker skin pigmentation and concealed bite sites. The predominance of cases in the 31–40-year age group is comparable with findings by Pathania et al. and Sharma et al.

IgM ELISA proved to be a reliable diagnostic test with superior sensitivity and specificity. The high concordance between ICT and ELISA suggests that ICT can serve as a useful screening tool in resource-limited settings.

5. Conclusion

Scrub typhus is an important and often underdiagnosed cause of pyrexia of unknown origin in Odisha. It should be included in the differential diagnosis of fever of unknown origin along with malaria, dengue, typhoid, leptospirosis. IgM ELISA remains the preferred diagnostic modality due to its high sensitivity and specificity, while ICT may be used as a rapid screening test.

References

- [1] Bonell A, Lubell Y, Newton PN, Crump JA, Paris DH. Estimating the burden of scrub typhus: a systematic review. *PLoS Negl Trop Dis*. 2017; 11: e0005838.

- [2] Saraswati K, Day NP, Mukaka M, Blacksell SD. Scrub typhus point-of-care testing: a systematic review and meta-analysis. *PLoS Negl Trop Dis*. 2018; 12: e0006330.
- [3] Tiwari S, Nanda M. Seroprevalence of scrub typhus among pyrexia of unknown origin patients. *J Clin Diagn Res*. 2020;14(9): DC28-DC31.
- [4] Sharma R, Mahajan SK, Singh B, Raina R, Kanga A. Predictors of severity in scrub typhus. *J Assoc Physicians India*. 2019; 67: 35-38.
- [5] Pathania M, Amisha, Malik P, Rathaur VK. Scrub typhus: demographic variables and clinical profile. *J Family Med Prim Care*. 2019; 8: 1189-1195.
- [6] Ramyasree A, Kalawat U, Rani ND, Chaudhury A. Seroprevalence of scrub typhus at a tertiary care hospital. *Indian J Med Microbiol*. 2015;33(1):68-72.