

Common Tropical fevers: Experience from a tertiary care teaching hospital in North India

Chandra S.^{1*}, Garg H.², Rai N.³, Malik R.⁴, Nain T.⁵, Gupta M.⁶

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^{1*} Surabhi Chandra, Professor & Head of Department, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

² Himanshu Garg, Post graduate Residents, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

³ Namrata Rai, Post graduate Residents, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

⁴ Ritu Malik, Post graduate Residents, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

⁵ Tanveer Nain, Post graduate Residents, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

⁶ Mayank Gupta, Post graduate Residents, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.

Background: We aimed at studying the clinical-laboratory profile of tropical fever, presenting to a tertiary care hospital. **Materials and methods:** The study was done after obtaining ethical clearance. In this prospective observational study, done from January 2022 to December 2022, patients fulfilling clinical criteria and confirmed positive on laboratory investigations were enrolled. They were managed and followed up during the hospital stay. Details were recorded, after obtaining written informed consent from parents. **Results:** A total of 118 patients who fulfilled the inclusion criteria were finally enrolled for analysis. The mean age of presentation was 12.9 years (Range 8-16 years; SD 2.169). The majority of cases, especially those known to be transmitted by mosquitoes, were seen in the post-monsoon season (50/118 = 42.3%). Typhoid or enteric fever (39/118 = 33.0%) was the major etiology. There was an overlap in clinical findings with hepatosplenomegaly being the most common one seen in 94.0% of cases and the least common finding was lymphadenopathy (5.5%) cases. A third (36/118 = 30.5%) of these patients required PICU admission sometime during hospitalization. Of the patients who required admission to PICU, around 90% required inotropic/ vasoactive support, 72.8% (59% non-invasive and 13.8% invasive) required ventilator support and 14.6% patients required renal replacement therapy. One hundred and eleven (111/118 = 94.0%) patients survived and recovered completely. **Conclusion:** Enteric fever was the most common etiology of Tropical Fever in this study. The majority of cases of tropical fever had intact survival and did not require PICU admission.

Keywords: Tropical Fever, Enteric Fever, Clinico-Laboratory Profile

Corresponding Author

Surabhi Chandra, Professor & Head of Department, Department of Pediatrics, SRMS-IMS, Bhojipura, Bareilly, Uttar Pradesh, India.
 Email: surabhi0329@gmail.com

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Introduction

Febrile infections commonly prevalent in tropical and subtropical regions are collectively termed 'Tropical fevers'. The Indian Society of Critical Care Medicine (ISCCM) Tropical fever management guidelines define them as "Infections prevalent in or unique to tropical and subtropical regions" [1]. The prevalence of these infections is largely influenced by the geographical and climatic conditions present in these regions.

Infectious illnesses commonly included in this category are Dengue, malaria, enteric fever, scrub typhus, leptospirosis, Hepatitis A, Japanese encephalitis and mixed infections. Many water-borne, food-borne, and vector-borne illnesses are also included in this group of fevers [2].

Clinical features of these infections are often non-specific, common and under-recognized [3-6]. Considering their high prevalence in these areas, considerable overlap in their clinical features and different pharmacotherapies for each of them, it is essential to know the clinical profile of these infections.

This study was undertaken to review the common tropical infections presenting to a tertiary care teaching hospital.

Aim

We aimed at studying the clinical-laboratory profile of tropical fever, presenting to a tertiary care hospital.

Materials and Methods

It was a prospective observational study, carried out in the Department of Pediatrics of a tertiary care teaching hospital over 12 months from January 2022 to December 2022, after obtaining ethical clearance from the Institutional Ethics Committee.

This was a hospital-based, prospective, observational study carried out in the Department of Pediatrics of a tertiary care teaching hospital. All children aged 1 month – 18 years of age, who were admitted to the hospital over 12 months (January 2022 to December 2022) and suspected to have a Tropical fever, depending on the clinical criteria, were subjected to the confirmatory laboratory test. They were enrolled in the study if laboratory

Tests confirmed the infection in them, after obtaining written informed consent from their parents. Patients with malignancy, immunodeficiency or autoimmune diseases, those whose parents did not consent and those who left treatment midway, were excluded from the diagnosis.

Clinical criteria for Tropical Fever were defined as follows; Acute onset (within the last 14 days), non-localizing fever of at least 48 hours duration with one or more of the following clinical findings; Rash/ thrombocytopenia, joint pain, abdominal pain, hepatosplenomegaly, jaundice, renal failure, respiratory distress, altered sensorium or multi-organ dysfunction syndrome OR fever in isolation. On fulfilment of clinical criteria, the patients were subjected to laboratory investigations.

Baseline investigations including complete blood count, general blood picture, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Urine routine, microscopy and a chest x-ray were done for all the patients enrolled. Subsequent investigations were based on predominant clinical history and examination. Confirmatory laboratory tests included; Peripheral blood smear or Rapid Diagnostic Test for malaria, Dengue NS1 antigen ELISA, IgM anti-Dengue antibodies, Scrub typhus immunofluorescence assay, IgM anti-Leptospira, Typhidot and IgM ELISA Typhoid fever, IgM anti-Hepatitis A and IgM ELISA in CSF for Japanese Encephalitis.

The patient was labelled to be suffering from tropical fever if he fulfilled the clinical criteria which were confirmed by laboratory investigations. More than 1 positive confirmatory test was labelled as 'Mixed infection'.

Patients enrolled in the study were managed as per standard treatment guidelines. Demographic and clinical details were noted on a pre-designed standard data collection proforma. Socio-economic status was defined using the modified Kuppuswamy scale [7]. Patients were followed up during the entire duration of their hospital stay. Their outcome was also noted.

Data were later entered into a Microsoft EXCEL 2013 worksheet and later analyzed using the Epi-info software version 7.2.0.1. Frequencies were calculated for categorical data and mean and standard deviation for continuous variables.

A p-value of <0.05 was considered to be statistically significant.

Results

A total of 123 patients with tropical fever presented to the hospital during the study period. Of these, 5 patients left treatment midway due to personal reasons. Hence, a total of 118 patients who fulfilled the inclusion criteria and were finally enrolled for analysis

Of these majority (64/118=64.2%) were boys. The majority of these patients were from rural or semi-urban areas (82/118=69.4%) and belonged to low socio-economic class (96/118= 81.3%) patients. The mean age of presentation was 12.9 years (Range 8-16 years; SD 2.169). The majority of cases, especially those known to be transmitted by mosquitoes, were seen in the post-monsoon season (50/118 = 42.3%)

The majority of cases were of Typhoid or enteric fever (39/118 = 33.0%). Two patients (2/118 = 1.6%) had mixed infection both of whom Scrub typhus and Enteric fever was confirmed on laboratory investigations. The etiological profile of patients is given in Fig 1.

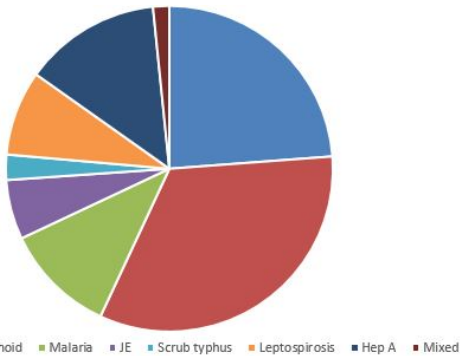


Figure 1: Etiological Profile of Tropical Fever

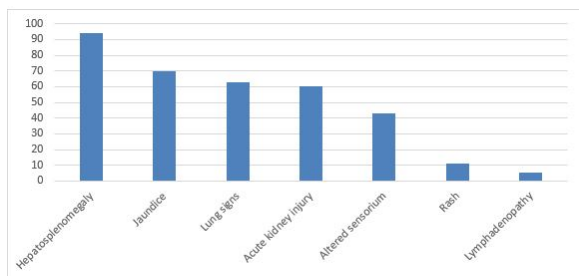


Figure 2: Clinical Findings in Patients with Tropical Fever

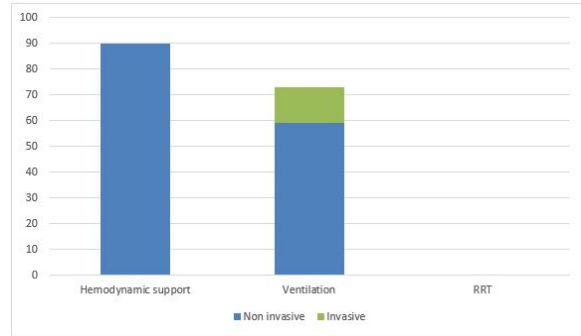


Figure 3. Critical care support required

The mean duration of hospital stay was 11.4 days (Range: 8.2 – 14.6; SD 2.54). One hundred and eleven (111/118 = 94.0%) patients survived. All seven (7/118 = 5.9%) who succumbed to their illness had developed multi-organ dysfunction syndrome (MODS).

Five of 7 patients with Japanese Encephalitis had some kind of focal neurological sequelae at the time of discharge. This included tone abnormalities in 3, epilepsy in 3 and movement disorder in 2. One patient had both hypertonia and movement disorder.

Discussion

Tropical fever is due to several communicable diseases endemic to tropical areas, which may cause significant morbidity and/ or mortality [2]

The majority of these fevers, presented to us were seen in boys. A similar observation was made in a prospective multicenter study by Singh S et al [8] on tropical fevers in Indian ICUs. Male to female ratio observed in pediatric patients was 1.77:1 in this study.

The majority of these patients were from rural or semi-urban areas (82/118=69.4%) and belonged to low socio-economic class (96/118= 81.3%) patients, as has also been the observation in tropical neuroinfectious diseases

The majority of cases, especially those known to be transmitted by mosquitoes, were seen in the post-monsoon season, as has also been mentioned in the management guidelines of tropical fevers, by the Indian Society of Critical Care Medicine Tropical Fever Group [1].

Most of the studies have found malaria as the most common tropical infection [10, 11, 12] while Dengue

Has been found as the most common etiology of tropical fever by some 8, 12 in ICUs.

In our study, enteric fever was the most common etiology followed by Dengue as also in some other studies [13, 14]. A review article on enteric fever makes a similar observation concluding that the Indian subcontinent bears the brunt of the load of enteric fever in tropical areas worldwide [15]. Scrub typhus which was reported to be the second most common cause of tropical fever in a study by Singhi et al (83.18%) [8], was not as commonly found in this study.

In this study, only 2 patients had mixed infections with laboratory tests positive both for Scrub Typhus and Enteric fever as has also been seen in a study by Basnyat B et al 16. A recent study on tropical infections reported that co-infections of malarialeptospirosis are not uncommon in tropical areas [17].

The most common clinical findings accompanying fever, as has been reported in different studies are rash 18, hepatorenal dysfunction 19 in comparison to hepatosplenomegaly (94%) in our patients. Hepatic dysfunction was seen in 70%, acute kidney injury in 60% and rash was seen in only 11.0% of our patients.

In this study we included all patients with a diagnosis of Tropical fever, irrespective of whether they were initially admitted in the ward or the PCU directly. Most of the international studies on this subject were done in travellers returning from tropical regions [10, 11, 18, 20] and national studies have taken PICU patients 8, 21 into account.

The majority (90%) of patients in our study required vasoactive support and almost three-fourths of them required some kind of ventilator support. This is in comparison to another study by Singhi S et al 8 in which around half of the patients required vasoactive support and nearly a quarter required ventilator support.

Intact survival was seen in 93.4% of our patients, which is likely because we included patients from the Pediatrics general ward as well. This was also the reason we did not analyze predictors of the outcome as another study 8 in which multi-organ dysfunction syndrome (MODS), day 1 Sequential Organ Failure Assessment (SOFA) score and the need for invasive ventilation were

Found to be independent predictors of unfavourable outcome on a multivariate analysis. However, MODS was a common finding seen in all the 7 patients who lost their lives.

Not all tropical infections (like Chikungunya, Escherichia coli, Entamoeba histolytica, rotavirus, chicken pox, Hepatitis E, Taenia species, filariasis, skin infections and others [2, 21] were included in the study, as these are not as commonly found in our hospital.

Conclusion

Enteric fever was the most common etiology of Tropical Fever in this study. Majority of cases of tropical fever had an intact survival and did not require PICU admission during their course of hospital stay.

Author contributions: SC, HG conceptualized the research, did data collection, manuscript preparation and critical analysis. HG, RM, NR, TN, MG collected data, and assisted in data collection and manuscript preparation. All authors approved the final version of the article.

What this study adds to existing knowledge?

The study shows the clinico-etiological profile of tropical fever from the Rohilkhand region of North India.

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