

Outcome and Clinico-laboratory Profile of pediatric scrub typhus in a tertiary medical college of West Bengal, Eastern India

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Abstract:

Introduction: Scrub typhus is an important cause of acute undifferentiated febrile illness in children which is defined as fever without any evidence of localized infection lasting ≤ 14 days. The goal of this study is to provide clinical aspect of the disease in details thus helping to create a better clinical and laboratory profile of this re-emerging disease for clinician to work with.

Methods: it is a prospective observational study done in the department of pediatric medicine NRS medical college between January 2018 to October 2019 with history of acute febrile illness in whom clinical and laboratory features consistent with scrub typhus included in our study. Scrub typhus was confirmed by IgM ELISA using INBIOS kit.

Results: A total of 77 cases with median age 8 years (range 3 months to 12 years) were diagnosed to have scrub typhus with a boys and girls ratio 1.4:1. Most case presented during the month of September (34%) followed by August (28%) and October (23%). Fever was the consistent finding (100%) of all cases. Headache (18%), myalgia (10%), breathlessness (29%), abdominal pain (27%), vomiting (41%), diarrhea (5%), rash (8%), eschar (7%), hepatomegaly (65%), splenomegaly (28%), lymphadenopathy (31%), pedal oedema (10%), altered sensorium, convulsions (21%) etc were other reported symptoms. Among laboratory findings trilineage cell involvement, altered liver enzymes with hypoalbuminemia, hyponatremia and increased creatinine level seen in many cases. Scrub encephalitis (21%), MODS (5%), ARDS (2.5%) & AKI (3.8%) were observed complications. Most of cases (87%) discharged after recovery. Case fatality rate was 9%.

Conclusion: Increased awareness of this infection among clinician with background knowledge of endemicity along with reliable rapid diagnostic tool will be the key factor to further reduce the mortality of this deadly disease.

Keywords : Orientia tsutsugamushi; scrub typhus, acute undifferentiated fever, IgM Elisa

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I. Introduction

Scrub typhus is an important cause of acute undifferentiated febrile illness in children which is defined as fever without any evidence of localized infection lasting ≤ 14 days^{1,2}. Orientia tsutsugamushi, the causative agent of this zoonotic disease is an obligatory intracellular bacteria distributed to a part of world known as the "tsutsugamushi triangle" which extends from northern Japan and far-eastern Russia in the north, to northern Australia in the south, and to Pakistan and Afghanistan in the west.³ Of the 29 states in India, 23 have reported the presence of scrub typhus.⁴⁻⁷ The infection is transmitted by larval mites or chiggers belonging to the family Trombiculidae. The clinical presentation of scrub typhus ranges from subclinical disease to multiorgan failure and death.⁸ Most patients presents with fever, diffuse lymphadenopathy, myalgia, rash, jaundice, thrombocytopenia, capillary leak syndrome, hepatomegaly, and splenomegaly. A single painless eschar with a erythematous rim at the site of chigger bite is seen in 7-68% of cases, and a maculopapular rash is present in 30%, both can be absent.⁹ Severe complications include prominent encephalitis, interstitial pneumonia, and ARDS and haemorrhagic features with circulatory collapse. The goal of this study is to provide clinical aspect of the disease in details thus helping to create a better clinical and laboratory profile of this re-emerging disease for clinician to work with.

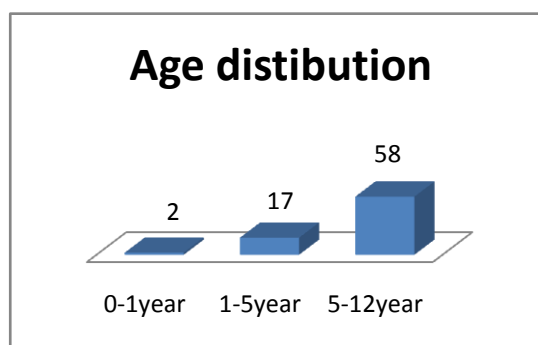
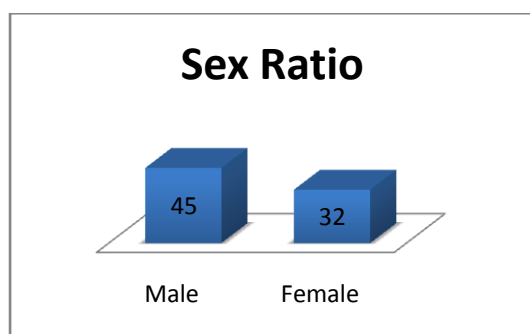
II. Materials And Methods

This was a prospective observational study done in the department of pediatric medicine NRS medical college. All children admitted to pediatric ward between January 2018 to October 2019 with history of acute febrile illness in whom clinical and laboratory features consistent with scrub typhus included in our study. Differential diagnosis such as dengue, malaria, chikungunya, enteric fever, urinary tract infection, respiratory infection, leptospirosis were excluded by history, clinical findings and relevant examinations. Serum electrolytes, Liver function test, renal function test, Widal test, CSF study, chest x-ray and Echocardiogram were done when clinically indicated.

Scrub typhus was confirmed by IgM ELISA using INBIOS kit for scrub typhus which is 90% sensitive and 100% specific. Despite the fact that immunofluorescence test is classically taken as the gold standard for diagnosing rickettsial infections, IgM ELISA is used by many laboratories for its cost, simplicity, and convenience. The collected data were compiled using Microsoft Excel 2010 and then analysed using statistical software Epi Info 7.1.5. The results were expressed in percentages and proportions.

III. Results

A total of 77 cases with median age 8 years (range 3 months to 12 years) were diagnosed to have scrub typhus. Out of 77 children 45 were boys and 32 were girls with a boy and girl ratio 1.4:1. Most case presented during the month of September (34%) followed by August (28%) and October (23%)



Fever was a consistent finding in all scrub cases with 70% having high grade fever. Most of the scrub typhus (65%) had fever for more than 7 days and minor group (17%) had fever lasting more than 14 days. Headache and myalgia (17% each), cough (18%) were other reported clinical features. Breathlessness, abdominal pain, vomiting, diarrhoea, rashes were found 29%, 27%, 41% and 8% cases respectively. 21% patients presented with altered sensorium and convulsion. Pedal oedema and ascites found among 10% cases. Multiorgan dysfunction (MODS), ARDS and Acute Kidney Injury (AKI) were observed in 5%, 2.5% and 3.8% cases respectively.

On clinical examination, mild to moderate pallor, severe pallor and lymphadenopathy seen viz. 48%, 2% and 31% cases. Eschar which is considered as a pathognomic feature of scrub typhus was seen only 7% cases. Common sites of eschar were groin, buttock followed by axilla and sole. Hepatomegaly (65%) is another common finding followed by splenomegaly (28%).

Table 1: Clinical Manifestation of Scrub Typhus

Clinical features	Number(%)	Clinical features	Number(%)
Fever	77(100%)	Breathlessness	22(29%)
Headache	17(13%)	Lymphadenopathy	24(31%)
Myalgia	17(13%)	Hepatomegaly	50(65%)
Rashes	6(8%)	Splenomegaly	21(28%)
Vomiting	31(41%)	Altered sensorium & convulsion	16(21%)
Diarrhoea	4(5%)	Ascites & pedal oedema	8(10%)
Abdominal pain	21(27%)	Eschar	5(7%)

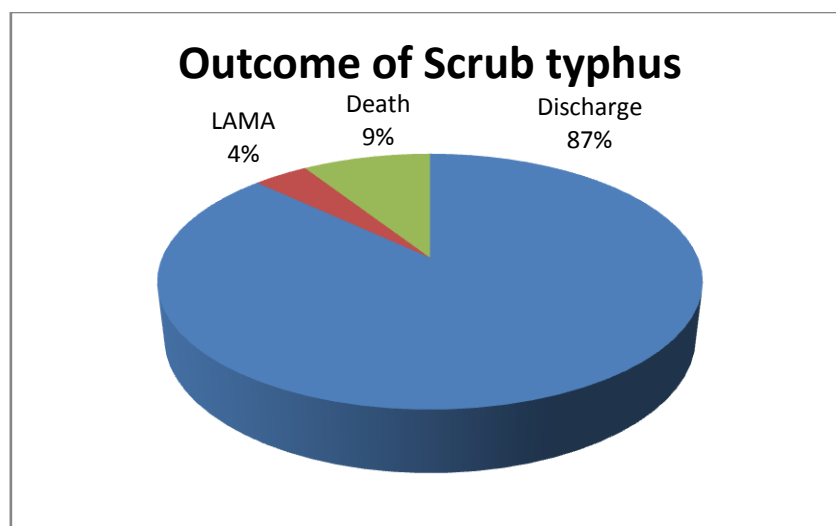
Table 2: Laboratory findings

Pallor(Hb gm/dl)(<11 gm/dl)	38(50%)
Leucocytosis(wbc>11000/cumm)	27(35%)
Leucopenia(wbc<4000/cumm)	11(14%)
Thrombocytopenia(<1.5lacs/cumm)	61(80%)
SGOT/SGPT[>3times of normal (40iu/L)]	31(41%)
Hypoalbuminemia(<2.5gm/dl)	21(28%)
Hyponatremia(<135meq/L)	12(16%)
Serum creatinine (>1mg/dl)	4(5%)
Scrub IgM	77(100%)

Among laboratory parameter, anemia and thrombocytopenia found in 50% and 81% children respectively. Leucopenia and leucocytosis seen in 14% and 35% cases. Rest of the cases leucocyte count was normal. Elevated liver enzymes (SGOT/SGPT) observed in 41% children. Hypoalbuminemia, hyponatremia and elevated creatinine level found in 28%, 16% & 5% cases respectively. All cases were positive for IgM scrub typhus.

Outcome:

Among 77 cases admitted during study period, 67 cases discharged after recovery, only 3 patients left against medical advice. In spite of our best effort 7 patients could not survive.



IV. Discussion

Present study shows increased incidence of scrub typhus during August to October which coincide with wet season suitable for growth of vegetation and trombiculid mite.

The incidence of scrub typhus is more among males like in previous studies. It may be due to predominance of male children over females as they display greater degree of activity and outdoor exposure.

In our study children of school going age (75%) are mostly affected. It may be due to more exposure to infected chigger. During rainy season chiggers may possibly change their habitat, so disease among infants who are predominantly indoor can be explained.¹⁰⁻¹²

High grade fever was the consistent clinical finding in the present study. This fever symptom is in congruence with most of the previous studies.^{11, 13}. The low incidence of prolonged fever lasting more than two weeks may be due to indiscriminate use of available antibiotics at locality.

Presence of rash is common in spotted fever, extremely rare in scrub typhus. Though rash is considered as hallmark of rickettsial disease, it was found only 8% cases in our study as compared with 22% patients from Vellore, 9% patients from Chandigarh and 20% patient from Himalayan region of North India, 30% patients in Thailand, and 55.7% patients from Jeju Islands, South Korea.¹⁴⁻²³. Rash is initially maculopapular, present in early stage of disease. Low incidence of rash may be due to late seeking of medical advice of these patients.

The pathognomonic eschar was present in 7% patients, a figure corroborative with previous study from the Himalayan region (9.5% patients), but lesser than that reported from south India (43.5%) and Jeju Island in South Korea (75.8%).¹⁷⁻¹⁹ This variation in the presence of eschar may be explained by the geographic distribution of different strains of the organism.

Gastrointestinal manifestations like abdominal pain (27%), vomiting (41%), and diarrhea (5%) occurred in 40% of patients in this study. Vomiting and diarrhea occurred in 54% and 30% cases in a study from south India.^{14,25}. This highlights the fact that febrile patients of scrub typhus can also present with prominent gastrointestinal symptoms. Lymphadenopathy was found in 31% patients in our study which is lesser from South India study (96%)²⁶ and higher than Vellore study (24%)²⁷.

Predominant hepatomegaly was observed in 65% cases as like previous studies.²⁸

Among the laboratory findings thrombocytopenia was observed in 80% cases in our study which is in congruence with other studies like Varghese et al (79%), Sharma et al (90%) and Sinha et al (85%).^{14,24,16} Liver enzymes (SGOT/SGPT) showed threefold increase in titre among 41% patients. Impaired renal function in the form of elevated creatinine level was noted in 4% cases. This finding is

corroborative with Philomela et al study.²⁷ This research documented hypoalbuminemia as a significant finding (28%) as compared to other study.

The common disease complication in our study were scrub encephalitis (21%),MODS(5%),ARDS(2.5%) and AKI(3.8%).A study on South India on adult population reported MODS 34% 14 .ARDS occurred in 25% and Acute kidney injury was noted in 32% in Sharma et al study.²⁴

In our study, the case fatality rate is 9% as compared to previous studies that has ranged 1.2% to as high as 46.3 depending on the complication.²⁹⁻³²

V. Conclusion

With the changing epidemiology Scrub typhus is now a commonest cause of acute febrile illness in children with significant mortality. Mortality is significant in patients with multiorgan dysfunctions.

When a patient presents with fever and elevated liver enzymes with or without the presence of eschar, scrub typhus considered as differential diagnosis and an empirical therapy with doxycycline should be started if there is high index of suspicion. However to further reduce the mortality of this deadly disease, increased awareness of this infection among clinician with background knowledge of endemicity along with reliable rapid diagnostic tool will be the key factor.

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Conflict of interest: None

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