Clinical Features, Laboratory Findings and Complications of Scrub Typhus in South Indian Children

Manjunath VG[1], Hedda P[2], Vijaykumar GS[3], Kumar JK[4], Murthy S[5]

Abstract

Introduction: Scrub typhus clinical features are non-specific and resemble other tropical infections like malaria, dengue and typhoid fever. Therefore appropriate gold standard laboratory tests are necessary to confirm the diagnosis of scrub typhus. Aim of this study was to determine the incidence, clinical features, laboratory data and complications of scrub typhus in South Indian Children. **Materials and Methods:** Children with fever of more than seven days who were tested negative for common tropical infections were subjected to IgM-IFA for scrub typhus. **Results:** Out of 857 children, 74 were eligible for IFA test. Out of these, 27(3.1%) tested positive for scrub typhus. Clinical features included hepatomegaly (96.3%), generalized lymphadenopathy (81.5%), splenomegaly (81.5%), hypotension (59.3%), rash (14.8%), eschar (7.4%), thrombocytopenia (66.7%), elevation of SGOT (85.2%) and SGPT (81.5%). Complications include hepatitis (14.8%), pneumonia (14.8%), myocarditis (14.8%) meningoencephalitis (3.7%) and MODS (3.7%).**Conclusion:** Scrub typhus should be considered in the differential diagnosis of a febrile child having hepatosplenomegaly, lymphadenopathy, liver dysfunction and thrombocytopenia.

Key words: Scrub typhus, Immune fluorescence antibody test, Children

Introduction

Annually an estimated one million Scrub typhus cases occur throughout the world[1,2]. In tropical countries, Rickettsial diseases may mimic other acute febrile illnesses such as malaria, dengue and typhoid fever, which are difficult to differentiate on clinical examination alone[3]. This poses a challenge as the management strategies are different and misdiagnosis can be life threatening. The commonly performed Weil-Felix test for scrub typhus is notoriously unreliable[1]. Therefore Immune fluorescence antibody (IFA) test is considered as the gold standard diagnostic test[1]. This study was undertaken to find the incidence of scrub typhus using IFA in children with acute febrile illness.

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Material and Methods

This was a prospective observational study conducted between December-2011 and November-2012. A total of 857 children in the age-group of 1-15 years with fever of seven days or more were admitted to JSS Hospital, Mysore. All were subjected to relevant investigations such as complete blood count, ESR, blood & urine culture, Buffy coat smear for malaria, dengue serology, Widal test, Mantoux test and Chest X-ray.

Seventy-four children in whom these investigations did not yield any etiological diagnosis were subjected to IFA testing. Their demographic, clinical and laboratory parameters were recorded in a predesigned proforma. Blood samples (5ml) were tested for specific IgM antibodies using a commercial IFA kit (Fullers laboratories. USA) which utilized four strains (Gilliam, Karp, Kato, Boryong). IFA was considered positive if the IgM titres were 1:64 or greater. Renal and liver function tests, abdominal and chest sonography was done in these children and treated with doxycycline. Depending upon the clinical need, other appropriate investigations like ECHO, CPK-MB, CSF and blood gas analyses were performed.

Aetiological diagnosis in 783 cases

Upper respiratory tract infections in 154, Malaria in 18, Dengue in 267, Pneumonia/empyema/lung abscess in 89, Enteric fever (typhoid and paratyphoid fever) in 113, Tuberculosis in 21, Urinary Tract Infection in 42, Chikungunya fever in 15,Acute viral hepatitis (A and E) in 13, Infectious mononucleosis in 2, Systemic Lupus Erythematosis in 2, Juvenile Idiopathic Arthritis in 4, Leukaemia in 2, Discharged Against Medical Advice 22 and others 19.

Results

Seventy four of 857(8.6%) children remained undiagnosed after evaluation for Malaria, Enteric fever, Dengue, Tuberculosis, Acute respiratory and Urinary infections[Fig 1]. Out of these 74 children, 27 (36.4 %) tested positive for *O.tsutsugamushi* by IFA[Fig 2] and all belonged to Gilliam strain. Overall 3.15% of acute febrile children were positive for *O.Tsutsugamushi* in the present study. Among the cases, 59.3% were from rural area and 63% presented in winter season.

Headache was present in 48.1% while hypotension was recorded in 59.3% of cases. Hepatomegaly was found in 96.3%, generalized lymphadenopathy and splenomegaly in 81.5% of cases each (Table 1). Thrombocytopenia was observed in 66.7 and a raised SGOT & SGPT was seen in 85.2 and 81.5% respectively (Table 2). A clinical diagnosis of myocarditis was entertained in 6 children and 4 of them had elevated CK-MB levels (Table 2). All cases recovered without any squeal.

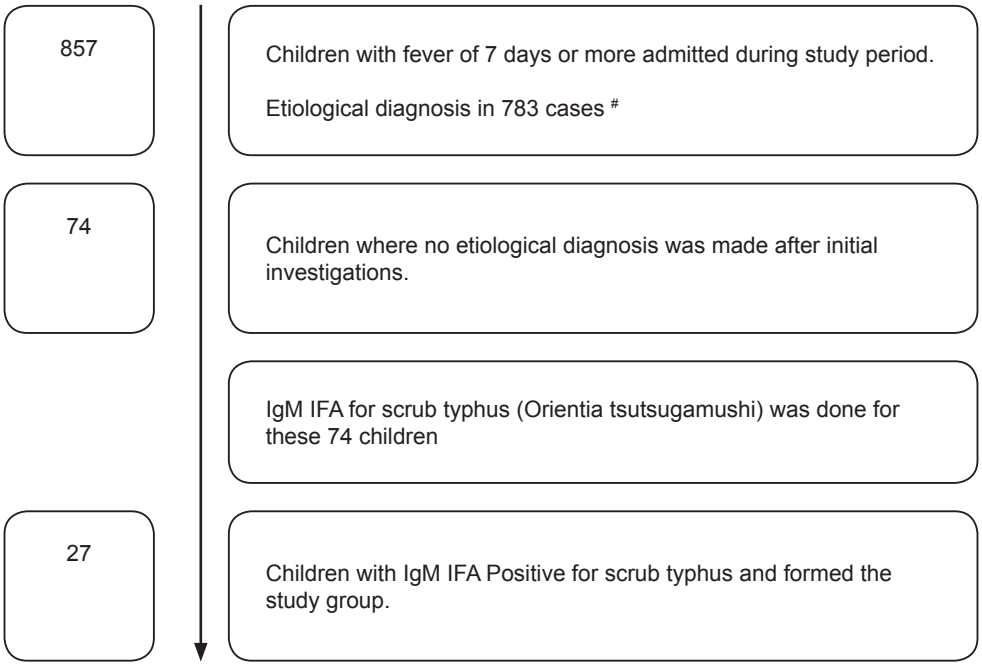

Fig 1: Flow Chart depicting recruitment of cases to the study

Table 1: Clinical profile (symptoms and signs) of scrub typhus (N= 27)

Clinical features(Symptoms/History)	Number (%)
Fever	27 (100)
Headache	13 (48.1)
Abdominal pain	10 (37)
Vomiting	10 (37)
Myalgia	9 (33.3)
Cough	3 (11.1)
Joint pain	2 (7.4)
Altered sensorium	2 (7.4)
Signs	
Hepatomegaly	26 (96.3)
Lymphadenopathy	22 (81.5)
Splenomegaly	22 (81.5)
Hypotension	16 (59.3)
Periorbital puffiness	13 (48.1)
Conjunctival congestion	9 (33.3)
Pedal oedema	8 (29.6)
Ascites	8 (29.6)
Rash	4 (14.8)
Tachypnea	3 (11.1)
Eschar	2 (7.4)

Table 2: Abnormal Laboratory parameters and complications in scrub typhus (N= 27)

Laboratory parameters	Number (%)
Hematological	
Thrombocytopenia	18 (66.7)
Anemia	13 (48.1)
Leucocytosis	5 (18.5)
Leukopenia	1 (3.7)
Biochemical	
AST(>40 IU/L)	23 (85.2)
ALT(>40 IU/L)	22 (81.5)
Serum sodium(<135)	17 (62.9)
Serum Albumin(<3.5)	15 (55.6)
Increased ALP	5 (18.5)
Total Serum Bilirubin >1.5mg%	2 (7.4)
Imaging	
Ascitis	9 (33.3)
Pleural effusion	5 (18.5)
Pneumonia	4 (14.8)
Complications#	
Hepatitis [AST & ALT>3 times elevation]	4 (14.8)
Cardiac involvement	4 (14.8)
CPK-MB>2 times elevation= 2 (7.4) CPK-MB>4 times elevation=2 (7.4)	

Meningoencephalitis, Severe thrombocytopenia (Platelets< 50000/mm^3), DIC (Disseminated Intravascular Coagulation) & MODS (Multi Organ Dysfunction Syndrome) were seen in one child each (3.7%).

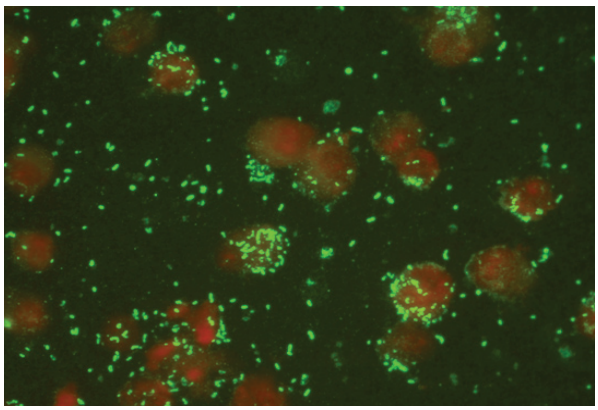

Fig 2: IFA positive reaction which appears as bright staining of short pleomorphic rod forms[400 x magnification]

Discussion

This study demonstrated the incidence of scrub typhus in children with more than one week of fever to be 3.15%. More than half were from rural area and nearly two thirds were seen in winter months. Similar geographic and seasonal trend have been reported by other authors[1,4,5]. This could be due to more vegetation and conducive environment for the chigger-mites to thrive in rural areas.

The clinical picture in scrub typhus is quite non-specific, necessitating clinicians to have high index suspicion for the diagnosis. Headache, macular rash, conjunctival hyperaemia noted in our study is common observation in scrub typhus[6,7,8]. None of our cases had history of tick exposure. Characteristic feature of scrub typhus is eschar, which was seen in less than 10% of our cases. However other authors have reported eschar between 10-92% of their cases[2]. Though it is difficult to ascertain the cause for such a low incidence of eschar in our children, it could be due to the different strain of the organism, and possibility of various ethnic populations responding differently to mite bite[2].

Features of capillary leak such as pedal oedema and peri-orbital puffiness were seen in many of our patients. Similar findings have been reported by Somashekar and Gurung et al[6,7]. Hypotension was noted in more than half of our patients confusing the diagnosis with Dengue fever. Only one child presented in shock which is in contrast to another study from Northern India which has reported shock in more than quarter of their patients[9].

The incidence of hepatosplenomegaly, lymphadenopathy, thrombocytopenia and hypoalbuminemia noted in our study was similar to other studies[4,6,9,10,11,12]. Kim et al observed significant

hypoalbuminemia in severe scrub typhus patients[13]. Scrub typhus closely resembles dengue infection resulting in diagnostic confusion. The presence of an eschar, tender lymphadenopathy, splenomegaly and persistence of fever after the recovery from shock helps to distinguish Rickettsial infection from dengue[3,9].

In our study, 14.8% of children with scrub typhus developed pneumonia. 37% of scrub typhus children developed Pneumonitis in a study by Sirisanthana et al[8]. Hepatitis was observed in 14.81% of children but none had jaundice. In a study by Yang et al, six out of 47 scrub typhus cases presented similar to viral hepatitis[14]. Myocarditis is rare and some children may have unrecognised mild myocarditis[15].We had four children with elevated CPK-MB suggesting myocardial injury but all had normal ECHO. Jim et al reported myocarditis in 5% of children[14]. Meningo-encephalitis is a dreaded but rare complication in scrub typhus. We had only one child with this complication and a similar incidence is noted by Sirisantana et al in their study[8].

Indirect florescent antibody test for scrub typhus has an advantage of being useful in the first week of illness over traditional Weil-Felix test which is useful only in the second week of illness. Currently IFA is considered as gold standard serological test for scrub typhus[1].

Limitation of our study is possibility of missing mild cases of scrub typhus that had fever of less than seven days duration. We did not demonstrate raise in titres using paired sera of our subjects.

Conclusion

The incidence of scrub typhus using IFA was 3.15% in children with acute febrile illness in our study. The clinical and laboratory features can be confusing with Dengue and other tropical illness. Scrub typhus should be strongly considered in any child with non-relenting febrile illness with hepatosplenomegaly, lymphadenopathy, liver dysfunction and thrombocytopenia.

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