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Scrub Typhus in Children at a Tertiary Care Hospital in Southeast Rajasthan: Clinical Profile and Complication

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Abstract

Objective: To study the clinical profile and complications of childhood scrub typhus.

Methods: Retrospective observation, during the period between July 2020 and December 2020. The diagnosis was confirmed by serology.

Results: Out of 35 diagnosed case of scrub typhus male and female ratio is 1.1:1(19:16). The age of the patients ranged from 1 to 17 years with a mean age was 8.1 years. All children presented with fever. Other common symptoms were vomiting 21(60%), abdominal pain 14(40%), headache 13 (35%), myalgia 13 (35%), altered sensorium 10 (28.5%), cough 6(17.1%), seizure 5 (14.2%), diarrhoea 4(11.4%), respiratory distress 4(11.4%), oliguria 2(5.7%), bleeding 2(5.7%). An Eschar was observed in 4 (11.4%) of the patients. Similarly, among clinical signs, hepatomegaly was encountered in 19 (54.2%), splenomegaly in 18 (51.4%), lymphadenopathy 12(34.2%) edema in 10 (28.5%), icterus in 5(14.2%), pallor in 5(14.2%) maculopapular rash in 7 (20%) of the 35 patients. Hepatitis was the most common complication seen in 7 (20%) children. Other complications encountered in the present study were meningoencephalitis, shock, respiratory distress, cardiac function, severe thrombocytopenia, renal impairments and DIC. Majority of patients (80%) recovered within one to three days of starting doxycycline treatment and remaining patients were recovered when azithromycin added. The overall mortality rate was 5.7%. Causes of death were multiple organ failure.

Conclusion: Scrub typhus should be considered in differential diagnosis in any acute febrile child in post monsoon season having a maculopapular rash, hepatosplenomegaly, tender lymphadenopathy, thrombocytopenia and features of organ dysfunction, hepatitis, ARDS or meningitis. Pending serological confirmation, empirical therapy with doxycycline or azithromycin should be started, as delay in treatment would result in life threatening complications.

Keywords: Scrub Typhus, Orientia tsutsugamushi, Eschar, hepatitis

Introduction

Scrub typhus is becoming an important cause of acute undifferentiated febrile illness in the Indian subcontinent [1]. Orientiatsutsugamushi, the causative agent of scrub typhus vectored by the biting of the larval life stage of infected Leptotrombidium mites is found in many parts of Asia including India, where it composes the most commonly reported rickettsial infection. Scrub typhus cases are being reported widely all over India including Rajasthan [2]. The majority of studies regarding rickettsial infections from various parts of the world are based on adult populations [3]. The majority of published studies are Retrospective or sporadic case reports [1]. Scrub typhus and other rickettsial infections are grossly under-diagnosed in India due to low index of suspicion,

non-specificity of signs and symptoms and absence of low cost, rapid and widely available diagnostic test [1,3].Even though there is a dramatic response to the antimicrobial therapy, a high index of suspicion is essential for early diagnosis and prevention of complications[4]. Delay in diagnosis and initiation of appropriate treatment can result in severe complications such as acute kidney failure, meningoencephalitis, acute respiratory distress syndrome (ARDS), septic shock, multi organ failure and death [5].Hence, this retrospective study was undertaken with an aim to evaluate the clinical laboratory profile, complication, and the subsequent outcomes associated in serologically confirmed children with scrub typhus admitted in tertiary care referral hospital.

Material and Method

Medical records of children between 1 to 17 years of age admitted in Pediatric Ward at Jhalawar medical college and hospital, a tertiary care referral teaching hospital situated in southeast of Rajasthan from July 2020, to December 2020, with a diagnosis of scrub typhus using appropriate clinical features and a single positive serological test were retrospectively reviewed. The serological test performed was scrub typhus Immunoglobulin M (IgM) ELISA kit by In Bios International Inc, USA. Demographic profile, clinical feature and laboratory parameters were collected from a proforma which was used as a data collecting form. The aforesaid proforma also contained information on complications of disease such as ARDS, meningoencephalitis, thrombocytopenia, acute kidney failure, respiratory failure, heart failure etc. along with the need of Pediatric Intensive Care Unit (PICU) admission, inotropic support, oxygen support, duration of PICU stay, hospital stay and mortality.

Laboratory investigations such as complete blood count, Liver function test, kidney function test, serum electrolytes, rapid antigen test for malaria, dengue serology, Widal test, blood and urine culture, chest X-ray, CT scan etc. were recorded. The data were entered in Microsoft Excel worksheets and analyzed. Categorical variables are expressed as the number of patients and the percentage of patients; continuous variables are expressed as mean and standard deviation. An alpha level of 5% has been considered, i.e., if any p-value is less than 0.05, it has been considered as significant. SPSS version 23 has been used for the analysis.

Results

A total of 35 children were found to have scrub typhus with positive IgM ELISA from July 2020 to Dec, 2020. The male and female ratio is 1.1:1(19:16). Age of the patients ranged from1 to 17 years with a mean age was 8.1 years. The patients were divided into two age groups less than 5 years 11(31.42%) and more than 5 years 24(68.57%). The demographic data is shown in table no.1.

Table 1: Demographic Data of Children with Scrub Typhus

	No (35)	(%)
Gender Male Female	 19 16	 54 46
Age group Less than 5years More than 5 years	 11 24	 31.42% 68.57%

The common clinical features at the time of presentation are depicted in Table no.2. All 35 (100%) patients presented with fever and 20(57.1%) patients were having less than 7 days of fever and 15(42.8%) were having more than 7 days of fever. Other common symptoms were vomiting 21(60%), abdominal pain 14(40%), headache 13 (35%), myalgia 13 (35%), altered sensorium 10 (28.5%), cough 6(17.1%), seizure 5 (14.2%), diarrhoea 4(11.4%), respiratory distress 4(11.4%), oliguria 2(5.7%), bleeding 2(5.7%). An Eschar was observed in 4 (11.4%) of the patients. Similarly, among clinical signs, hepatomegaly was encountered in 19 (54.2%), splenomegaly in 18 (51.4%), lymphadenopathy 12(34.2%) edema in 10 (28.5%), icterus in 5(14.2%), pallor in 5(14.2%) maculopapular rash in 7 (20%) of the 35 patients.

Table 2: Common clinical feature at the time of presentation

Clinical features	No of patients [n=35(%)]
Fever < 7 days >7days	35(100%) 20(57.1%) 15(42.8%)
Nausea/vomiting	21(60%)

Pain abdomen	14(40%)
Headache	13(35%)
Myalgia	13(35%)
Altered sensorium	10(28.5%)
Cough/coryza	6(17.1%)
Seizure	5(14.2%)
Diarrhea	4(11.4%)
Respiratory distress	4(11.4%)
Oliguria	2(5.7%)
Bleeding	2(5.7%)
Eschar	4(11.4%)
Hepatomegaly	19(54.2%)
Splenomegaly	18(51.4%)
Lymphadenopathy	12(34.2%)
Edema	10(28.5%)
Jaundice	5(14.2%)
Pallor	5(14.2%)
Maculopapular rash	7(20%)

Tables 3 and 4 show laboratory parameters and complications observed among children diagnosed with scrub typhus respectively. Two patients were died, due to MODS. Remaining patients recovered within one to three days of starting treatment. Doxycycline was given in all 35 patients and out of these 80% patients recovered. In rest of the cases, we added Azithromycin. Severe Anemia (hemoglobin <7.0 g%) was present in 5 patients (14.2%), thrombocytopenia (platelet count <1,00,000/mm3) in 9 (25.7%), leucocytosis in 19 (54.2%), elevated liver enzymes (SGOT, SGPT) in 7 (20%), deranged kidney function in 6 (17.1%), hyperbilirubinemia in 5 (14.2%), hypoalbunemia and hyponatremia in 3(8.5%) each of children.

Hepatitis was the most common complication seen in 7 (20%) children. Other complications encountered in the present study were meningoencephalitis, shock, respiratory distress, cardiac dysfunction, severe thrombocytopenia, renal impairments and DIC.

Table 3: Laboratory Abnormalities in Children with Scrub Typus

parameters	No.	%
Anemia (< 7gm %)	5	14.2%
TLC Leukocytosis Leucopenia	19 4	54.2% 11.4%
Thrombocytopenia	9	25.7%
< 1 LAC < 50000Cumm	4	11.4%
Raised liver enzyme (SGPT/SGOT)	7	20%

Table 4: Complications of scrub typhus seen in the present study

Complication	No. (n=35)	%
Hepatitis	7	20%
Meningoencephalitis	5	14.2%
Shock	5	14.2%
Respiratory distress	4	11.4%
Cardiac dysfunction	4	11.4%
Severe thrombocytopenia	4	11.4%
Renal impairment	3	8.5%
DIC	1	2.8%

Discussion

In the present study most of the cases were seen during the months of July to December. The disease presents as an acute febrile illness with non-specific signs and symptoms. In our study, children in the age group less than 5 years were 11(32%) and more than 5years were 24(68%) and 19 (54%) were males and 16 (46%) were females. Comparison with other Indian studies demonstrated the presence of scrub typhus in children of all ages (1,4). All the patients were from the rural areas of the Jhalawar districts in Rajasthan where Children play and are also involved in the harvesting activity in the fields where they are exposed to the bites of larval mites. Fever is the most common symptom which is observed in our study and other studies as well (3,4,6). Other common symptoms were that of gastrointestinal symptoms such as nausea/ vomiting (60%), pain abdomen (40%) and diarrhea(11%) which coordinates with other studies done in India. Headache, myalgia, altered sensorium, cough, seizure, respiratory distress, oliguria and bleeding were found 35%, 35%,28%,17%,14%,11%,6%,6%, respectively. On physical examination, the most common signs were hepatomegaly (54%), followed by splenomegaly (51%), lymphadenopathy (34%) then edema (28%). Differential diagnosis of scrub typhus is malaria, Dengue, leptospirosis, Enteric fever etc. Here splenomegaly is an important clinical finding of scrub typhus that distinguishes it from dengue as splenomegaly is uncommon in dengue (6).Other common clinical

manifestation seen in scrub typhus patients is lymphadenopathy (8,10)which can be a differentiating feature from malaria and dengue. Presence of an Escher provides a valuable clinical clue in the early diagnosis of scrub typhus (7).It may develop before the onset of systemic signs. However, it is rarely seen in south East Asia and Indian subcontinent (1,3). In this study Escher was found in only 4 children (11%) which is in contrast to a few other studies which showed a higher detection rate (7, 12). Analysis of laboratory parameters revealed Leukopenia was uncommon in our study being around 11% whereas it was seen in 23% of the patients in another study (8). Leucocytosis was seen in 54% which is almost the same as that seen in other studies ranging from 21–47% (5,8). Severe anemia was reported in 5 children (14%). In the present study, we used ELISA testing for IgM antibodies against O. tsutsugamushi for diagnosis. This test has shown good sensitivity and specificity for detecting specific antibodies and has been adequately validated (11). Complications in scrub typhus develop after first week of illness (1) and are directly related to the blood load of O. tsutsugamushi (13). In the present study, the most common organ dysfunction was hepatitis followed by ARDS, circulatory collapse, meningoencephalitis, AKI and one patient was presented with cerebellar ataxia. Out of 35 children, 5 children (14%) were clinically icteric and 9 children (24%) had hyperbilirubinemia on investigation. Among 35 children, increased SGOT and SGPT were found in 7 (20%) patients. Dyselectrolytemia such as hyponatremia was found in 3 (8.5%) children. Prevalence of hyponatremia ranged from 15–32% in other studies (9). Hypoalbuminemia was also found in 3 children (8.5%) out of total 35.Out of all 35 patients 16(45%) patients needed ICU admission, 10 (28%) needed oxygen support, 2 (5.7%) required assisted ventilation, 5(14%) required inotropic support, PRBC requirement in 8 (23%) patients and RDP requirement in 6(17%) patients. Although the case fatality rate reported for scrub typhus varies from 14% in India to 15–30% in Taiwan (14) and 10% in Korea (15), it was observed to be 5.7% in this study. The limitations of the study were that it was retrospective rather than prospective. During the outbreak, all the study subjects were examined by several doctors after hospitalisation which might have led to errors in observing and recording clinical data.

Conclusion: Scrub typhus should be considered in differential diagnosis in any acute febrile child in post monsoon season having a maculopapular rash, hepatosplenomegaly, tender lymphadenopathy, thrombocytopenia and features of organ dysfunction hepatitis, ARDS or meningitis. Pending serological confirmation, empirical therapy with doxycycline or azithromycin should be started, as delay in treatment would result in life threatening complications. Ethics approval - Approval to perform this study was provided by the Institutional Ethics Committee of Jhalawar Medical College, Jhalawar, Rajasthan, India after review of the methodology.

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