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A CLINICOEPIDEOMOLOGICAL AND LABORATORY PROFILE OF SCRUB TYPHUS IN A URBAN TERTIARY CARE HOSPITAL

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Abstract: *Acute febrile illness is one of the common reasons for outpatient visits to any pediatric outpatient clinic. Prompt and accurate diagnosis plays a key role in preventing complications and mortality. Accurate diagnosis is achieved by astute clinical examination identification of differentiating features aided by laboratory parameters. Scrub typhus is one of the common illness along with Dengue fever which contribute to significant morbidity and mortality. The study was carried out in 76 children between 1 month and 12 years, admitted in Paediatric Department of Saveetha medical college and hospital, Thandalambetween March 2017 to March 2019.A total of 76 children with positive rapid IgM scrub typhus positive were studied of which 41 were boys and 35 were girls. Fever was the most common presentation and present in all the children. Gastrointestinal symptoms like vomiting (78%), abdominal pain (71%), and diarrhea (63%) were other common presentation. Apart from lymphadenopathy which was documented in most of the children. Edema (2.6%), oliguria (1.3%), septic shock (1.3%) were the less common presentations. Eschar was documented in 63.1% of the children. Among the laboratory parameters thrombocytopenia was the most common presentation present in 64.4 % of the children. Co infections were noticed in 6 children of whom 2 had typhoid, 2 had malaria and 2 children had dengue fever. Scrub typhus is one of the common causes of undifferentiated fevers and needs to be identified and appropriately managed to prevent complications.*

Key words: *Scrub typhus, Eschar, Ricketsial infections, Thrombocytopenia, Septic shock.*

I. INTRODUCTION

Rickettsial infections are a group of zoonotic febrile illness caused by obligate intracellular bacteria from the genus *Rickettsia*, Orientia, *Ehrlichia*, *Neorickettsia*, and *Anaplasma*(1). They are spread by tick or mite bites.

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Scrub typhus is caused by *Orientiatsutsugamushi* and is the most commonly reported rickettsial infection in India. These infections are distributed geographically in a triangular pattern which borders northern Japan and far-eastern Russia in the north to northern Australia in the south and Pakistan and Afghanistan to the west, as well as in the islands of the western Pacific and Indian Oceans[2,3]

The usual presentation is fever without localizing signs lasting for less than 14 days [1,2,3]. Other presentations include abdominal pain, vomiting, headache, fatigue and malaise. Clinical signs which are commonly noticed include hepatosplenomegaly, lymphadenopathy and eschar. Common laboratory parameters include thrombocytopenia, elevated total leucocyte count, deranged liver enzymes. The complications include meningoencephalitis, septic shock, pneumonia and multiorgandysfunction[4].

The scrub infection is grossly under-diagnosed and often under reported in India[2] because of non-specific clinical presentation, limited awareness about the disease, low index of suspicion among clinicians, and a lack of diagnostic facilities .Further studies in children are lacking and are usually case reports ,case series and retrospective studies. We attempted to do a prospective survey of the clinical and laboratory features of children admitted with fever with positive scrub typhus serology in our institution.

II. MATERIAL AND METHODS

A prospective descriptive study was conducted in the Department of Pediatrics, Saveetha medical college and hospital between March 2017 and March 2019.All children below the age of 12 years who presented with features consistent with scrub typhus were recruited in the study. A total of 76 children had Positive IgM scrub typhus.

Investigations like complete blood count with differential counts, peripheral smear for malarial parasite, urine analysis and blood culture were sent for all patients and repeated if clinically warranted as per the unit policy. Other investigations like Serum electrolytes, Liver function test, renal function test, Widal test, chest x-ray and Echocardiogram were done when clinically warranted.

Scrub typhus was confirmed by IgM ELISA using INBIOS kit for scrub typhus which has a 91% sensitivity and 100% specificity. Serology was done in all children who had fever for more than five days duration. Weil Felix test was done in 28 children along with serum IgM in children who had clinical and laboratory features consistent with scrub typhus, but without eschar.

Demographic data such as age, gender and the presenting symptoms including the history of drug intake were recorded as per the Performa.Statistical analysis was done with SPSS-21 and mean, and standard deviation and proportions were analyzed.

III. RESULTS

A total of 76 children were admitted in the hospital with positive IgM serology for scrub typhus was included in the study. Of this 76 children 41 (53.9%) were boys and 35(46.1%) were girls. The age of these children ranged from 6 months to 12 years of age with an average age of presentation of six years. Children aged between 5 to 10 years accounted for nearly 53.9 % of the total cases. Majority of these patients were from nearby districts of Tamil Nadu and lived in rural areas (82.9%). Majority of the cases were reported between the months of July

and December (65.7%) of total cases. All the children had fever which was the most consistent clinical symptom .Most of the children had fever which was mild or moderate and duration was 7 or more days at the time of admission . The gastrointestinal symptoms were the second most consistent presentation and was found in majority of the children .The most common gastrointestinal symptoms included vomiting (78%), abdominal pain (71%), diarrhea (63.1%) Other clinical symptoms included maculopapular rashes were noticed among 18.4% of children. Headache (15.7%) % and myalgia (13.1%), cough and runny nose (31.5%). Symptoms suggestive of severe illness were observed in a small number of cases and included Edema (2.6%), oliguria (1.3%), septic shock (1.3%).

Most consistent clinical examination finding was identification of an eschar which was noticed in 63.1% of the children and was commonly noticed in the axilla, groin .Other important clinical finding was lymphadenopathy which again was noticed in 88.1 % of the children with majority having generalized lymphadenopathy. Another common finding was organomegaly. Hepatomegaly was noticed in 27.9% children and hepatosplenomegaly in 51.4% children. Isolated splenomegaly was found in 9.2% cases.

Among the laboratory parameters, the most consistent finding was thrombocytopenia which was noticed in 64.3.5 of children .However majority of them had mild to moderate thrombocytopenia and bleeding manifestations were not documented. Total leukocyte counts were normal in the majority of patients. Leukocytosis and leukopenia were observed in 22.3% and 10.5%of the children respectively.

Other laboratory findings included altered liver enzymes, dyselectrolemia which were found in very few cases.

Table1 Study population demographics

Parameter	**Number (%)**
Total no of children studied	76(100%)
No of male children	41(53.9%)
No of female children	35(46.1%)
Age group	
<1 year	3(3.9%)
1 to 5 years	22(28.9%)
5 to 10 years	41(53.9%)
>10 years	11(14.4%)
Area	
Rural	63(82.9%)
Urban	1317.1%)
Distribution of cases	
January to March	15(19.7%)
April to June	1114.4%)
July to September	22(28.9%)
October to December	28(36.8%)

Table 2 .Clinical Symptom

Clinical Symptoms		Number (% of cases)
Fever	<7 days	10(13.1%)
	7 to 14 days	48(63.1%)
	>14 days	18(23.6%)
Headache		12(15.7%)
Myalgia		10(13.1%)
Arthalgia/arthritis		2(2.6%)
Abdominal pain		54(71%)
Vomiting		60(78.9%)
Loose stools		48(63.1%)
Cough		24(31.5%)

Table 3.Clinical signs

Clinical signs		Number (% of cases)
Lymphadenopathy	Regional	9(11.9%)
	Generalised	67(88.1%)
Tachypnea		3(3.9%)
Retraction		5(6.5%)
Tachycardia		10(13.1%)
Shock		1(1.3%)
Edema		2(2.6%)
Facial puffiness		2(2.6%)
Oliguria		1(1.3%)
Eschar		48(63.1%)
Organomegaly	Hepatomegaly	21(27.9%)
	Hepatosplenomegaly	39(51.3%)
	Splenomegaly	7(9.2%)

Table 4.Laborotory parameter

Presentation		Number % of cases
Thrombocytopenia	<50000	2(2.6%)

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(cells /cc)		
	50000 to 100000	8(10.52%)
	100000to 150000	40(53.6%)
Anemia		48 (63.1%)
Abnormal LFT		4(5.2%)
Abnormal RFT		2(2.6%)
Abnormal X-ray		2(2.6%)
IgM scrub		76(100%)
WBC Counts(cells /cc)	<4000	18(23.5%
	4000 to 11000	48(63.1%)
	>11000	10(13.1%)

IV. DISCUSSION

Scrub typhus, also known as Tsutsugamushi fever, is one of the common causes for acute undifferentiated fever in children. It has a seasonal distribution with most cases being distributed in the rainy season between June and December[1,2,,6,-9] .Most of the cases have presentation with prolonged fever and non-specific signs and symptoms. Consistent clinical finding is the identification of an eschar which is the mite bite mark. The illness can be associated with complications like meningoencephalitis, pneumonitis, ARDS and multiorgan dysfunction (MODS). Endocarditis and hemophagocyticlymphhistiocytosis are other rare complications[10-12].

Because of the non -specific symptomatology and overlap of symptoms with dengue and other viral illness there is often a delay in diagnosis which is often associated with increased mortality [12] .Further early diagnosis and antimicrobial therapy with doxycycline or azithromycin can result in good recovery.

In our study around 65.7% of the cases are school going and are hence exposed to the mite in the shrubs .Few cases in the non-school going children can be explained by the transmission through fomites or by the change in habitat of the mite during the rainy season[9] .The school children also play outside and are exposed to the infective organism.

Majority of the cases where reported in the rainy season between July and December Similar findings were noticed in previous study by Selvakumaretal[13]. This season coincided with the growth of vegetation and mite. The possibility of chigger migrating to a safer place (inside a home) during monsoon season may probably explain the incidence of scrub typhus in infants noticed in our study.

Fever was the most consistent symptom and it was mostly mild to moderate in nature which is similar to the reports from previous literature[13,14,15] .This could also be due to empirical antibiotic use by physicians as outpatient and also over the counter use of medicines.

Maculopapular rashes were noted in 18.4 % of the cases, this is in contrast to literature from other countries and previous studies [16],this could be possibly explained by the dark complexion of the study population which probably made the identification of the rash difficult.

The gastrointestinal symptoms like vomiting (78%), diarrhea (63.1%) and abdominal pain (71%) were reported which is similar to literature from previous studies[1-13]. Gastrointestinal system was the most commonly affected system (51 %) and vomiting (68 %) and pain abdomen (42 %) were the most common symptoms according to previous studies.

Eschar was identified in 63.1% of the cases .The identification of eschar was between 30% to 67 % in previous studies [14,17]. The site of eschar was also axilla and groin most commonly, though few children had it around the umbilicus, nape of neck, ear cartilage, and gluteal groove. Identification of eschar requires proper clinical examination and suspicion of scrub typhus.

Most consistent clinical sign was Lymphadenopathy Regional lymphadenitis at the site of eschar was a common finding in previous studies.Generalized lymphadenopathy was more common in our study compared to localized lymphadenopathy [8,9].

Hepatosplenomegaly was a consistent examination finding found in 51.4 % of cases compared to isolated hepatomegaly or splenomegaly which was reported in previous studies.

. The high incidence of hepatosplenomegaly and generalized lymphadenopathy is a pointer towards reticuloendothelial system involvement in scrub typhus[13]. Localized lymphadenitis may not have such significant involvement of the reticuloendothelial system. The significance of this finding needs further evaluation.

The complications were noted among children who had coinfections (N=6, 2-malaria, 2-dengue, 2-typhoid) accounting for edema, respiratory distress, shock and oliguria. Moreover, no mortality was reported in our study. This successful treatment of scrub cases without mortality may attribute to the clinician's awareness of scrub typhus cases during monsoon season as a common cause for prolonged fever.

Forty-seven per cent of present study population reported thrombocytopenia. Compared to previous studies the present study shows a significantly higher rate of moderate thrombocytopenia[18,19] . Two cases of severe thrombocytopenia had simultaneous co-infection.

Even though liver enzymes were elevated in a small number of cases, none of them had clinical or biochemical evidence of jaundice. Renal function was done only for those who had oliguria or edema. Echo was normal in those with tachycardia and edema. There was no evidence of myocarditis.

Scrub typhus was diagnosed based on ELISA IgM positivity. Weil-Felix was done in those children who seldom had eschar. Of the 28 cases which did not have eschar, Weil Felix was positive only in 53.5%cases. This low positive rate indicates the utility of Weil Felix as a tool for diagnosing scrub typhus. Clinical suspicion along with the presence of eschar, with anemia, thrombocytopenia and serum IgM positivity clinch the diagnosis of scrub typhus in the majority of cases. As per unit protocol, children with less than six years were treated with Azithromycin (10mg/kg/day x 5 days) and those more than six years were administered Doxycycline (5 mg/kg/day x 5 days), resulting in complete clinical cure without any recurrence during follow up.

V. CONCLUSION

Scrub typhus should be considered as a differential diagnosis of acute undifferentiated fevers moreso during the rainy season. Diagnosis is mainly clinical and requires high index of suspicion and astute clinical

examination.IgM scrub typhus is a rapid test and can identify illness in most of the cases. Early antimicrobial therapy has been associated with excellent outcomes.

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