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Original Research Article

Clinical profile and laboratory parameters of confirmed pediatric scrub typhus cases in a tertiary health care institute

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ABSTRACT

Background: Scrub typhus is one of the vector borne tropical infectious disease, caused by *O. Tsutsugamushi*. Because of nonspecific signs and symptoms and variable prevalence of pathognomic sign (eschar), diagnosis is very difficult in early stage. The purpose of present research was to differentiate that whether case presenting at our institution are different from previously conducted research in various regions.
Methods: Hospital record of all reported cases of scrub typhus admitted to department of pediatrics at tertiary health care institute in North India over last two years (2018-2019) was retrieved and reviewed.
Results: More cases were reported in male. Maximum number of cases were in 5-10 years i.e. 32 (50.0%) and only one case in less than 12 months. Maximum number cases were reported in August to October 53 (82.8%) as shown. Most common presenting complaint was fever. Most of cases reported with fever of duration of 7-14 days in (51.6%). Rash was present in 7 (10.5%) and eschar in 1 (1.5%). In lab parameters reported abnormalities severe hypoalbuminemia, hyperbilirubinemia, elevated transaminases, anemia, thrombocytopenia leucopenia and leucocytosis. Hepatitis in 48 (75%) was most common complication followed by pneumonia. Other reported complications were myocarditis, acute kidney injury, pneumonia, bleeding, meningitis, enchepalopathy , papilledema, ARDS and hemophagocytosis.
Conclusions: Pediatrician should keep high index of suspicion for suspect scrub typhus in a child presents with febrile illness and early treat should be started. Hepatitis is most common complication. As Scrub typhus is associated with multisystem involvement, thorough assessment of patient should be done to look for these complications and appropriate management of complications should be provided to prevent mortality.

Keywords: Orientia, Acute kidney injury, Acute respiratory distress syndrome, Multiorgan dysfunction, Disseminated intravascular coagulation, Hemophagolymphohistiocytosis

INTRODUCTION

Scrub typhus is one of the vector borne tropical infectious disease, caused by *O. tsutsugamushi*, transmitted to human host by larvae of trombiculid mite.[1] Scrub typhus presents an acute febrile illness.[2,3] Clinical presentation is non-specific, characterized by fever, headache, pain abdomen, vomiting, hepatosplenomegaly, lymphadenopathy, generalized anasarca, rash and shortness of breath.[4,5] Microvascular leakage results in edema, reduced tissue perfusion and end-organ ischemic injury.[4,5] The complications of scrub typhus are acute kidney injury (AKI), hepatitis, acute respiratory distress syndrome (ARDS), meningitis, shock, myocarditis. These complications usually appear in the second week of illness.[4,5] Eschar is the pathognomic sign and its

prevalence is in 11-43% of cases in many studies.[6-10] As the signs and symptoms are non-specific, diagnosis is very difficult in early stage. Delay in treatment leads to serious complications. We conducted the study to study clinical and laboratory profile confirmed cases of scrub typhus at our institution in north india . Aim of present research was to differentiate that whether case presenting at our institution are different from previously conducted research in various regions. Objective of current investigation was to study the clinical and laboratory profile of confirmed pediatric scrub typhus cases

METHODS

We conducted a retrospective observational, hospital-based study after taking ethical approval from Research Committee & related document attached at the end. Hospital record of all reported cases of scrub typhus admitted to department of pediatrics at Govt. medical college & hospital, Chandigarh, a tertiary health care institute in North India, over last two years (2018-2019) was retrieved and reviewed. Only confirmed cases of scrub (IgM ELISA positive) testing were included in this study. Data regarding demographics variables, clinical presentation and routine investigations was recorded and analysed.

Sampling method

Current study is time bound retrospective study. All the admitted scrub typhus cases over study period of two years (January 2018 to December 2019) reviewed and analysed.

Inclusion and exclusion criteria

All cases diagnosed as Scrub typhus by using IgM Scrub typhus ELISA were included. All unconfirmed (IgM negative) scrub typhus cases were excluded.

Statistical analysis

Data collected is analysed by using descriptive statistical analysis of demographic variables. Data collected is entered into Microsoft excel spread-sheet and analysed for demographic variables and clinical presentation and laboratory parameters.

Definitions of various clinical parameters

Myocarditis: congestive cardiac failure or requirement of dopamine /dobutamine >5 mcg/kg/min, adrenalin or nor-adrenalin or elevated CPK-MB (>25 U/l).[11] Acute kidney injury: According to Kidney Disease: Improving Global Outcomes definition and classification.[12] Acute respiratory distress syndrome: according to consensus recommendation from Pediatric Acute Lung Injury consensus.[13] Hepatitis: When liver transaminase and or serum bilirubin are found to be elevated.[14] Hemophagocytosis Lymphohistiocytosis: diagnostic and therapeutic guidelines for hemophagocytic lymphohistiocytosis.[15] Disseminated Intravascular coagulation: Clinical manifestations of bleeding along with thrombocytopenia and deranged coagulation profile.[14] Meningitis: clinical features or elevated cells and protein on cerebrospinal fluid (CSF) analysis.

RESULTS

Sixty-four confirmed paediatrics scrub typhus patients were admitted during the study period of which 40 (62.5%) patients were males and 24 (37.5%) were females. Age wise-distribution of patients is as depicted in (Table 1). Maximum number of cases were in 5-10 years and only one case in less than 12 months. The range, mean and median age of study population are 0.9-13.8 years, 7.8±3.25 years and 8 years respectively. Monthly distribution of cases is depicted in (Table 1). Maximum number cases were reported in August to October (autumn season) 53 (82.8%) as shown (Table 1). Distribution of various signs and symptoms as depicted in (Table 1). All 64 cases (100%) had fever. Maximum number of cases reported with fever of duration of 7-14 days (51.6%). Loose stool and dysentery present only in 4 (6.3%) and 1 (1.5%). Rash was present in 7 (10.5%) and eschar in 1 (1.5%). Neck stiffness, seizures and altered sensorium in 5 (7.8%), 5 (7.8%) and 9 (14.1%) respectively. Shock was present in 25 (39.1%); fluid responsive in 8 (12.5%) and ionotropic support required in 17 (26.5%). Lymphadenopathy, hepatomegaly and splenomegaly in 3.1%, 58.7% and 53.9%. Various laboratory parameters as depicted in Table 2. Hypoalbuminemia and severe hypoalbuminemia in 49 (76.56 %) and 20 (31.25%) respectively. Leucocytosis was present in 23 (35.93%) and leucopenia in 9 (14.1%). Anemia was present in 49 (76.56%). Thrombocytopenia was present in 42 (65.6%) with maximum number of cases reported with platelet count between 50000-100000/mm3. None had platelet count less than 10000/mm3. Distribution of various complications as depicted in (Table 1). Hepatitis reported in maximum number of cases i.e. 47 (74.6%) cases followed by pneumonia in 40 (63.5%).

DISCUSSION

As the clinical presentation of scrub typhus is non-specific. Therefore, it is need of hour that every clinician either general physician or specialist must be aware of various clinical presentation and seasonal occurrence in particular region. In our study, we described the demographic, clinical features, laboratory parameters and seasonal variations of the re-emerging tropical infection of scrub typhus. We reported total sixty-four paediatrics scrub typhus patients which were admitted to department of pediatrics at tertiary health care institute in North India during study period (2018-2019). The proportion of male paediatrics patients is relatively higher as compared to female patients. This difference is explained by more outdoor activities in boys.

Table 1: Demographics, seasonal distributions, signs-symptoms and complications.

Demographics		N (%)	Signs/symptoms		N (%)	Signs/symptoms	N (%)
Age (years)	Mean	7.8±3.25	Fever	<7 days	23 (35.9)	Lymphadenopathy	3.1
				7-14 days	33 (51.6)	Hepatomegaly	58.7
				>14 days	8 (12.5)	Splenomegaly	53.9
	Range	11 months to 13.8 years	Myalgia & Malaise		7 (10.9)	Swelling	42.2
	Median	08	Pain abdomen		31 (48.4)	Decreased urine output	0
Age (years)	<1	1 (1.5)	Vomiting		28 (43.8)	Neck stiffness	7.8
	1-5	7 (10.9)	Loose stool		4 (6.3)	Complications	**N (%)**
	5-10	32 (50.0)	Dysentery		1 (1.5)	Hepatitis	48 (75)
	>10	24 (37.5)	Cough		11 (17.2)	Pneumonia	40 (62.5)
Sex	Male	40 (62.5)	Seizures		5 (7.8)	ARDS	5 (7.9)
						Meningitis	5 (7.9)
			Altered sensorium		9 (14.1)	Encephalopathy	9 (14.06)
	Female	24 (37.5)	Rash		7 (10.9)	AKI	17 (27)
			Eschar		1 (1.5)	DIC	3 (4.6)
Season	Feb-Apr	0 (0)	Anasarca		27 (42.2)	Myocarditis	24 (38.1)
	May-July	5 (7.8)	Jaundice		2 (3.1)	HLH	1 (1.5)
	Aug-Oct	53 (82.8)	Tachypnea		40 (62.5)	Thrombocytopenia	42 (65.6)
	Nov-Jan	6 (9.4)	-			Shock	25 (39.1)

Table 2: Laboratory parameters.

Lab Parameters		N (%)
Transaminitis		48 (75)
Elevated SGOT		23 (35.93)
Elevated SGPT		25 (39.1)
Elevated bilirubin		15 (23.8)
Thrombocytopenia	<150000/mm^3	42 (65.6)
	100000-150000/mm^3	7 (10.9)
	50000-100000/mm^3	16 (25)
	20000-50000/mm^3	15 (23.4)
	10000-20000/mm^3	4 (6.25)
Leukocytosis		23 (35.93)
Leukopenia		9 (14.1)
Anemia		49 (76.56)
Hypoalbuminemia (3.5 gm/dl)		49 (76.56)
Severe hypoalbuminemia (</= 2.5gm/dl)		20 (31.25)

Similarly, Kumar et al reported similar results.[16] The maximum number of patients were in 5-10 years of age group as explained by more outdoor activities in this group. Kumar et al reported similar results.[16] We reported one case in an infant of age 11 months with secondary hemophagolymphohistiocytosis. Nowneet et al and Bajracharya et al reported minimum age of 8 & 9 months respectively in their study.[17,18]

Maximum number of cases were reported in August to October (autumn season) 59 (81.9%), Similarly Kaushal et al reported an outbreak in September in hilly terrain of North India.[19] In our study, fever was most common presenting complaint (100% cases) followed by tachypnea 40 (62.5%), vomiting 28 (43.8%), pain abdomen 31 (48.4%), cough 11(17.2%), generalized anasarca 27 (42.2%) was among common presentation as depicted in (Table 1). Similarly results reported by Kumar et al and Bhatt et al.[17-20] In our study 51.6% cases have fever of 7-14 days duration, Similarly Bhatt and Kumar et al reported fever of 7-14 days in 59% and 60% cases respectively.[16,17] While Bhatt reported vomiting in 56%, cough in 35%, abdominal pain in 33% and breathlessness in 29%.[17] We reported Lymphadenopathy, hepatomegaly and splenomegaly in 3.1%, 58.7% and 53.9%. Kumar et al reported hepatomegaly in 61.8%, splenomegaly in 8.8%, and lymphadenopathy in 23.4% and Kumar et al reported lymphadenopathy in 37%, hepatomegaly in 91% and splenomegaly in 60% cases.[16,20] The presence of an eschar is helpful in clinical in the diagnosis of scrub typhus; but its absence does not rule out the disease. We reported rash in 7 (10.5%) and

eschar in 1(1.5%). Bhatt et al reported rash and eschar in 20% cases.[17] Others did not find an eschar in any of their cases.[21-24] Difference in findings can be due to retrospective observational study. Generalised anasarca was present in 27 cases (42.2%). Bhatt reported anasarca in 39% cases.[17] Loose stool and dysentery present only in 4 (6.3%) and 1 (1.5%) Bhatt reported loose stool in 6% cases.[17]

Neck stiffness, Seizures and altered sensorium in 5 (7.8%), 5 (7.8%) and 9 (14.1%). Bhatt et al reported meningeal signs in 18% and seizures in 20% cases.[17] Shock was present in 25 (39.1%); fluid responsive in 8 (12.5%) and inotropic support required in 17 (26.5%) cases. Bhatt et al reported shock in 36% cases.[17] In Laboratory parameters, our study revealed anemia in 49 (76.56 %) which may due to underlying nutritional deficiency also. Leukopenia was present in 9 (14.1%), while Bajracharya et al reported leukopenia in 3.6%.[19] Leucocytosis was present in 23 (35.93%) similar results observed by Khandelwal et al also Thrombocytopenia was present in 42 (65.6%), 16 (25%) cases with platelet count between 50000-100000/mm3 and 15 (23.4%) cases with platelet count between 20000-50000/mm3.[25] None had platelet count less than 10000/mm^3. Bhatt et al reported thrombocytopenia in 53% and platelet count <50000/mm^3 in 27.2% cases.[17] We reported hepatitis in 48 (75 %) cases, myocarditis in 24 (38.1%), acute kidney injury in 17 (27.0%), pneumonia in 40 (62.5%), bleeding in 6 (9.5%), meningitis in 5 (7.9%), enchepalopathy 9 (14.06%) and papilledema 1 (1.5%), hemophagocytosis in 1 (1.5%), ARDS in 5 (7.9%). Bajracharya reported hepatitis in 59.5%, myocarditis in 40.5%, meningitis in 34.5%.[19] Meningitis and meningoencephalitis was high in our study (30.4%) which was similar to the study done by Bhatt et al.[17] We reported one case of hemophagocytic lymphohistiocytosis (HLH). Khandelwal et al also reported similar finding.[25] Sankhyan et al reported three cases (20%) of HLH.[26]

We reported AKI in 27% cases and AKI is observed as a complication in various studies with range between 2%-20%.[16,23] We reported pneumonia in 40 (62.5% cases), whereas Bhatt pneumonia in 3% to 21% of cases.[17] ARDS and myocarditis were reported in 7.8% and 38.1% of cases, respectively in the present study. ARDS in literature has been reported in 4% to 22% of cases.[9,27]

Limitations

Limitations were; study reflects the data collected from tertiary referral hospital; therefore, cannot be applied to community. Second diagnosis based on IgM ELISA only because indirect immunofluorescence assay not available in India.

CONCLUSION

Paediatrician should keep high index of suspicion for suspect scrub typhus in a child presents with febrile illness and early treat should be started. Hepatitis is most common complication. As Scrub typhus is associated with multisystem involvement, thorough assessment of patient should be done to look for these complications and appropriate management of complications should be provided to prevent mortality.

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