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Clinical, Laboratory Profile and Outcome of Scrub Typhus in Children

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Abstract : Objective : *To study the clinical, laboratory profile and outcome of scrub typhus in children.* ***Methodology****: Children admitted with unexplained fever and diagnosed as scrub typhus between Nov 2013 and Mar 2015 were included in this study. Detailed history, clinical examination findings, laboratory profile, complications and outcome were analysed.* ***Results****: Total of 100 children were included and all of them presented with unexplained fever and any one or more of the following features like headache, abdominal pain, vomiting, eschar, rash, hepatospleenomegaly and shock. IgM ELISA was done to confirm the diagnosis. Neutrophilia, thrombocytopenia, elevated liver enzymes, raised CRP and anaemia were observed in this study. Complications like shock, pneumonitis, seizure, gastro intestinal bleeding and renal failure were observed. All the children responded promptly to therapy with either doxycycline or azithromycin and recovered completely without any residual impairment.* ***Conclusion****: Scrub typhus is not uncommon in children. High index of suspicion based on clinical features with or without eschar and prompt therapy with specific antibiotic will result in complete recovery from scrub typhus and favourable outcome.*
Keywords: *Chigger, ELISA, Eschar, Fever, Typhus.*

I. Introduction

Scrub typhus is one of the most covert re- emerging infections of recent days. It is caused by Orientia tsutsugamushi. It is transmitted by bite of a chigger, a larval stage of trombiculid mite. It is generally incapacitating and notoriously difficult to diagnose. Untreated cases can have fatality rates as high as 30-35% but when diagnosed timely it is often easily treatable [1]. The greatest challenge to Paediatrician is the difficult diagnostic dilemma caused by this infection early in their clinical course when specific antibiotic therapy is most effective [2]. Scrub typhus is remerging and known to occur all over India [3]. It is prevalent in many parts of India but exact data is unavailable [4,5]. Although scrub typhus is being reported from different regions of the country, majority of studies on scrub typhus were done in adult population. There is paucity of studies on Paediatric scrub typhus. Hence this study was conducted to assess the clinical, laboratory profile and outcome of scrub typhus in children in a rural tertiary care teaching institute located in south India.

II. Materials And Methods

This study was conducted in rural tertiary care teaching institute between Nov2013 to March 2015. Children between 6 months to15 years of age, admitted with fever without focus and any one or more of the following clinical features like eschar, rash, hepatospleenomegaly, lymphadenopathy and circulatory compromise and diagnosed as scrub typhus by IgMELISA system by In Bios International Inc. were included in this study. It is a qualitative ELISA for orientia tsutsugamushi in patients serum. Total of 100 children were included in this study. History of presenting illness, clinical examination findings were documented in detail. Complete blood count was done in all children. Other relevant investigations like C reactive protein liver function tests, renal parameters, blood culture, chest X Ray, USG abdomen and CSF analysis were done as clinically indicated. Children more than 8 years of age were treated with doxycycline and others were treated with azithromycin. Outcome was assessed based on defervescence after starting the antibiotic therapy, course of the illness in the hospital, duration of hospital stay, complications and mortality in the study population.

III. Results

A total of 100 children were included in this study. Out of them 59(59%) were males and 41(41%) were female children. 39(39%) children in this study group were below 5 years of age, 43(43%) were in the age group of between 5- 10 years and 18(18%) were above 10 years of age. Youngest among them was 11 months old. The mean age at presentation was 6.2 years.

Fever was the most common presenting illness in all the children. Majority had fever for less than 1 week. Maximum duration of fever was 21 days. Mean duration of fever was 8.1 days. Presenting symptoms and findings on clinical examination is given in **Table 1**. Eschar was present in 71(71%) children. Most

commonly found in the groin followed by axila, neck, post auricular region, back and extremities. Multiple eschars were seen in 5% of children.

On investigation, complete blood count and peripheral smear revealed that 45(45%) children in this study group were found to be anemic and thrombocytopenia was present in 45(45%) children. Mean platelet count was 88,466/mm3 Laboratory findings are given in **Table 2**. USG was done in 70(70%) children. Free fluid in the peritoneum and pleural space was found in 4 (4%) children.

Children more than eight years were given oral doxycycline at a dose of 4.5 mg /kg body weight/day in two divided doses for 7 days and the rest were given azithromycin 10mg/kg body weight/day for seven days. All the children responded promptly and in most of them fever subsided within 12 hrs. of starting therapy. The mean duration to defervescence was 19.32 hrs. Duration of hospital stay was less than 5 days in 55(55%) of children and 40% of children had to stay for 5-10 days. Only 10(10%) children needed more than 10 days of hospitalization because of complications. Mean duration of hospital stay was 5.07 days. Various complications were observed in this study and it is given in **Table 2**. All the children in this study including those who developed complications recovered completely and discharged home without any residual impairment.

Table 1: Presenting symptoms and clinical examination findings in children with scrub typhus

PRESENTING SYMPTOMS	NUMBER OF PATIENTS	CLINICAL FINDINGS	NUMBER OF PATIENTS
Fever	100(100%)	Maculopapular rash	05(5%)
Headache	39(39%)	Eschar	71(71%)
Vomiting	48(48%)	Lymohadenopathy	04(4%)
Abdominal pain	34(34%)	Hepatomegaly	61(61%)
Seizure	02(2%)	Splenomegaly	54(54%)
Cough	23(23%)	Anaemia	45(45%)
Dyspnoea	04(4%)	Meningeal signs	02(2%)
GI bleeding	02(2%)	Oedema	08(8%)
		Hepatospleenomegaly	56(56%)

Table 2: Laboratory findings and complications of scrub typhus in children

LABORATORY FINDINGS	MBER OF PATIENTS	COMPLICATIONS	NUMBER OF PATIENTS
Anaemia(Hb<11gm%)	45(45%)	Gastrointestinal bleeding	04(4%)
Leucopenia(<4000cells/mm^3)	08(8%)	Pneumonitis	04(4%)
Leukocytosis(>10000cells/mm^3)	38(38%)	Menigoencephlalitis	02(2%)
Neutrophilia(>70% of total WBC count)	62(62%)	Shock	04(4%)
Thrombocytopenia(<150,000/mm^3)	55(55%)	Acuterenal failure	02(2%)
Elevated liver enzymes	55(55%)	Electrolyte disturbances	06(6%)
Hypoalbuminemia(<3.5 gm/dl)	08(8%)	Severe thrombocytopenia	18(18%)
Hyponatremia(<135 meq/L)	32(32%)		
Hypokalemia (<3.5 meq/L)	02(2%)		
Elevated CRP (>1.0 mg/dl)	100(100%)		
Proteinuria	18(18%)		
Chest infiltrates	04(4%)		
Pleural effusion	04(4%)		
CSF WBC (> 5cells/mm^3)	02(02%)		

IV. Discussion

There have been studies from various parts of the world describing variable presentation of scrub typhus in children. Studies have shown that more than half of the patients of scrub typhus were less than 5 years old[6,7]which is contrary to our study population where children less than five years and between 5- 10 years of age were almost equally affected. We noticed a slight male preponderance, which can be explained by high risk of exposure to chiggers in them who are more likely to play outdoors. Fever was the most common presenting symptom with mean duration of fever being 8.1 days in our study which is comparable to study done by Huang CT et al[6] and Diagra et al[7] . Scrub typhus has been a rare differential diagnosis in children with fever without foci, one of the reasons for this being its vague symptomatology and absence of any pathognomonic clinical feature except Eschar. Presence of Cough, respiratory distress, gastrointestinal symptoms, shock and central nervous system involvement in children with scrub typhus in our study group was similar to studies done by Chanta C et al [8], Kumat M et al[9] and Huang CT et al[6]. This variability in symptomatology reflects the heterogeneity and multisystem involvement of scrub typhus. Presence of eschar varies form 11-75% in various studies. In concordance with these we noticed eschar in 71% of our children, most commonly in the hidden regions of the body. In this aspect our study results were similar to report given by Chanta et al [8] and Kumar M et al [9]. We also noticed multiple eschars in 5% of our children without any correlation between number of echars and severity of the illness in these children and just indicate multiple bites by the chigger. Maculopapular rash was rarely seen in our study when compared to other studies may be because the children in our study, being residents of tropical country were predominantly of dark complexion, in whom rash can be easily missed.

Presence of hepatospleenomegaly in our study group is similar to publication by Rathi NB et al[10] on clinical scoring system for early detection of spotted fever in which it is quoted that scrub typhus should be suspected in the presence of hepatospleenomegaly with fever for more than five days.

There was no specific trend observed in blood counts in previous studies but in our study neutrophilia and thrombocytopenia was seen in more than 50% of children. CRP was positive in all the children in whom it was done, as a marker of inflammation. Elevated liver enzyme levels were reported in previous studies and we observed scrub typhus is often associated with anicteric hepatitis with elevation of ALT and AST. But elevated liver enzymes in isolation is not suggestive of scrub typhus as this can be seen in several other diseases like dengue, enteric fever and leptospirosis which are endemic in our region. Because of non-specificity of clinical presentation, laboratory tests are required to confirm scrub typhus in children. Among various tests available, Indirect immunofluorescence test is considered as gold standard but it is not easily available in India and expensive also. We have used IgM ELISA for scrub typhus as diagnostic tool in our study and National Centre for Disease Control of India, in 2009 declared ELISA techniques, particularly immunoglobulin M (IgM) capture assays, are the most sensitive tests available for rickettsial diseases at present. All the children responded well to treatment with either doxycycline or azithromycin. We do not report any relapse in our study. The mean fever clearance time in our study was 19.32 hrs. and mean duration of hospital stay was 5.07 days. Few children developed complications like pneumonitis, meningoencephalitis, gastrointestinal bleeding, and shock and eventually all of them recovered completely without any residual impairment. No mortality was reported in our study. Comparable to previous studies early identification and institution of specific therapy either empirically on suspicion or after definite diagnosis has significantly reduced the mortality to nil.

V. Conclusion

Scrub typhus is not uncommon and it is a reemerging disease in children. High index of suspicion especially when a child presents with fever without foci, eschar, rash and hepatospleenomegaly will lead to early diagnosis. Prompt therapy with either doxycycline or azithromycin results in complete recovery and favorable outcome.

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