IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 3 Ver.8 March. (2018), PP 21-23
www.iosrjournals.org

Is Dengue Epidemic Masking The Incidence Of Scrub Typhus? An Observational Study

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Abstract: *Scrub typhus, an acute febrile illness caused by Orientia tsutsugamushi, is essentially a vasculitic disorder which if left untreated or improperly treated can lead to serious end organ damage and death. So its early diagnosis is of utmost importance. As peak season of Dengue and Scrub typhus overlaps (June to November) and both show similar clinical features, there is a tendency to overlook the latter where dengue is endemic. As the catchment area of our hospital is a dengue endemic zone with history of occurrence of epidemics in the past, there is an inherent tendency to be biased towards dengue. In 2017 we found 1259 cases to be reactive for Dengue NS1 out of 5228suspected cases tested for it(24% positivity), and 717 cases were reactive for Dengue IgM out of 3474 suspectedcases tested for it (20.7% positivity). In contrast only 62suspected cases were tested for Scrub typhus by Immunochromatographic Test (ICT) kit from July'2017 onwards and among them 12were found to be reactive (19.4% positivity). Thus, the proportion of positive cases among the different tests performed are fairly comparable, though there is pronounced skewing towards the dengue diagnostic tests in terms of the relative frequency of their utilisation. Hence it can be tacitly inferred that cases of scrub typhus are being missed due to our overzealous emphasis towards Dengue diagnosis, especially during epidemics.*

Key Words:*Orientia tsutsugamushi, Scrub typhus, Immunochromatographic test, eschar*

Date of Submission: 01-03-2018 Date of acceptance: 19-03-2018

I. Introduction

In India Scrub typhus has been reported from several states, namely, Haryana, Jammu, and Kashmir, Himachal Pradesh, Uttaranchal, West Bengal, Assam, Maharashtra, Kerala and Tamil Nadu. [(1)] Scrub typhus is an acute febrile illness caused by *Orientia tsutsugamushi*, which is transmitted to humans by the larva of trombiculid mites. It produces disseminated vasculitic and perivascular inflammatory lesions followed by significant vascular leakage and end-organ injury. It affects people of all ages. Though scrub typhus in pregnancy is rare, it is associated with increased foetal loss, preterm delivery, and small for gestational age infants. Incubation period is 6-21 days and characterized by fever, headache, myalgia, cough, and gastrointestinal symptoms. A primary papular lesion which later crusts to form a flat black eschar, may be present. Serious complications may occur if untreated. [(2)]Owing to its potential to cause severe complications, diagnosis of scrub typhus, and decision to initiate treatment should be based on clinical suspicion and confirmed by serologic tests. Laboratory diagnosis includes Weil-Felix agglutination test, Enzyme linked immunosorbent assay, rapid lateral flow-assay, western blot, immunochromatographic test, the indirect fluorescent assay, indirect immunoperoxidase test and PCR amplification of orientia genes. [(2)] The Weil-Felix agglutination test, oldest test in current use, detects cross-reacting antibodies to *Proteus mirabilis* OXK but it has low sensitivity. [(3)] PCR is the most sensitive diagnostic test for scrub typhus. [(4)]But molecular diagnostic facility is not available in most of the health care set up in developing countries like India. Other laboratory investigations usually reveal leucopoenia, thrombocytopenia, deranged hepatic and renal function, proteinuria and reticulonodular infiltrate.[(5, 6)]

A rapid diagnostic ICT strip is available for diagnosis of scrub typhus. The ICT kit can detect IgG, IgM and IgA of *Orientia tsutsugamushi*. The results were recorded as reactive or nonreactive. Blacksell*et al*. found that the sensitivity and specificity for the detection of IgM were 96.8 and 93.3%, respectively. [(7)]

The recommended treatment regimen for scrub typhus is doxycycline. Treatment of pregnant women with azithromycin was successfully done without relapse and with favourable pregnancy outcomes.[(2)]

II. Materials And Method

Serum was collected from clinically suspected cases which included patients presenting with fever, headache, myalgia, cough, and gastrointestinal symptoms. A primary papular lesion which had crusted to form a flat black eschar was also present in most of the patients. The sera were tested by rapid immunochromatographic card (ICT) test. All reactive sera were also tested for Dengue NS1 and Dengue IgM for detection of cross-reactivity.

Picture 1: Eschar

III. Result

Only 60 clinically suspected cases were tested by rapid ICT card test. Among them 12 cases (20%) were positive for scrub typhus. Among them 9 cases (75%) were paediatric and 3 cases (25%) were adult. We have found 6 patients were male (50%) and 6 patients (50%) were female. 9 cases (75%) occurs during November month. Among 12 cases 8cases (66.7%) presented with eschar. No sample was cross reactive with Dengue NS1 and Dengue IgM. All the patients were successfully treated by doxycycline.

Picture 2:

ICT card
test reactive

IV. Discussion

In a study in Tamil NaduT. Paul *et al.*found seropositivity for scrub typhus to be 31% in the year 2017 which is higher than our study[8]while another study in Uttarakhand by Khan F *et al.* in2015 showedseropositivity to be 20% which matched our study finding. [9] Ramyasree A *et al.*reported that most cases of scrub typhus in their study belonged to the age group of 18-45 years but in our study majority of cases (75%) were below 12 years of age. In the same studyno sex predilection was reported which concurred to our study. [10] In a study in South India Varghesea GM*et al*found the peak time of scrub typhus incidence to be between Septemberand January which is close to our study finding. [11] In another study Varghesea GM *et al.* found the eschar to be present in 55% of cases of scrub typhuswhile we found that 66.7% cases presented with eschar.[12]

The incidence of scrub typhus is more in the catchment area of our hospital due to the presence of several defunct jute mills, and also the frenzy created by the Dengue outbreak skewed the opinion of most medical practitioners in the locality towards it, thus leading to much lesser use of antibiotics in patients presenting with fever. Hence cases of scrub typhus which would have otherwise gone unnoticed due to early use of antibiotics like doxycyclineand azithromycin by local practitioners, but this time not only required admission to our hospital and also sometimes presented with serious complications.

V. Conclusion

This study thus gives us a valuable insight that even during a dengue epidemic the possibility of scrub typhus is very real and evident. So clinicians should preferably keep a high index of suspicion for a case of fever to be due to scrub typhus even during dengue outbreaks.

Acknowledgements

We express sincere gratitude to the Principal, Medical Superintendent cum vice Principal, and faculties of Medicine and Paediatric departments of our college. We specially extend our thanks to all the staff of the department of Microbiology and participants included in ourstudy.

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