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Original Research Article

Prevalence of Rickettsial Infections in Febrile Patients with Special Reference to Scrub Typhus in a Tertiary Care Hospital

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Abstract

Background: Rickettsial infections are attributed as one of the important cause of pyrexia of unknown origin and there is a need to be differentiated from other common febrile illness. This study was conducted to know the prevalence of rickettsial disease among febrile patients since scrub typhus is endemic in our district in monsoon season the prevalence of scrub typhus is also studied. ***Materials & Methods:*** Clinical data and history collected from all PUO patients. A careful search of eschar was performed in all patients, peripheral smear, rapid test for Malaria, widal, Dengue NS1 done accordingly based on the clinical data. Serum samples collected from all the cases and weil felix test was done. Most of the samples were reactive to OX-K antigen, they were subjected to scrub typhus investigation. IgM ELISA was done for scrub typhus. ***Results:*** Out of 180 patients 58 (32.22%) were positive for weil felix test. Among the 58 positives 28 (48.27%) were positive for OXK antigen suggestive of scrub typhus. Out of 28 patients 27 (96.45%) were positive in both ELISA & ICT. Only 1 (3.57%) was negative by ICT but positive in ELISA. Seropositivity of scrub typhus is higher in Males in the age group 30 – 45yrs .Fever with chills was present in all cases & headache followed by rashes was the next common finding in all patients with scrub typhus. ***Conclusion:*** In our study the Seroprevalence of scrub typhus throws a light that, this has to be included in the fever panel in differential diagnosis, which will help in timely diagnosis and adequate treatment can be given and avoid complications.

Keywords: Weil felix, Scrub typhus, ELISA, ICT.

INTRODUCTION

Rickettsial infections are prevalent and have been reported in all parts of Indian subcontinent particularly scrub typhus infections [1]. Rickettsial infections are attributed as one of the important cause of pyrexia of unknown origin and there is a need to be differentiated from other common febrile illness for appropriate treatment at the right time [2]. Severity of the Ricketissial disease varies from self limited illness to life threatening infection if untreated[3]. Mortality ratio in Rickettsial infections is reported to occur in 1% to 30% in untreated cases .Treatment of rickettsial infections needs to be started on the clinical suspicion as the method of testing the infection varies between different laboratories [4]. Scrub typhus is acute febrile illness and its prevalence is 47.5% in Vellore [5]. Incubation period of various rickettsial infection varies between 2 – 21 days. It is likely to be missed as the clinical presentation may mimic the common infections in tropics [6]. This study was conducted to know the prevalence of rickettsial disease among febrile patients since scrub typhus is endemic in our district in monsoon season the prevalence of scrub typhus is studied.

MATERIALS & METHODS

This study was done from June 2017 to Dec 2017 in our hospital after getting informed consent from the patients. This study was approved by the institution ethics committee.

Inclusion Criteria

- Adults hospitatlised with fever with one or more features like rash, edema, hepatosplenomegaly, lymphadenpathy, eschar.

Exclusion Criteria

- The cause of fever known & patient on treatment in outpatient [7].
- 340 cases of PUO of which180 patients who were in eligible criteria were subjected to the study. Clinical data and history collected from all PUO patients about duration of fever, age, sex, residential area, exposure to animals, and exposure to farming, h/o bite, vital signs, general & systemic examination findings were recorded. A careful

search of eschar was performed in all patients, peripheral smear, rapid test for Malaria, widal, Dengue NS1 and IgM antibody, urine and blood culture, tuberculin test, Leptospira & HIV tests done accordingly based on the clinical data [8]. Complete blood count, CSF analysis, chest xray renal & liver function, urine analysis, serum electrolytes USG abdomen done when necessary [9]. Serum samples collected from all the cases and weil felix test was done Titre of > 1:80 for OX2, Ox19, OxK were considered as significant [10]. Most of the samples were reactive to OX-K antigen; they were subjected to scrub typhus investigation. A fourfold rise in titre of paired sera in diagnostics for infections with febrile agents [11]. Since ELISA was performed on single serum. Immunochromatographic test can also be done which has got equal sensitivity & specificity [12].

- IgM ELISA was done for scrub typhus. The tests were performed as per manufacturers instruction and as OD (Optical density) more than (or) equal to 0.5 was taken as positive [13]. ICT (Immuno Chromatographic Test) also has equal sensitivity and specificity, easy to perform & single sera can be tested were also done for our samples for further confirmation [14].

RESULTS

Out of 180 patients 58 (32.22%) were positive for weil felix test. Among the 58 positives 28 (48.27%) were positive for OXK antigen suggestive of scrub typhus, 14 (24.13%) were positive for spotted fever group and 8 (13.79%) were positive for typhus group. 2(7.14%) were positive for two antigens both OXK and OX2.

28 positive cases of scrub typhus were subjected to ICT and ELISA. Out of 28 patients 27 (96.45%) were positive in both ELISA & ICT. Only 1 (3.57%) was negative by ICT but positive in ELISA.

Table-1: Shows prevalence of scrub typhus in age group

Age	Male		Female	
	n	%	n	%
0 – 15 yrs	2	7.14	3	10.71
15 – 30 yrs	2	7.14	2	7.14
30 – 45 yrs	6	21.42	5	17.85
45 – 60 yrs	2	7.14	3	10.71
> 60yrs	2	7.14	1	3.57

Seropositivity of scrub typhus is higher in Males in the age group 30 – 45yrs

Table-2: Correlation of scrub typhus with clinical findings n = 28

Parameters	n	%
Fever with chills	28	100
Headache	21	82.1
Rashes	23	75.1
Vomiting	12	42.85
Dypnea	9	32.14
Pain in abdomen	8	28.57
Cough	14	50
Altered sensorium	5	17.85
Hepatomegaly	6	21.42
Lymphadenopathy	9	32.14
Pedal edema	3	10.71
Conjunctival congestion	5	17.85
Eschar	-	-

Fever with chills was present in all cases & headache followed by rashes was the next common finding in all patients with scrub typhus no eschar was seen in our study.

Table-3: Shows Prevalence of predisposing factors to scrub typhus n=28

Predisposing factors	n	%
Exposure to rodents	24	85.71
H/o insect bite	21	75.1
Exposure to pets & domestic animals	21	75.1
field Labourers	25	89.28
House surrounded by bushes	23	82.1
Wearing shoes while working	3	10.71

89% 0f scrub typhus affected people were labourers who don't wear proper foot wear while working & live in a bushy area with exposure to rodents.

DISCUSSION

Rickettsial infections are re-emerging particularly the prevalence of scrub typhus varies from 0.8% to 60% in different countries [15]. In our study 58(32.22%) were positive for weil felix test which was concordant with the study done by Sanap *et al.*, [5] who also reported 32.3% of rickettsial infection in their study and also with veena mittal et al who reported 33.3% of rickettsial infection in their study [16].

Among the 58 positive rickettsial patients, 28 (48.27%) were positive for scrub typhus which is similar to study done by veena mital et al who also isolated 48.27% of scrub typus in their study. Palanivel *et al.*, [17] reported 99.5% positive for IgM ELISA in diagnosing scrub typhus & gurung *et al.*, [18] used ELISA & rapid method for diagnosis of scrub typhus & reported one sample positive by ELISA & negative by rapid method.

In our study 27 (96.4%) were positive for ELISA & ICT. Which is concordent with above findings also similar with Ramyashre *et al.*, [19] who also reported 97% of positivity in ELISA & ICT.

Among the positive scrub typhus males were affected more in the 3rd & 4th decade which was concordant with Ramyashre *et al*., [19] who reported males are commonly affected and but sero positivity was more in 6th decade but similar finding reported with Drexier *et al*., [20] who reported males are commonly affected in third decade.

All patients had fever which is concordant with Das *et al*., [21] who also reported that fever was common feature in all patients. Kamini *et al.*, [22] reported fever, with cough arthagia & positivity more in older age group. Fever, cough & vomiting were the chief complaints in studies done by Kumar *et al*., [23] & Tsay *et al*., [24].

No exchar was detected in any of the patients in our study which is a similar finding done by Ramyashra et al[19] However studies done by subblakshmi *et al*., [25] & ogawa *et al*., [26] reported that rashes is important finding in their study which is 82% and 90% respectively. In our study also rashes in present in 82.1% of patient correlates with this finding. Hepato splenomegaly was seen in 32% of our study which is less than study done by Fauzia khan [9] who reported 42%. of hepatosplenomegaly.

In our study 75% we exposed to animals, 82.1% lived in bushy area and only 10% are wearing shoes while working. A study done by Fauzia *et al*., [9] showed 65% exposed to animals, 78% living in bushy area and 50% not wearing shoes. Scrub typhus is reported in as endemic in many parts of India particularly Tamilnadu, Kerala, Karanataka & Orissa [27]. Our study provides an evidence for seropositivity of scrub typhus in and around Kanchipuram. In our study Weil felix test serve as primary test, cheapest test to detect the rickettsial disease when there is high index of suspicion followed by ELISA which would increase the frequency of diagnosis of disease. Indirect immunofluroscence test which is the gold standard is beyond the affordability in our area.

CONCLUSION

In our study the Seroprevalence of scrub typhus throws a light that, this has to be included in the fever panel in differential diagnosis, which will help in timely diagnosis and adequate treatment can be given and avoid complications. Health education campaigns for agricultural workers regarding their personal protection can also serve as an important public health measure to control infection.

REFERENCE

1. Sood, A., & Chauhan, S. (2013). Rickettsial Diseases: An Urgent Need to Upgrade Diagnostic Facilities. *International Journal of Recent Trends in Science and Technology*, 7: 20-21.
2. Mittal, V., Gupta, N., Bhattacharya, D., Kumar, K., Ichhpujani, R. L., Singh, S., ... & Rana, U. V. S. (2012). Serological evidence of rickettsial infections in Delhi. *The Indian journal of medical research*, *135*(4), 538.
3. Shenoy, S., Baliga, S., & Ashok, J. (2015). Rickettsial diseases in children.
4. Rathi, N., & Rathi, A. (2010). Rickettsial infections: Indian perspective. *Indian pediatrics*, *47*(2), 157-164.
5. Sanap, S. S., Thakur, V. A., Maniar, J. M., Vasave, S. V., & Vaidya, S. P. (2017). Weil – Felix Test – A Diagnostic Tool for Rickettsial Diseases. *Austin Journal Ctinical Pathology*, 4(1).
6. Mahajan, S. K., & Bakshi, D. (2007). Acute reversible hearing loss in scrub typhus. *JAPI*, *55*, 512-514.
7. Rathi, N. B., Rathi, A. N., Goodman, M. H., & Aghai, Z. H. (2011). Rickettsial diseases in central India: proposed clinical scoring system for early detection of spotted fever. *Indian pediatrics*, *48*(11), 867-872.
8. Mittal, V., Gupta, N., Bhattacharya, D., Kumar, K., Ichhpujani, R. L., Singh, S., ... & Rana, U. V. S. (2012). Serological evidence of rickettsial infections in Delhi. *The Indian journal of medical research*, *135*(4), 538.
9. Fauzia, K., Garima, M., Agarwal, R. K., & Sthaile, A. (2015). Prevalence of scrub typhus A causes of concern in clttarakhand region. *International journal of current Microbiology and applied sciences*; 1(1), 101-109.
10. Typhus, S. (2010). Diagnosis and treatment of scrub typhus–the Indian scenario. *JAPI*, *58*, 11-12.
11. Kamarasu, K., Malathi, M., Rajagopal, V., Subramani, K., Jagadeeshramasamy, D., & Mathai, E. (2007). Serological evidence for wide distribution of spotted fevers & typhus fever in Tamil Nadu. *Indian Journal of Medical Research*, *126*(2), 128-130.
12. Usha, K., Kumar, E., Kalawat, U. S. H. A., Kumar, S. B., Chaudhury, A., & Sai Gopal, D. V. R. (2014). Seroprevalence of scrub Typhus among febrile patients–a preliminary study. *Asian J Pharm Clin Res*, *7*(1), 19-21.
13. Sengupta, M., Anandan, S., Daniel, D., & Prakash, J. A. J. (2015). Scrub typhus seroprevalence in healthy Indian population. *Journal of clinical and diagnostic research: JCDR*, *9*(10), DM01.
14. Typhus, S. (2010). Diagnosis and treatment of scrub typhus–the Indian scenario. *JAPI*, *58*, 11-12.
15. Mahajan, S. K., Rolain, J. M., Kashyap, R., Bakshi, D., Sharma, V., Prasher, B. S., ... & Raoult, D. (2006). Scrub typhus in Himalayas. *Emerging infectious diseases*, *12*(10), 1590-1592.
16. Mittal, V., Gupta, N., Bhattacharya, D., Kumar, K., Ichhpujani, R. L., Singh, S., ... & Rana, U. V. S. (2012). Serological evidence of rickettsial

infections in Delhi. *The Indian journal of medical research*, *135*(4), 538-541

17. Palanivel, S., Nedunchelian, K., Poovazhagi, V., Raghunadan, R., & Ramachandran, P. (2012). Clinical profile of scrub typhus in children. *The Indian Journal of Pediatrics*, *79*(11), 1459-1462.
18. Gurung, S., Pradhan, J., & Bhutia, P. Y. (2013). Outbreak of scrub typhus in the North East Himalayan region-Sikkim: an emerging threat. *Indian journal of medical microbiology*, *31*(1), 72-74.
19. Ramyasree, A., Kalawat, U., Rani, N. D., & Chaudhury, A. (2015). Seroprevalence of Scrub typhus at a tertiary care hospital in Andhra Pradesh. *Indian journal of medical microbiology*, *33*(1), 68-72.
20. Drexler, N. A., Dahlgren, F. S., Heitman, K. N., Massung, R. F., Paddock, C. D., & Behravesh, C. B. (2016). National surveillance of spotted fever group rickettsioses in the United States, 2008–2012. *The American journal of tropical medicine and hygiene*, *94*(1), 26-34.
21. Dass, R., Deka, N. M., Duwarah, S. G., Barman, H., Hoque, R., Mili, D., & Barthakur, D. (2011). Characteristics of pediatric scrub typhus during an outbreak in the North Eastern region of India: peculiarities in clinical presentation, laboratory findings and complications. *The Indian Journal of Pediatrics*, *78*(11), 1365-1370.
22. Kammili, N., Swathi, A., Devara, S. M., & Anuradha, P. R. (2013). Prevalence of scrub typhus among acute undifferentiated febrile illness cases provisionally diagnosed as Dengue fever. *J Evol Med Dent Sci*, *2*, 2661-64.
23. Kumar, M., Krishnamurthy, S., Delhikumar, C. G., Narayanan, P., Biswal, N., & Srinivasan, S. (2012). Scrub typhus in children at a tertiary hospital in southern India: clinical profile and complications. *Journal of infection and public health*, *5*(1), 82-88.
24. Tsay, R. W., & Chang, F. Y. (1998). Serious complications in scrub typhus. *Journal of microbiology, immunology, and infection= Wei mian yu gan ran za zhi*, *31*(4), 240-244.
25. Subbalaxmi, M. V. S., Chandra, N., Teja, V. D., Lakshmi, V., Rao, M. N., & Raju, Y. S. N. (2012). Scrub typhus-experience from a South Indian tertiary care hospital. *BMC infectious Diseases*, *12*(1), 77.
26. Ogawa, M., Hagiwara, T., Kishimoto, T., Shiga, S., Yoshida, Y., Furuya, Y., ... & Masukawa, K. (2002). Scrub typhus in Japan: epidemiology and clinical features of cases reported in 1998. *The American journal of tropical medicine and hygiene*, *67*(2), 162-165.
27. Raghu, K. K., Tejashree, P., & Basavarajappa, K. (2015). Serological evidence of rickettsial infections in and around Davangere. *International Journal of Medical Science and Public Health*, 4: 1731-1734.