

Trends of Scrub Typhus at A Tertiary Care Hospital In Jaipur, Rajasthan

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Abstract: Introduction: Rickettsia diseases are now established as re-emerging zoonotic bacterial infections in the Indian subcontinent. Objectives: The retrospective study was conducted to see the trends of scrub typhus with cofactors like disease & sex ratio significance and impact of seasons on the disease outcome in the Jaipur, Rajasthan. Methods: A total of 2233 samples were processed between January 2013 to November 2016 suspecting rickettsia infection with complaints of fever, rash, oedema, hepatosplenomegaly, lymphadenopathy and an eschar, with or without a history of tick exposure at Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan. IgM antibodies to Orientia tsutsugamushi antigen were tested by ELISA method. Results: A total of 2233 samples were processed from January 2013 to November 2016. Out of 2233 samples 475 samples were IgM antibody reactive by ELISA method. In 2013 positivity is 36.38% while in 2014 positivity is 24.34%. In 2015, 21.49% positivity rate while Jan-Nov16, 12.43% positivity. Females are more prone to infection than male patients specially with rural background. Maximum numbers of cases were reported from the month of August to October. Conclusions: Scrub typhus is prevalent but an underdiagnosed disease in India. The prevalence is gradually decreasing with increasing sample size every year with female patients predominance. Trends are more in late rainy season between August and October months. Rickettsia – specific IgM ab ELISA tests can help in early diagnosis & early empiric therapy which can be given to reduce serious complications and mortality. [Manisha JNJIRM 2017; 8(2):9-11]

Key Words: scrub typhus fever, enzyme-linked immunosorbent assay, Orientia tsutsugamushi.

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Introduction: Rickettsial diseases are now established as re-emerging zoonotic bacterial infections in the Indian subcontinent and are important but often under-recognised cause of febrile illness.¹ Among the wide range of rickettsial diseases, scrub typhus and spotted fever group diseases are most commonly recognised in the Asia-Pacific region.² In the recent years, outbreaks have been reported in the Sub-Himalayan belt as well as in Maharashtra, Rajasthan, Punjab and Southern Indian states of Tamil Nadu, Kerala and Karnataka.¹

The symptoms of Rickettsia infection are due to invasion and multiplication of Rickettsia in the endothelial cells of small blood vessels, smooth muscle cells and histiocytic. The tissue most affected are skin, heart, brain and lungs. There is local cellular response with the infected cells becoming inflamed and severely damaged. Capillaries become blocked and bleeding may occur in severe infections.³

The infection clinically manifests as non-specific febrile illness, which is accompanied by headache, myalgia, occasional rash, often accompanied by gastrointestinal, respiratory, or central nervous system (CNS) symptoms, which may lead to severe multi-organ dysfunction in untreated cases.^{4,5,6} The observed varied clinical manifestations reported from India could be due to differences in the infecting

strains, which are known to have a high level of antigenic variation.¹

Recent outbreaks are reported by detecting antigen-specific IgM antibodies by enzyme-linked immunosorbent assay (ELISA).⁷

Methods: The study was conducted between January 2013 to November 2016 in Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, total of 2233 samples were processed in the duration, included all the patients of OPD & indoors suspecting rickettsia infection.

A confirmed case of rickettsia infection was defined as one that was positive for ELISA (scrub typhus IgM antibody), with no evidence of any other infection. Rickettsia infection was confirmed with scrub typhus group ELISA Kit (InBios International, Inc., Seattle, WA, USA) to detect O.tsutsugamushi-specific IgM antibodies. It is a qualitative test for the detection of IgM antibodies to Orientia tsutsugamushi in the serum sample. In this test, wells of each plate were coated with O.tsutsugamushi antigen & samples were tested by ELISA method for IgM antibody for O. tsutsugamushi.^{7,8}

Results: The study was conducted to see the trends of scrub typhus in the relation of prevalence of the

disease, sex ratio significance and impact of seasons on the disease outcome in the Jaipur, Rajasthan. A total of 2233 samples were processed in \approx 4 years of duration. Out of 2233 samples 475 samples were IgM antibody reactive by ELISA method. In 2013 out of 437 samples 152 samples were reactive with the positivity is 36.38%. In 2014 out of 382 samples 93 samples were reactive & positivity is 24.34%, In 2015 out of 521 samples processed 112 samples were reactive & positivity is 21.49% while jan-nov16, 12.43% positivity with the 111 samples were positive out of 893 samples. In the study most of the patients were from rural background. Maximum numbers of

cases were reported from the month of August to October.

Table 1: Trends of scrub typhus

Year	Total Samples	Reactive	Non-Reactive	Percentage of Positivity
2013	437	159	278	36.38%
2014	382	93	289	24.34%
2015	521	112	409	21.49%
2016	893	111	782	12.43%

This shows that the sample size was increasing every year while the trends of positivity ratio is decreasing.

Table 2: month wise samples data with results

Month	Total 2013	Reactive 2013	Total 2014	Reactive 2014	Total 2015	Reactive 2015	Total 2016	Reactive 2016
Jan	4	0	7	0	11	0	09	00
Feb	3	0	1	0	3	0	05	01
March	2	0	3	0	2	0	05	00
April	1	0	1	0	2	0	09	01
May	0	0	4	0	11	3	22	01
June	0	0	10	2	10	0	16	00
July	1	0	12	4	8	1	22	00
Aug	45	25	35	10	104	36	75	18
Sept	205	88	106	45	202	63	377	74
Oct	113	35	121	26	108	6	268	14
Nov	56	11	67	5	53	3	85	02
Dec	7	0	15	1	7	0	-	-
Total	437	159	382	93	521	112	893	111

Trends of positivity is more towards the august to october months.

Table3: male v/s female ratio

	Total	Reactive	Non-reactive	X2 difference	P value
Total male	1338	198 (14.79%)	1140	83.5	0.000
Total female	895	277 (30.94%)	618		

Results shows the positivity in the female patient is more than male patients.

In the statistically analysis using Chi- square test(X^2)the probability value(P value) is 0.000,which is less than 0.05 which is significant. There is statistically significant correlation of sex with the incidence of scrub typhus. Significantly more number of females were reported scrub typhus reactive than male patients.

Discussion: Scrub typhus is a rickettsia disease caused by *O. tsutsugamushi* which is a Gram negative, intracellular bacterium. The disease is transmitted by larval form of the mite, *trabecula delinensis*. Human infection occurs by an infected mite. The infection

period is 7-10 days. a necrotic lesion (eschar) occurs at the site of the bite in the skin⁹

In India, rickettsia infections constitute an emerging group of zoonosis, particularly scrub typhus and Indian tick typhus.¹ The objectives of the present study are to see the trends of the scrub typhus in consecutive approximate four years span, which shows the significantly decreasing trends of the disease while the sample size was increasing gradually. This shows the prevalence of other infections like dengue fever, chikungunya fever etc. in the same time duration.

Most of the cases were seen during the months of August to October. Such post-monsoon seasonality was reported earlier BS Kalal's study¹, R bithu's study.⁸ This is because the mites are more active during or at the end of rainy season which coincides with the months of August to October.

Female patients reactivity predominance is similar to the studies of Dr Parul's study¹⁰ where positivity ratio of male: female was 0.5%,&0.66% in R bithu's study respectively.⁸The study shows more positivity of Scrub typhus in females , this could be due to active involvement of females in farming and maintaining live stocks .

These reports are likely to represent an underestimate of the true burden, as many of the cases go undiagnosed due to a lack of awareness regarding the illness and a lack of specific laboratory facilities in high-burden areas. The absence of specific diagnosis often leads to extensive investigations, excessive financial burden on families and irrational & inappropriate antibiotic use.

Conclusion: Scrub typhus is prevalent but an underdiagnosed disease in India. The burden of rickettsia infection in the patients of all age groups with non-specific prolonged febrile illness in Jaipur,Rajasthan is high with varied degree of clinical manifestations and a substantial rate of severe complications. The prevalence is gradually decreasing with increasing sample size every year with female patients are more prone to get scrub typhus infection than male patients. It should be considered in the differential diagnosis of patients suffering from acute febrile illness especially with pneumonitis, thrombocytopenia, elevation of liver enzyme, serum urea and serum creatinine. This is particularly important after the rainy season and early cooler months, i.e. between August and October months. Rickettsia – specific ELISA tests can help in early diagnosis and early institution of appropriate treatment that may prevent life threatening complications. An early empiric therapy can be given to reduce serious complications and mortality.

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