

## Scrub Typhus Complications : Analysis of Recent Cases at a Single Centre

Jay Deshmukh<sup>1</sup>, Sandhya Saoji<sup>2</sup>, Arjun Deshmukh<sup>3</sup>, Vijay M Katekhaye<sup>4</sup>

### ABSTRACT

**Introduction :** Scrub typhus is known from various parts of India. However, reports from central India region are sparse. Scrub typhus is associated with various complications and adverse hospital outcomes.

**Aim :** To study the complications in patients with scrub typhus from central India.

**Materials and Methods :** Retrospective analysis of 16 IgM ELISA confirmed scrub typhus cases was done. Complications were identified. Age (<40 Vs>40 years) and gender (male vs female) specific comparisons were performed.

**Results :** Diagnosed cases of scrub typhus were frequent in patients aged below 40 years (68.8) and in females (81.2%). Among various complications, anaemia (56.2%), thrombocytopenia (56.2%), elevated liver enzymes (37.5%) and pleural effusion (37.5%) were frequent. Overall, the number of complications were more in females (88.2%) and younger age (73.5%) groups. No deaths were seen in our set-up.

**Conclusions :** Scrub typhus was common in females and in younger age groups. This finding need further exploration in a large, prospective, trial in confirmed cases of scrub typhus.

**Keywords :** Scrub typhus, *Orientia tsutsugamushi*, complications

### Introduction :

*Scrub Typhus* is caused by the rickettsia *Orientia tsutsugamushi* remains hugely underdiagnosed and underreported<sup>1,2</sup>. A strong surveillance is necessary as fatality is higher in untreated patients<sup>3</sup>. Scrub typhus has been identified and reported from various parts of India<sup>4,7</sup>. However, there are scant reports from Central India region. Further, scrub typhus has been reported in all ages and both genders<sup>2,4,6,7</sup>. Outcome studies have identified factors such as absence of eschar, need for intensive care, age of 60 years or more, leucocytosis above 10000 cells/mm<sup>3</sup> and hypoalbuminemia to be associated with severe complications and fatal outcomes in scrub typhus<sup>8,9</sup>. We performed a pilot observation to find out

complications in scrub typhus from single-centre.

### Materials and Methods :

In this retrospective observational study, data of patients admitted during May to August 2016 of diagnosed scrub typhus cases with positive IgM was analysed. Patients having mixed infection with malaria or dengue were excluded from the study. Data on demography and complications was assimilated from patient case files. Anaemia was defined as haemoglobin concentration below 11 gm/dL in both genders. Leucocytosis was considered with total leucocyte counts (TLC) above 11000 cells/mm<sup>3</sup>. Thrombocytopenia was labelled when platelet counts were lower than 1.5 lac cells/mm<sup>3</sup>. Elevation in liver enzymes namely alanine aminotransferase (ALT or SGPT) and aspartate aminotransferase (AST or SGOT) 3 times above upper level of normal (for SGPT 55 IU, for SGOT : 40 IU) was considered abnormal. Serum creatinine cut-off was taken as 1.5 mg/dL to consider renal function derangement. Data was analysed with descriptive statistics.

### Results :

In 16 cases of IgM ELISA positive scrub typhus,

<sup>1</sup>Consultant Physician and Director, <sup>3</sup>Consultant Physician, Sunflower Hospitals, Nagpur

<sup>2</sup>Consultant Microbiologist, Suvishwas Diagnostic Lab, Nagpur

<sup>4</sup>Physician, Dev Clinic, Nagpur

#### Address for Correspondence -

Dr. Jay Deshmukh

E-mail : jmdngp@yahoo.com

median age was 35 years with majority being < 40 years (68.8%), females (81.2%). Demographic characteristics are shown in table 1.

**Table 1 : Baseline characteristics of study population**

Characteristic	Observations (n=16)
<b>Age (years)</b>	
Median	35
<40	11 (68.8)
40 to 60	3 (18.8)
>60	3 (18.8)
<b>Gender</b>	
Male	3 (18.8)
Female	13 (81.2)
<b>Residence</b>	
Local	3 (18.8)
Outstation	13 (81.2)
<b>IgM ELISA Positivity</b>	16 (100.0)

Data presented as median or n (%), SD : standard deviation, ELISA : Enzyme linked immunosorbent assay

Complications identified in study patients are summarized in table 2. Anaemia was seen in 56.25% cases which was seen only in females (69.2%) and in 40.0% of patients below 40 years. Other

complications were thrombocytopenia (56.2%), elevation of liver enzymes (37.5%), pleural effusion (37.5%), bilateral pneumonitis (6.2%), pericardial effusion (6.2%), renal parenchymal disease (6.2%). From total complications (n=34), females (88.2%) and patients aged <40 years (73.5%) had higher frequency of complications.

#### Discussion :

In this pilot study, we found higher proportion of females and patients younger than 40 years being diagnosed with scrub typhus. In an outbreak report from Rajasthan India, Sinha et al. reported scrub typhus in more number of females than males (66.7% Vs 33.3% respectively)<sup>2</sup>. However, in previous studies there was no difference in prevalence of scrub typhus in males and females<sup>3,6,7</sup>.

Eschar is a characteristic sign of scrub typhus and has been reported in various studies. None of the patient in our study had eschar formation. This pathognomic sign is seen at the inoculating site. Eschar detection of up to 45% cases have been reported<sup>10</sup>. In a similar series of 10 paediatric cases from Rajasthan, Gupta et al. have reported eschar in 2 cases<sup>11</sup>. A study from South India reported eschar in 46% cases<sup>1</sup>. Absence of eschar however should not exclude the diagnosis of scrub typhus. Interestingly, a study from Korea reported absence of eschar as a factor associated with sever scrub

**Table 2 : Complications in study population**

Complications	Total (n=16)	Gender		Age	
		Male (n=3)	Female (n=13)	< 40 (n=10)	= 40 (n=6)
Anaemia (Hb<11 gm%)	9 (56.2)	0	9 (69.2)	7 (70.0)	2 (33.3)
Thrombocytopenia (Platelet<1.5 lac/mm <sup>3</sup> )	9 (56.2)	2 (66.7)	7 (53.8)	6 (60.0)	3 (50.0)
Increased liver enzymes	6 (37.5)	1 (33.3)	5 (38.5)	4 (40.0)	2 (33.3)
Pleural effusion	6 (37.5)	0	6 (46.2)	5 (50.0)	1 (16.7)
Bilateral pneumonitis	1 (6.2)	0	1 (7.7)	0	1 (16.7)
Pericardial effusion	1 (6.2)	0	1 (7.7)	1 (10.0)	0
Capillary leak syndrome	1 (6.2)	0	1 (7.7)	1 (10.0)	0
Renal parenchymal disease	1 (6.2)	1 (33.3)	0	1 (10.0)	0
<b>TOTAL</b>	<b>34</b>	<b>4 (11.8)</b>	<b>30 (88.2)</b>	<b>25 (73.5)</b>	<b>9 (26.5)</b>

typhus (odds ratio [OR] 6.62, 95% confidence interval 1.22, 35.8;  $p=0.03$ ) on a multivariate analysis. The other factors with significant association to severe disease were age above 60 years (OR 3.13), leucocytosis (OR 3.6), and hypoalbuminemia (serum albumin  $\leq 3$  gm/dL) (OR 5.01). We observed 18.8% cases above 60 years, no eschar in any patient, and leucocytosis in 31.2% cases. These purport that complete investigation of scrub typhus fever is necessary to determine factors associated with adverse outcomes. In our study we found anaemia (56.2%) and thrombocytopenia (56.2%) as most common complications. Rama et al also reported occurrence of thrombocytopenia in 56% cases which is similar to our study<sup>4</sup>. Raised liver enzymes, pleural effusion, pneumonitis, capillary leak syndrome and renal disease were few of the complications seen in our study. Such complications have been reported previously also. A study from Vivekanandan et al from South India reported thrombocytopenia in 28.1% and raised liver enzymes in 95.9% of the cases. Such complications carry a higher risk of mortality in scrub typhus. In a multivariate analysis, Chrispal et al.<sup>10</sup> observed acute respiratory distress syndrome, shock, renal failure and metabolic acidosis as independent predictors of mortality. Higher occurrence of complications in young females in our study is probably an incidental finding and requires further evaluation. Despite these observations, no significant difference in hospital stay was seen either in gender or age based analysis. No mortality was seen in any case in our study.

### Limitations :

Our study was limited by a retrospective design and limited number of cases. These need further evaluation in a large sample prospective study. Evaluation of factors associated with complications was not performed in our study.

### Conclusion :

Our pilot observation in scrub typhus suggests higher frequency in females and in younger patients. Absence of eschar in doesn't excludes the diagnosis of scrub typhus. Associated complications tend to

increase the risk of mortality in these cases which demands early identification and treatment. This pilot study is one of early observations from central India highlights need of further prospective research in this under diagnosed and under reported disease.

### References :

1. Vivekanandan M, Mani A, Priya YS, Singh AP, Jayakumar S, Purty S. Outbreak of scrub typhus in Pondicherry. *J Assoc Physicians India*. 2010; 58(1):24-8.
2. Sinha P, Gupta S, Dawra R, Rijhawan P. Recent outbreak of scrub typhus in North Western part of India. *Indian J Med Microbiol* [Internet]. 2014;32(3):24750. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25008815>
3. Kumar V, Kumar V, Yadav AK, Iyengar S, Bhalla A, Sharma N, et al. Scrub Typhus Is an Under-recognized Cause of Acute Febrile Illness with Acute Kidney Injury in India. *PLoS Negl Trop Dis*. 2014;8(1):6.
4. Rama G. Study of Scrub Typhus-Clinical Profile, Laboratory Profile, Complications and Outcome. *IOSR J Dent Med Sci Ver VII* [Internet]. 2015;14(3):2279-861. Available from: [www.iosrjournals.org](http://www.iosrjournals.org)
5. Sankhyan N, Sapharishi LG, Sasidaran K, Kanga A, Singhi SC. Clinical profile of scrub typhus in children and its association with hemophagocytic lymphohistiocytosis. *Indian Pediatr*. 2014; 51(8):651-3.
6. Sarangi R, Pradhan S, Debata N ch, Mahapatra S. Clinical profile of scrub typhus in children treated in a tertiary care hospital in eastern India. *Pediatr Pol* [Internet]. Polish Pediatric Society.; 2016;91(4):308-11. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S0031393916300269>
7. Varghese GM, Trowbridge P, Janardhanan J, Thomas K, Peter J V., Mathews P, et al. Clinical profile and improving mortality trend of scrub typhus in South India. *Int J Infect Dis* [Internet]. International Society for Infectious Diseases; 2014;23:39-43. Available from: <http://dx.doi.org/10.1016/j.ijid.2014.02.009>
8. Kedareshwar PS, Narvencar DM, Kim SW, Choi S-H, Yun NR. Clinical and laboratory findings associated with severe scrub typhus. *BMC Infect Dis*. 2010;10:108.
9. Lee C-S, Hwang J-H, Lee H-B, Kwon K-S. Risk factors leading to fatal outcome in scrub typhus patients. *Am J Trop Med Hyg* [Internet]. 2009;81(3):484-8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19706919>
10. Chrispal A, Boorugu H, Gopinath KG, Prakash KAJ, Chandy S, Abraham OC, et al. *Tropical Doctor*. 2010; 40:129-133.
11. Gupta VK, Agrawal P, Gupta RK, Sharma RB, Bhatnagar JP. Clinical profile of scrub typhus in relation with malaria and dengue seasonal outbreak from semi desert area of Rajasthan, India. 2016;3(3):943-8.