

**A Retrospective Study of Scrub Typhus Associated Acute Kidney Injury: A Tertiary Care Hospital Experience**Ashutosh Soni<sup>1</sup>, Jagdish Vishnoi<sup>2</sup>, Nilesh Patira<sup>3</sup>, \*Saurabh Gupta<sup>4</sup>, Kamlesh Bhatt<sup>5</sup>, KR Sharma<sup>6</sup>, Mohd Shakeel<sup>7</sup><sup>1</sup>Assistant Professor, Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>2</sup>Professor, Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>3</sup>Professor, Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>4</sup>Assistant Professor Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>5</sup>Associate Professor, Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>6</sup>Head and Professor, Department of Medicine, Pacific Medical College and Hospital Udaipur, Rajasthan<sup>7</sup>Associate Professor, Department of Biochemistry, Sardar Patel Medical College, Bikaner, Rajasthan

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Conflict of interest: Nil

**Abstract:****Background:** Scrub typhus is a vector borne rickettsial disease commonly found in many parts of India. This study is planned to report the clinical profile of acute kidney injury (AKI) associated with scrub typhus.**Methods:** Retrospective study of hospitalized patients of acute febrile illness who were diagnosed scrub typhus and had AKI was planned at Department of Medicine, Pacific Medical College and Hospital, Udaipur, Rajasthan from sept -22 to sept-23. Total 50 patients has been taken.**Results:** All 50 (100%) patients presented with fever and 32(64.00%) patient were have less than 7 days fever and 18(36.00%) were have more than 7 days fever. Other common symptoms were vomiting 30(60.00%), abdominal pain 20(40%), headache 17 (34%), myalgia 18 (36%), altered sensorium 14 (28.00%), cough 8(16.00%), seizure 6 (12.00%), diarrhea 6(12.00%), respiratory distress 7(14.00%), oliguria 3(6.00%), bleeding 3(6.00%).**Conclusion:** This study shows that AKI in scrub typhus is common and a severe disease. The patients with scrub typhus associated AKI have worse biochemical parameters and suffer from various complications.**Keywords:** AKI, Scrub typhus, Rickettsial infection.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Scrub typhus is becoming an important cause of acute undifferentiated febrile illness in the Indian subcontinent. *Orientia tsutsugamushi*, the causative agent of scrub typhus is found in many parts of Asia including India. [1] Scrub typhus, is now the most commonly reported rickettsial infection from the Indian subcontinent. Scrub typhus and other rickettsial infections are grossly under-diagnosed in India because of their non-specific clinical presentation, low index of suspicion among clinicians, limited awareness about the disease and lack of diagnostic facilities. [2]

Even though there is a dramatic response to the antimicrobial therapy, the diagnosis is often delayed due to their nonspecific clinical presentation, lack of adequate diagnostic materials and low index of suspicion among the health care professionals. [3] Delay in diagnosis and initiation of appropriate treatment can result in severe complications such as acute kidney failure, meningo-encephalitis, acute

respiratory distress syndrome (ARDS), septic shock, multi organ failure and death. [4]

Acute kidney injury (AKI) is a major global health issue and its incidence is markedly rising and affects an estimated 13–18% of hospitalised patients, resulting in increasing hospital stay, healthcare costs, poor short-term and long-term outcomes, especially in patients with chronic kidney disease (CKD). [5] In patients with infectious disease, especially those with sepsis, the incidence of AKI is reported to range from 5% to 51%. [6] Renal involvement is not uncommon in scrub typhus, and ranges from simple haematuria or proteinuria, 10–20% incidence of scrub typhus, to severe complications, including acute renal failure, nephrotic syndrome and end-stage renal disease leading to long-term haemodialysis. [7] It is known that the incidence of AKI in scrub typhus ranges from 8% to 40% according to the classification criteria used. The risk factors and

prognosis of AKI associated with scrub typhus have been poorly studied. [8]

## Material and Method

**Type of Study-** Retrospective study

**Inclusion Criteria-** All patient were subjected to The Scrub Typhus Detect IgM ELISA test which is a qualitative ELISA for the detection of IgM antibodies in human serum to *O. tsutsugamushi* (OT) derived recombinant antigen (In Bios International, Inc., Seattle, WA), and were performed as per the manufacturer's instructions. The cut off value was calculated using geographically relevant serum samples and a value of 40.468 was considered positive. It was presumed that the patient had normal renal function if the serum creatinine was 1.5 mg/dL.

**Exclusion Criteria-** Patients with negative lab report for scrub typhus

A proforma was used as a data collecting form to collect information on demographic profile, clinical and laboratory features. Complications of disease such as ARDS, meningoencephalitis, thrombocytopenia, acute kidney failure, respiratory

failure, heart failure etc. along with the need of notropic support, and oxygen support, duration of ICU stay, hospital stay and mortality were noted in the proforma.

Laboratory investigations such as complete blood count, Liver function test, kidney function test, serum electrolytes, rapid antigen test for malaria, dengue serology, Widal test, blood and urine culture, chest X-ray, etc were recorded.

The data were entered in Microsoft Excel worksheets and analyzed. Categorical variables are expressed as the number of patients and the percentage of patients; continuous variables are expressed as mean and standard deviation. An alpha level of 5% has been considered, i.e. if any p-value is less than 0.05, it has been considered as significant. SPSS version 20 has been used for the analysis

## Results

A total of 50 patients were found to have scrub typhus with positive IgM ELISA. The male and female ratio is 1.08:1(26:24). The mean age was 36.25±12.35 years.

**Table 1: Demographic profile**

Mean age in yrs	36.25±12.35 yrs
Male: Female	26 : 24
Rural: urban	37:13

**Table 2: Clinical profile**

Clinical features	No of patients [n=50(%)]
Fever	50(100%)
< 7 days	32(64.00%)
>7days	18(36.00%)
Nausea/vomitting	30(60.00%)
Pain abdomen	20(40.00%)
Headache	17(34.00%)
Myalgia	18(36.00%)
Altered sensorium	14(28.00%)
Cough/coryza	8(16.00%)
Seizure	7(14.00%)
Diarrhea	6(12.00%)
Respiratory distress	7(14.00%)
Oliguria	3(6.00%)
Bleeding	3(6.00%)
Eschar	6(12.00%)
Hepatomegaly	27(54.00%)
Splenomegaly	26(52.00%)
Lymphadenopathy	17(34.00%)
Edema	14(28.00%)
Jaundice	7(14.00%)
Pallor	7(14.00%)
Maculopapular rash	10(20.00%)

All 50 (100%) patients presented with fever and 32(64.00%) patient were have less than 7 days fever and 18(36.00%) were have more than 7 days fever.

Other common symptoms were vomiting 30 (60.00%), abdominal pain 20 (40%), headache 17 (34%), myalgia 18 (36%), altered sensorium 14

(28.00%), cough 8(16.00%), seizure 6 (12.00%), diarrhea 6(12.00%), respiratory distress 7(14.00%), oliguria 3(6.00%), bleeding 3(6.00%).

**Table 3: Outcome**

ARDS	6(12.00%)
Pneumonia	2(4.00%)
MODS	3(6.00%)
Bleeding	2(4.00%)
Mortality	4(8.00%)

Among the complications ARDS was most common 12.00%. Patients who developed MODS had poor outcome and mortality was noted among 8.00% of patients in this study.

**Table 4: Lab profile**

Parameters	Mean $\pm$ SD
Urea (mg/dL)	133.23 $\pm$ 48.01
Creatinine (mg/dL)	3.02 $\pm$ 1.01
Albumin (g/dL)	2.81 $\pm$ 0.61

### Discussion

A total of 50 patients were found to have scrub typhus with positive IgM ELISA. The male and female ratio is 1.08:1(26:24). The mean age was 36.25 $\pm$ 12.35 years. All 50 (100%) patients presented with fever and 32(64.00%) patient were have less than 7 days fever and 18(36.00%) were having more than 7 days fever.

Other common symptoms were vomiting 30(60.00%), abdominal pain 20(40%), headache 17 (34%), myalgia 18 (36%), altered sensorium 14 (28.00%), cough 8(16.00%), seizure 6 (12.00%), diarrhea 6(12.00%), respiratory distress 7(14.00%), oliguria 3(6.00%), bleeding 3(6.00%), hepatomegaly (54.00%), splenomegaly (52.00%). The presence of splenomegaly is an important clinical finding of scrub typhus that distinguishes it from dengue as splenomegaly is uncommon in dengue. [9] Lymphadenopathy is also commonly seen in scrub typhus. [10-11] It can be a differentiating feature from malaria and dengue where patients can also have hepatomegaly and splenomegaly as was seen in our patients with scrub typhus. Presence of an eschar provides a valuable clinical clue in the early diagnosis of scrub typhus.[11] It may develop before the onset of systemic signs. however, it is rarely seen in south East Asia and Indian subcontinent. In this study Eschar was found in only 6 (12.00%) which is in contrast to a few other studies which showed a higher detection rate. [12]

Complications in scrub typhus develop after first week of illness and are directly related to the blood load of *O. tsutsugamushi*. [9] In the present study, the most common organ dysfunction was ARDS followed by MODS.

Although the case fatality rate reported for scrub typhus varies from 15–30% in India<sup>12</sup> and Taiwan and 10% in Korea. [13] it was observed to be 8.00% in this study.

### Conclusions

This study shows that AKI in scrub typhus is common and a severe disease. The patients with scrub typhus associated AKI have worse biochemical parameters and suffer from various complications.

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