

## Case Report

# Scrub typhus associated acute kidney injury in a 33-year-old male

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### ABSTRACT

Scrub typhus or bush typhus is caused by *Orientia tsutsugamushi*. An eschar at the site of bite is evidentiary of scrub typhus. Increased mortality is seen in cases presenting with acute kidney injury (AKI), acute respiratory distress syndrome (ARDS), pneumonitis, meningitis, myocarditis and multi-organ dysfunction. Renal impairment in scrub typhus should be identified and management initiated early to prevent the progress of the damage. Scrub typhus if left undiagnosed and untreated results in high morbidity and mortality. Here we report a case of a 33-year-old male with AKI following scrub typhus fever. In our case early diagnosis and management led the patient to recovery.

**Keywords:** Scrub typhus, *Orientia tsutsugamushi*, AKI, Recovery

### INTRODUCTION

Scrub typhus or bush typhus is caused by *Orientia tsutsugamushi*, a gram-negative intracellular bacillus which is transmitted through bites of larval form (chiggers) of trombiculid mites<sup>1</sup>. Scrub typhus presents as fever, myalgia, maculopapular rash, hepatosplenomegaly and an eschar at the site of bite is seen in most cases. Increased mortality is seen in cases presenting with AKI, ARDS, pneumonitis, meningitis, myocarditis and multi-organ dysfunction.<sup>2</sup> The proposed mechanisms of AKI in scrub typhus are vasculitis, rhabdomyolysis, septic shock, volume depletion and direct renal invasion of *O. tsutsugamushi*.<sup>3</sup> Scrub typhus results in high morbidity and mortality if left undiagnosed and untreated. Therefore, it is vital that any case of febrile illness is investigated thoroughly with high suspicion for scrub typhus.

### CASE REPORT

A 33-year-old male native of a tribal area of Manipur presented to RIMS Imphal casualty department with chief complaints of fever, shortness of breath, diarrhea, dry cough and decreased urine output for 5 days. There was no

history of headache, nausea, vomiting, abdominal pain or seizures. On examination the patient's blood pressure was 100/60 mmHg, oxygen saturation 96% at room air, pulse rate of 112/minute, respiratory rate 28 per minute and axillary temperature was 100.6°F. An eschar 10mm in diameter was present on the right axilla. On systemic examination patient had normal higher mental function. Bilateral lung field was clear on auscultation with no added sounds. Cardiovascular examination revealed normal S1S2 with no rub, gallop or murmur. Abdomen was soft, non-tender with normal audible bowel sounds. Chest X-ray showed no remarkable findings. Electrocardiogram showed sinus tachycardia.

On evaluation patient had hemoglobin level of 12.2 g/dL, white blood cell count was 8,800/μL and platelet count was 89,000/μL. Scrub typhus IgM was positive by immunochromatographic assay while malaria parasite, typhidot and dengue serology revealed negative results. Serum electrolytes revealed hyponatremia at sodium 124 mEq/L and hypokalemia at potassium 2.7 mEq/L which was effectively corrected. Other laboratory tests included C-Reactive protein >31.3 mg/dL, D-Dimer 4.39 mg/L, anti-nuclear antibody 0.1 U/ml, bicarbonate 15 mmol/L,

prothrombin time 13.0 seconds and INR 1.2, serum amylase 185 U/L, serum lipase 366 U/L and serum ferritin level >1200 ng/ml. Serum uric acid levels was high at 15.1 mg%. Liver function test showed moderate elevation of serum aspartate aminotransferase and alanine aminotransferase.

**Table 1: Association between serum creatinine and urine output.**

Duration (Hours)	Serum creatinine (mg/dl)	Urine output (ml)
24	6.3	250
48	7.0	100
96	4.8	1200
120	2.7	1650
144	1.0	2200

Kidney function test revealed serum urea at 145 mg/dL and creatinine 6.3 mg/dL and on quantification urine output was 250 ml in 24 hours, Serum creatinine further rose to 7 mg/dl at 48 hours with urine output of only 100 ml. Nephrology was consulted and patient was planned for hemodialysis but was first put on a trial of conservative management with supportives in the form of injectable amino acid, oral alpha keto analogues, acetylcysteine 300 mg, pyridoxamine dihydrochloride 50 mg and glutamine 10 mg, As urine output improved to 1200 ml at 96 hours and serum creatinine dropped to 4.8 mg/dl plan for dialysis was withheld and later abandoned as serum creatinine improved to 2.7 mg/dl and with urine output of 1650 ml at 120 hours. At 144 hours patient attained normal serum creatinine level of 1.0 mg/dl and urine output of 2200 ml which remained within normal range thereafter. Urine routine examination revealed 6-7 pus cells/hpf with pH 4.0. Urine culture and sensitivity remained sterile on repeated samples.

Scrub typhus fever management included injection azithromycin 500 mg in 500 ml normal saline 24 hourly for 5 days, oral doxycycline 100 mg 12 hourly for 14 days and other supportive measures including adequate hydration. Patient was discharged after 8 days of hospitalization with normal stable vitals and normal lab parameters and advised to follow up on OPD basis.



**Figure 1: Site of eschar on the right axilla.**

## DISCUSSION

Scrub typhus owing to its nonspecific clinical presentation accompanied with low index of suspicion by physicians and lack of diagnostic facilities remains undiagnosed in many parts of India. It presents with varied symptoms like fever, headache, myalgia, nausea, vomiting, diarrhea, cough and even breathlessness. The severity of the illness varies from mild subclinical cases to severe form involving multiple organ system which can turn fatal when undiagnosed and left untreated.<sup>4</sup> AKI in scrub typhus is multifactorial in origin with presumed causes like renal hypo perfusion resulting from shock or hypovolemia, rhabdomyolysis, vasculitis, acute interstitial nephritis and direct microbial invasion of the renal tubules causing acute tubular necrosis.<sup>5-6</sup> Multiple mechanism have been explained for AKI in scrub typhus such as multiorgan failure by vasculitis of the small blood vessels involving the kidney leading to renal failure. Also disseminated intravascular coagulation may induce microangiopathy resulting in multiple organ damage. Another mechanism is renal hypoperfusion caused by shock or volume depletion leading to prerenal azotemia.<sup>7-8</sup> Hyponatremia reflecting increased vascularity is seen in majority of the patients diagnosed with Scrub typhus. Normal or occasional lymphocytosis, mild to moderate elevations of hepatic enzymes and dyselectrolytemia are common.<sup>9</sup> Scrub typhus treatment includes doxycycline 200 mg per day in divided dose as the main drug of choice. Rapid resolution of fever following use of doxycycline is characteristic. Chloramphenicol, azithromycin and rifampicin are also useful for the treatment of scrub typhus. Azithromycin has been proved more effective than doxycycline in doxycycline-susceptible and doxycycline-resistant strains causing scrub typhus.<sup>10</sup>

Scrub typhus induced acute renal failure is often reversible with use of appropriate antibiotic therapy and treatment to improve renal perfusion. Patient should be evaluated thoroughly to recognize any renal impairment caused by scrub typhus infection so as early interventions can prevent morbidity and mortality.

## CONCLUSION

Scrub typhus should always be considered as a differential in cases presenting with fever and AKI. Scrub typhus cases presents with abnormal laboratory parameters such as increased total counts, thrombocytopenia, hyponatremia, abnormal liver and renal function and elevated CRP levels. Increased mortality is seen when cases present with AKI, ARDS, pneumonitis, meningitis, myocarditis and multi-organ dysfunction. An early diagnosis and appropriate antibiotic therapy should be initiated in due time to effectively treat the disease.

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