



## Infection Related Glomerulonephritis due to Scrub Typhus: A Case Report

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### Abstract

Infection Related Glomerulonephritis (IRGN) is an immune complex mediated renal injury occurring simultaneously with the infection. Although *Streptococcus* and *Staphylococcus* species are among the leading cause of IRGN noted till date, there are new emerging cases which found that Rickettsial infection can also cause IRGN. Scrub typhus is a rickettsial infection caused by *Orientia tsutsugamushi* which can have multisystem involvement and varied clinical presentations. Here we are presenting a case of 9-year female child who developed Acute Kidney Injury (AKI) with features of glomerulonephritis in the background of scrub typhus infection. Patient was treated conservatively with Doxycycline and gradually AKI resolved and also other features of glomerulonephritis. This case study highlights the role of early diagnosis and treatment of scrub typhus based on a high index of clinical suspicion and adequate investigations.

### Introduction

Scrub typhus is a febrile Rickettsial illness caused by *Orientia tsutsugamushi*. It is a disease identified since World War II when it caused significant mortality and morbidity in the soldiers posted in Southeast Asia [1]. But there has been a significant decline in the number of cases in the subsequent decades. It is spread by the bite of tick and in 45% to 55% of cases it is associated with Eschar at the site of the bite [2]. In scrub typhus, there is significant focal and disseminated vasculitis which involves the spleen, liver, heart, and lungs, sometimes present with nonspecific multi-organ involvement [3]. The prevalence and outcome of kidney involvement in scrub typhus like AKI are largely unknown [4]. There is a paucity of literature to prove immune complex-mediated glomerulonephritis in Rickettsial infection in the pediatric population. Like malaria scrub typhus can also cause nephrotic syndrome, hence it is important to keep in mind the possibility of AKI in patients of Scrub typhus [5]. Infection Related Glomerulonephritis (IRGN) is an immune complex mediated renal injury occurring simultaneously with the infection. Till date, though rare, all the reported cases of IRGN were either caused by *Streptococcus* or *Staphylococcus* sp. IRGN caused by Rickettsial infection, its disease course and fatality are largely unknown till date.

### Case Presentation

A 9-year-old girl presented to the emergency department with complaint of persistent low-grade fever for two weeks which was followed by progressive swelling of the face starting with periorbital puffiness and bilateral lower limbs for five days. It was associated with oliguria and gross hematuria for two days. It was not associated with loose stool, vomiting, or burning micturition. There was no history of similar episodes in the past nor was there any other significant medical history. During admission, she was conscious, oriented, febrile (axillary temperature 101. F) with a heart rate of 102 beats/min, BP -120/60 mmHg which was stage 2 hypertension for age. There was bilateral non-tender cervical lymphadenopathy, periorbital puffiness, hepatomegaly, pitting pedal edema and ascites marked by presence of shifting dullness.

On admission her investigation revealed urine albumin ++, urine RBC- 10/HPF, pus cell 10-12/HPF, serum albumin 2.8 mg/dl, serum cholesterol- 137 mg/dl, complete hemogram showing Hb- 10.3 g/dl, platelets being 2.1 lakhs, total leukocyte count serum C3 (28) and negative ANA serum urea was 69 mg/dl and creatinine value being 1.15 mg/dl which gradually decreased to urea 26 mg/dl and creatinine being 0.9 mg/dl serum ASO titer being negative and so was the Malaria MP-ICT. CRP was 8.1 mg/dl and LFT revealing serum Bilirubin (total)- 0.4 mg/dl, serum bilirubin (direct)- 0.2 mg/dl, AST-23 IU/L, ALT-26 IU/L, ALP-110 IU/L.

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In view of persistent fever and pending urine and blood culture report, she was treated with empirical intravenous antibiotics (ceftriaxone) and oral amlodipine to control blood pressure. However, she had continued fever, cultures reports were negative but with persistent high CRP (42 mg/dl), non-response to antibiotics, persistent fever, hypertension, negative culture, low C3 (46 mg/dl), gross hematuria, hypertension, lymphadenopathy, and hepatomegaly, further work up was done to rule out unusual infection. Investigations for scrub typhus revealed positive IgM positive, suggestive of infection. Based on lab reports Infection Related Glomerulonephritis (IRGN) was considered and she was treated with Doxycycline (4 mg/kg/day) and after 3 days fever subsided and after 5 days the edema started subsiding patient was discharged in a hemodynamically stable condition with a diagnosis of infection related glomerulonephritis due to scrub typhus and resolving AKI with hypertension which was controlled with medication.

## Discussion

It is not common to find renal involvement in scrub typhus. In the background of a febrile illness patients can present with acute kidney injury. The urine examination with albuminuria, microscopic hematuria and proteinuria is most common presentation [6]. In this case report we have presented a 9-year female child with hematuria, hypertension and edema with fever suggesting a nephro-nephrotic syndrome like presentation initially which was later confirmed to be infection related glomerulonephritis due to scrub typhus. Glomerulonephritis may be rarely caused by Rickettsial infection [7]. Rickettsial infections have been overlooked as a cause of AKI, especially in children. Rickettsial infection has not been reported as a cause of AKI in children as per a recent study in central India [8]. However lower incidences of AKI (2-10%) have been reported in certain studies. As per Yen et al., AKI is a rare but serious complication in scrub typhus infection [9]. The main mechanism of AKI being impaired renal perfusion because of volume depletion or an increased vascular permeability. Overall kidney involvement is believed as a part of multi-organ involvement in patients with severe scrub typhus disease [10]. According to Dumler et al., prerenal azotemia is the most common pathophysiology of renal failure in case of typhus related systemic vasculitis [11]. Glassock et al. [12] in a recent study proposed a nomenclature for glomerulonephritis associated with infections and classified them under two heads; post-infectious glomerulonephritis and Infection Related Glomerulonephritis (IRGN). Here our patient had few clinical findings like fever, weight gain, edema without having any latent period which is suggestive of IRGN, related to the primary infection. In contrast to PSGN, most other pathogens cause glomerulonephritis when infection is still active, hence the term Infection Related Glomerulonephritis (IRGN) has been suggested [13].

## Conclusion

Scrub typhus can have varied clinical presentations and is being under diagnosed due to low index of suspicion and lack of awareness among physicians. Considering the prevalence of scrub typhus in India, patients presenting with persistent fever and AKI should be investigated for scrub typhus. Early diagnosis and treatment will reduce the mortality as well as morbidity significantly.

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