

Scrub typhus-associated Kawasaki disease in a toddler: An uncommon infectious trigger of systemic vasculitis

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ABSTRACT

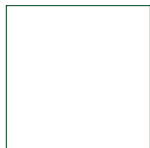
Kawasaki disease (KD) is an acute medium-vessel vasculitis and a leading cause of acquired heart disease in children. Scrub typhus may mimic KD or coexist, requiring prompt antibiotic therapy, while KD necessitates immunomodulatory treatment. Careful clinical evaluation, laboratory assessment, and echocardiography are essential for differentiation. A systematic, multidisciplinary approach improves diagnostic accuracy, optimizes management, and reduces cardiovascular complications. We report a 2-year-10-month-old boy who presented with high-grade fever, generalized maculopapular rash, and bilateral non-purulent conjunctival congestion. Based on clinical features consistent with KD, he was promptly treated with intravenous immunoglobulin and aspirin to reduce the risk of coronary artery complications, resulting in initial defervescence and clinical improvement. However, recurrence of fever during hospitalization necessitated further evaluation for alternative or concomitant etiologies. Subsequent laboratory investigations revealed positive serology for scrub typhus. Doxycycline therapy was initiated, leading to sustained defervescence and complete recovery. This case emphasizes the importance of early diagnosis and timely management of KD to prevent cardiac sequelae. It also highlights the need to consider coexisting tropical infections, particularly in an endemic region, in children with persistent or recrudescent fever despite appropriate initial immunomodulatory therapy.

Key words: Kawasaki disease, *Orientia tsutsugamushi*, Pediatric vasculitis, Scrub typhus, Tropical infection mimic

Kawasaki disease (KD) is an acute febrile vasculitis that predominantly affects infants and young children and is recognized as one of the most important causes of acquired heart disease in the pediatric population. The disease primarily targets medium-sized arteries, particularly the coronary arteries, which may develop dilatation or aneurysms if treatment is delayed. Early recognition and prompt administration of intravenous immunoglobulin (IVIG) have significantly improved outcomes and reduced the incidence of coronary artery complications [1]. The clinical diagnosis of KD is based on characteristic features, including persistent fever, bilateral non-purulent conjunctival congestion, polymorphous rash, changes in the lips and oral cavity, extremity changes, and cervical lymphadenopathy. Although these features are well established, incomplete or atypical forms of the disease are frequently encountered, especially in younger children, making diagnosis challenging for clinicians [2]. Over the decades, the management of KD

has evolved considerably with improved understanding of its inflammatory mechanisms and clinical course. Timely administration of IVIG and antiplatelet therapy remains the cornerstone of treatment during the acute phase and plays a crucial role in preventing coronary artery abnormalities [3]. Despite advances in diagnostic criteria, differentiating KD from other febrile illnesses can be difficult, particularly in regions where infectious diseases with overlapping clinical manifestations are common. Many infections may present with fever, rash, and systemic inflammation, which can mimic the clinical picture of KD and lead to diagnostic uncertainty [4].

Scrub typhus is an important zoonotic infection caused by the intracellular organism *Orientia tsutsugamushi* and transmitted through the bite of infected chigger mites. The disease is widely prevalent in many parts of Asia, including India, and is increasingly recognized as a significant cause of acute undifferentiated fever in children. Pediatric patients often present with fever, rash, lymphadenopathy, hepatosplenomegaly, and laboratory evidence of systemic inflammation [5]. Prompt treatment of scrub typhus is essential because untreated

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infection may progress to severe complications such as respiratory distress, encephalitis, myocarditis, and multiorgan dysfunction. Antibiotic therapy, particularly with doxycycline or azithromycin, has been shown to be highly effective and usually results in rapid clinical recovery when initiated early [6]. Recent reports suggest that scrub typhus may occasionally present with features resembling KD or may coexist with inflammatory syndromes that share similar clinical manifestations. Such overlap may complicate the diagnostic process and delay appropriate therapy, particularly in endemic areas where both conditions may occur in the pediatric population [7].

CASE REPORT

A 2-year-10-month-old boy presented with high-grade fever for 5 days, with temperatures reaching up to 104°F. The fever was associated with a generalized macular rash and bilateral non-purulent conjunctival congestion and was poorly responsive to antipyretics. There was no history of cough, diarrhea, or urinary symptoms.

On examination, the child was febrile and irritable, with tachycardia and tachypnea proportional to the fever. Blood pressure was within normal limits for age. There were no cardiac murmurs or additional heart sounds. A dull macular rash was noted over the trunk and extremities, along with bilateral conjunctival congestion. No cervical lymphadenopathy or extremity edema was observed, and no localizing focus of infection was evident.

Laboratory evaluation revealed leukocytosis (total leukocyte count 16,700/mm³), hemoglobin of 9.2 g/dL, and elevated C-reactive protein. Liver and renal function tests were within normal limits. Echocardiography showed normal cardiac structure and preserved ventricular systolic function with no evidence of coronary artery dilatation or aneurysm formation (Fig. 1).

Based on prolonged fever, mucocutaneous features, and elevated inflammatory markers, a diagnosis of KD was considered. The child was treated with IVIG at a dose of 2 g/kg and aspirin. Fever subsided within 24 h of IVIG administration, and the child remained afebrile for 3 days.

DISCUSSION

Inflammatory syndromes in children may sometimes arise in association with infectious triggers, leading to clinical presentations that resemble KD. In some reported cases, scrub typhus infection has been associated with systemic inflammation and multisystem involvement that can mimic Kawasaki-like illness [8]. Advances in molecular and immunological research have provided new insights into the mechanisms involved in KD. Current evidence suggests that environmental or infectious triggers may initiate an abnormal immune response in genetically susceptible individuals, ultimately resulting in vascular inflammation and endothelial injury [9].

Scrub typhus remains a significant public health problem in many Asian countries and contributes substantially to the burden of febrile illness in both adults and children. Epidemiological studies have demonstrated wide geographic distribution and seasonal variation, highlighting the importance of clinical awareness and early diagnosis in endemic regions [10]. In India, pediatric scrub typhus has been reported to mimic several other diseases, including dengue fever, enteric fever, and inflammatory syndromes. Case series have shown that the infection may present with diverse clinical manifestations, sometimes leading to misdiagnosis and delayed treatment [11]. The historical understanding of scrub typhus has evolved over time, with increasing recognition of its epidemiology, pathogenesis, and clinical spectrum. Ongoing research continues to clarify its transmission patterns and the factors responsible for its re-emergence in several regions of Asia [12].

Effective management of scrub typhus depends on early initiation of appropriate antibiotic therapy. Clinical trials comparing azithromycin and doxycycline have demonstrated that both agents are effective for the treatment of pediatric scrub typhus, providing rapid resolution of fever and other systemic symptoms [13].

Similarly, comparative studies evaluating oral azithromycin and doxycycline in children have shown favorable outcomes with both regimens, supporting their use in uncomplicated cases. Awareness of this therapeutic response is important when evaluating children with

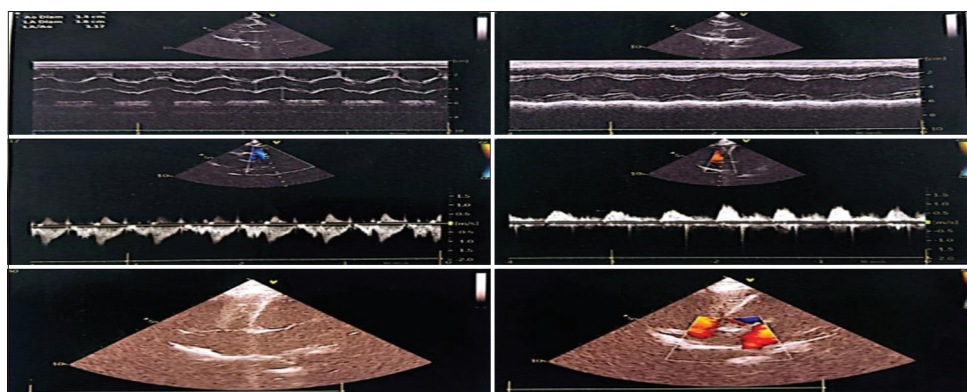


Figure 1: Echocardiography showed normal cardiac structure and preserved ventricular systolic function with no evidence of coronary artery dilatation or aneurysm formation

persistent fever and inflammatory features suggestive of alternative diagnoses such as KD [14].

CONCLUSION

This case underscores the importance of timely KD management to prevent cardiac sequelae while simultaneously screening for endemic tropical infections. Clinicians should maintain a high index of suspicion for co-existing etiologies in children with persistent or recurrent fever despite initial standard therapy.

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