ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 09 | September - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

DECODING THE DIAGNOSTIC DILEMMA OF SCRUB TYPHUS CO-INFECTION WITH ACUTE HEPATITIS A IN A CHILD

Clinical Microbiology

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ABSTRACT

Background: Scrub typhus-associated hepatitis and acute hepatitis A can be difficult to distinguish clinically because of overlapping presentations, potentially resulting in missed or delayed diagnosis. A high index of clinical suspicion is therefore essential for early recognition, particularly in endemic regions. **Case Presentation:** A 10-year-old girl presented with an 8-day history of fever, jaundice, and altered sensorium, with markedly elevated aminotransferases. Hepatitis A virus IgM was positive. In view of multisystem involvement and the endemicity of scrub typhus in the region, scrub typhus IgM testing was performed by ELISA and was positive, supporting a diagnosis of co-infection. She showed clinical improvement within 48 hours of initiation of doxycycline along with supportive care. **Conclusion:** Scrub typhus and acute hepatitis A may coexist and present with overlapping, non-specific clinical manifestations. In children from endemic regions presenting with fever, jaundice, altered sensorium, and multisystem involvement, scrub typhus should be considered even in the presence of confirmed acute viral hepatitis. Timely recognition and appropriate diagnostic testing may facilitate early initiation of specific antimicrobial therapy and improve clinical outcomes.

KEYWORDS

Scrub typhus; Acute hepatitis A; Hepatitis; Co-infection; Children

INTRODUCTION

Acute hepatitis is characterised by acute hepatocellular injury with elevation of serum aminotransferases and may present with jaundice, constitutional symptoms, gastrointestinal complaints, and, in severe cases, altered sensorium. In children, viral infections are important causes of acute hepatitis, with hepatitis A virus (HAV) remaining a major aetiological agent in endemic regions such as India.[1,2]

In tropical countries, however, hepatic involvement is not restricted to hepatotropic viruses. Several systemic infections, including malaria, enteric fever, leptospirosis, dengue, and rickettsial infections such as scrub typhus, may cause hepatitis and produce clinical features that overlap with acute viral hepatitis.[4,5] Fever, jaundice, elevated aminotransferases, and neurological manifestations may therefore create a diagnostic challenge, particularly when more than one infection is present.

Scrub typhus, caused by Orientia tsutsugamushi, is an important re-emerging rickettsial infection in India and may involve multiple organ systems, including the liver. Hepatic involvement commonly manifests as elevated aminotransferases and bilirubin, while severe disease may be associated with neurological, renal, pulmonary, and cardiovascular complications.[6,7] The characteristic eschar may be absent, further increasing the possibility of missed or delayed diagnosis.

Co-infection with acute viral hepatitis can further obscure the clinical picture. Recognition of scrub typhus in a child with confirmed hepatitis A is particularly important because scrub typhus requires specific antimicrobial therapy. We describe a 10-year-old girl with acute hepatitis A and concurrent scrub typhus who presented with fever, jaundice, and altered sensorium.

Case Presentation

A 10-year-old girl presented to the emergency department of our hospital on 11 October 2025 with an 8-day history of fever, yellowish discolouration of the skin and eyes for 6 days, and altered sensorium associated with irritability, generalised weakness, and decreased oral intake for 7 days. She had five episodes of vomiting on the day of admission. She had recently travelled from her village to Jamshedpur. She was fully immunized for her age and developmentally normal.

On examination, she appeared ill, with a respiratory rate of 24/min, heart rate of 110/min, blood pressure of 100/80 mmHg, and oxygen saturation of 98% on room air. She was icteric, with no pallor or rash. Neurological examination revealed drowsiness with a Glasgow Coma Scale score of 10/15 (E4V2M4). Respiratory examination revealed normal bilateral air entry with vesicular breath sounds and no added sounds. The liver was not palpable, and there was no evidence of bleeding diathesis. Chest radiography was normal.

Initial investigations showed hemoglobin of 12.5 g/dL and a total leucocyte count of 13.37 x 10^3/uL (69% polymorphs and 31% lymphocytes), with a normal platelet count. Liver function tests were markedly deranged, with an INR of 1.14, alanine aminotransferase (ALT) of 4529 U/L, aspartate aminotransferase (AST) of 2470 U/L, serum albumin of 3.7 g/dL, total bilirubin of 8.7 mg/dL, and direct bilirubin of 5.3 mg/dL. In view of the raised leucocyte count, she was empirically started on intravenous antibiotics along with supportive care.

Over the following hours, her irritability worsened, and she was managed supportively for altered sensorium in the setting of severe acute hepatitis. Hepatitis A virus (HAV) IgM was positive, while testing for hepatitis E, hepatitis B, hepatitis C, HIV, dengue, malaria, and enteric fever was negative. Given the multisystem involvement and endemicity of rickettsial illness in the region, scrub typhus IgM testing was performed by ELISA on day 2 of admission and was positive. No eschar was identified on clinical examination.

Oral doxycycline was initiated at 2.2 mg/kg/dose twice daily. The child showed clinical improvement within 48 hours of initiation of doxycycline, with improvement in sensorium and a favourable trend in liver function tests. However, before she was clinically fit for discharge, her parents requested discharge against medical advice for personal reasons; therefore, further follow-up was not possible.

DISCUSSION

Acute hepatitis A is commonly diagnosed by detection of HAV-specific IgM. Scrub typhus can be diagnosed using serological and molecular methods, including IgM ELISA, indirect immunofluorescence assay, and PCR for Orientia tsutsugamushi, depending on the clinical setting and availability of tests. In many resource-limited settings across South and Southeast Asia, access to reference-standard or molecular testing may be limited, making clinical suspicion and appropriate use of available serological tests important.

Scrub typhus is a potentially life-threatening, mite-borne febrile illness caused by O. tsutsugamushi, with humans serving as accidental hosts. It is endemic across the 'tsutsugamushi triangle,' which extends from Japan, Taiwan, China, and South Korea in the north, through India and Nepal in the west, to Australia and Indonesia in the south, and re-emergence has been documented across several Indian states in recent years.[6] After invading the host, the organism proliferates within phagocytes and spreads to the endothelium of small blood vessels, triggering an inflammatory response. The resulting endothelial injury may involve the skin, skeletal muscle, lungs, kidneys, brain, and heart.[7]

Patients may present with an uncomplicated febrile illness or with mono- or multi-organ dysfunction, and severe disease can be fatal.[7] The classic eschar and rash may be absent, potentially delaying diagnosis. Leukocytosis, thrombocytopenia, and elevated transaminases have been described, while hepatitis, pneumonia, meningoencephalitis, acute kidney injury, myocarditis, and shock are

recognised complications.[7]In our patient, fever, jaundice, altered sensorium, irritability, generalised weakness, and reduced oral intake were non-specific and overlapped considerably with other tropical infections, including malaria, dengue, leptospirosis, enteric fever, and viral hepatitis. Similar overlapping presentations of scrub typhus with hepatitis have been reported in neonates and children by Vajpayee et al. and Agrawal et al.[8,9]

Liver involvement is common in scrub typhus and may manifest as elevated aminotransferases and bilirubin. Although these biochemical abnormalities are non-specific, hepatic involvement in scrub typhus has been attributed to inflammatory and vasculitic injury involving the sinusoidal endothelium, Kupffer cells, and hepatocytes.[10] In our patient, liver enzymes were markedly elevated on admission, with ALT and AST values of 4529 U/L and 2470 U/L, respectively. Ogawa et al. reported liver dysfunction in a substantial proportion of patients with scrub typhus.[11]

In this case, the positive HAV IgM provides a clear explanation for acute viral hepatitis, while concurrent scrub typhus may have contributed to the systemic clinical picture. Hepatic injury in hepatitis A is predominantly immune mediated, whereas scrub typhus is associated with endothelial inflammation and vasculitic injury. The overlapping clinical manifestations can therefore make recognition of co-infection difficult on clinical grounds alone.

Recognising scrub typhus in a patient with acute hepatitis is particularly important because timely initiation of appropriate antimicrobial therapy may prevent progression to severe multisystem disease. The clinical improvement observed after initiation of doxycycline supported the relevance of recognising and treating the concurrent rickettsial infection, although treatment response alone should not be considered diagnostic.

CONCLUSION

Scrub typhus and acute hepatitis A may coexist and present with overlapping, non-specific clinical manifestations. In children from endemic regions presenting with fever, jaundice, altered sensorium, and multisystem involvement, scrub typhus should be considered even in the presence of confirmed acute viral hepatitis. A high index of clinical suspicion, supported by timely and appropriate diagnostic testing, can facilitate early initiation of specific antimicrobial therapy and may reduce the risk of severe complications.

Declarations

Consent: Written informed consent was obtained from the patient's parents/legal guardian for publication of this case report and any accompanying clinical details.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: This case report received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contributions: All authors contributed to the acquisition and interpretation of case data and to drafting or critically revising the manuscript. All authors read and approved the final manuscript.

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