Short Report

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Central nervous system involvement in scrub typhus

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Abstract

Scrub typhus is an emerging infectious disease in India. Among its protean clinical manifestations, central nervous system involvement is common. In this prospective observational study, altered sensorium, headache, seizures and aseptic meningitis were found to be common central nervous system manifestations. Prompt treatment with doxycycline reduces morbidity and mortality.

Keywords

Aseptic meningitis, central nervous system, scrub typhus

Introduction

Scrub typhus, an emerging infectious disease in India, has a wide spectrum of clinical manifestations such as fever, rash, eschar, gastrointestinal, pulmonary, renal, haematological, and central nervous system (CNS) manifestations.[1] The word 'typhus' is Greek in origin and denotes 'hazy' or 'smoky', referring to the altered mental status of patients with rickettsial infections.[2] CNS manifestations of scrub typhus include aseptic meningitis, encephalitis, seizures, abnormal movements, etc. There is limited published data on CNS manifestations of scrub typhus (Table 1). This report describes the neurological manifestations of scrub typhus patients admitted to a tertiary care teaching hospital in southern India.

Methodology

All patients with acute undifferentiated febrile illness, that is, without definite localizing symptoms or signs and a fever of 5–21 days duration, admitted between January 2007 and January 2008, were prospectively evaluated. The study was approved by an institutional review board. We recruited 398 patients, of whom 189 were diagnosed as having scrub typhus based on immunoglobulin M (IgM) serology or/and the presence of an eschar. A lumbar puncture was performed whenever clinically indicated. Indications for a lumbar puncture were the presence of neck stiffness, altered sensorium or seizures. A lumbar puncture was not performed if there was a contraindication, such as the presence of coagulopathy (platelet count less than 50,000/cc and/or deranged prothrombin time [international normalized ratio (INR) >1.3]) or partial thromboplastin time. Aseptic meningitis was defined as the presence of neck stiffness and cerebrospinal fluid (CSF) abnormalities, that is, CSF cells >5 cells/cc, normal CSF sugar with or without protein elevation.

Results

Headache was the most common CNS manifestation seen in 79 (41.8%) patients, followed by altered sensorium in 42 (22.2%) patients. Twelve (6.3%) had seizures,

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Table 1. Prevalence of central nervous system (CNS) manifestations.

Any CNS manifestation	79 (41.8%)
Altered sensorium	42 (22.2%)
Seizures	12 (6.3%)
Neck stiffness	38 (20.1%)

Table 2. Cerebrospinal fluid (CSF) characteristics (39 patients had aseptic meningitis).

CSF analysis (47)	Mean	Standard deviation	Range
CSF counts/mm^3	47.3	74.7	2–450
CSF differential count			
Lymphocyte (%)	85.3%	16.6	30–100
Neutrophil (%)	14.7%	16.5	0–70
CSF protein (mg/dL)	90.6	62.2	14–360
CSF sugar (mg/dL)	67.6	31.9	35–209

and neck stiffness was found in 38 (20.1%) of those with scrub typhus. A lumbar puncture was necessary for 59 patients, but not carried out for 12 patients due to one of the contraindications previously mentioned. Thus a lumbar puncture was performed on only 47 patients, of which 39 were diagnosed with aseptic meningitis. A mean CSF count was 47/mm^3 (6–450/mm^3). Other CSF characteristics included lymphocytic predominance, mild elevation of protein and normal CSF sugars (Table 2). Of the patients with aseptic meningitis, 26 (66%) had headache, 12 (31%) had vomiting, 10 (25%) had seizures and 18 (46%) had altered sensorium. None of the patients had focal neurological deficits.

Discussion

Scrub typhus has protean clinical manifestations ranging from simple febrile illness to multi organ involvement, resulting in significant morbidity and mortality[1] which can present with a variety of CNS manifestations. In addition to the above-mentioned manifestations, two patients who presented beyond the study period with febrile illness with tremors and chorea respectively, had received no drugs prior to admission, which could explain the abnormal movements. They were subsequently diagnosed as having scrub typhus and the abnormal movements were resolved with treatment of the primary aetiology (scrub typhus).

Rare complications such as cerebral infarction, polyneuropathy and transverse myelitis have been reported.[3,4] In rickettsial infections, CNS is most often involved in Rocky Mountain spotted fever, but less often in epidemic typhus and scrub typhus. About 41% of our patients had CNS involvement which greatly resembled those seen in another published study from India.[5] Our study contradicts the earlier perception that CNS involvement in scrub typhus is rare. There is some data describing radiological features in scrub typhus, but to our knowledge no specific neuroradiological features pathognomic of scrub typhus have been described.[6] Pai et al. demonstrated CNS invasion by *Orientia tsutsugamushi* by evaluating CSF specimens by nested polymerase chain reaction (PCR) in patients with scrub typhus.[7] Autopsy specimens of patients with fatal scrub typhus clearly revealed CNS pathology, including infiltration of leptomeninges with mononuclear cells, haemorrhages in the brain and typhus nodules (clusters of microglia cells).[7] Altered sensorium has also been found to be an independent predictor of mortality in patients with scrub typhus.[1]

Conclusion

It is imperative that scrub typhus be suspected in patients with acute febrile illness with CNS manifestations, and treated promptly in order to reduce morbidity and mortality.

Declaration of conflicting interests

None declared.

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