Scrub typhus with longitudinally extensive transverse myelitis

Sanjay K. Mahajan¹, Sanyam Kumar², Mahak Garg¹, Madan Kaushik¹, Sudhir Sharma³ & Rajiv Raina¹

¹Department of Medicine, Indira Gandhi Medical College, Shimla; ²All India Institute of Medical Sciences, New Delhi; ³Department of Neurology, Indira Gandhi Medical College, Shimla, India

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Scrub typhus is a febrile illness caused by Orientia tsutsugamushi bacteria. It is endemic to a part of world known as the “tsutsugamushi triangle” extending from northern Japan and far-eastern Russia in the north, to northern Australia in the south, and to Pakistan and Afghanistan in the west¹–². Scrub typhus has been reported from many parts of India including Himachal Pradesh³. The disease is characterized by fever, headache, myalgia, cough, suffused conjunctiva and gastrointestinal symptoms. It is transmitted to humans through the bite of the larval trombiculid mites (commonly called chiggers). An eschar at the site of chigger bite pathognomonic and is seen in 40% patients of scrub typhus⁴. There can be presence of regional lymphadenopathy/generalized lymphadenopathy, maculopapular rash and splenomegaly. The severity of the symptoms varies widely in this disease. The disease is characterized by focal or disseminated vasculitis and perivasculitis which may involve the lungs, heart, liver, spleen and central nervous system¹–². The overall histological picture of scrub typhus in the central nervous system is best described as a meningoencephalitis. Dissemination of bacteria from the periphery to the central nervous system is hematogenous. Orientia tsutsugamushi is frequently found in circulating mononuclear cells during naturally acquired infection. There is prolonged microbial survival in leukocytes, and phagocyte-facilitated infection could play a role in invasion of central nervous system⁵. Detection of O. tsutsugamushi by pooled antigen ELISA has shown very good sensitivity (94%) and specificity (91%)⁶. The occurrence of various neurological manifestations in scrub typhus has been well documented in literature but its association with longitudinally extensive transverse myelitis (LETM) has not been reported. We present a case of scrub typhus with LETM that improved after treatment.

Case Report
A 35-yr-old female, from rural background, presented with fever, diffuse headache and chills for four days during monsoon season in 2015. She developed severe pain in right upper back radiating to shoulder and the lower back. She developed weakness of right lower limb for one day and subsequently developed weakness of left lower limb. She also complained of diminution perception of pain in both legs. There was no history of photosensitivity, oral or vaginal ulcers, rash or joint pains. On examination, she was conscious, oriented, and was febrile. There was a black painless papule with central necrosis (eschar) on the anterior abdominal wall (Fig. 1).

The examination of the nervous system revealed flaccid paraplegia. All deep tendon reflexes and superficial abdominal reflex were absent. Plantar reflexes were mute. The touch, pain, temperature along with position and vibration sensations were markedly decreased below the umbilicus. The rest of neurological and systemic examination was normal.

Her hemogram showed hemoglobin–11.2 g%, total leukocyte count–7800/mm³ with 67% polymorphs, and

Fig. 1: Eschar on anterior abdominal wall (Arrow).
erythrocyte sedimentation rate (ESR) was 40 mm in first hour. Her random blood sugar was 114 mg%, total serum proteins—7.1 g% with serum albumin level 3.4 g%, total bilirubin–0.6 mg% and conjugated bilirubin–0.2 mg%, serum glutamic-oxaloacetic transaminase (SGOT)–86 IU/L, serum glutamic-pyruvic transaminase (SGPT)–34 IU/L, alkaline phosphatase–62 IU/L, urea–22 mg%, creatinine–0.8 mg%. The urine examination showed proteinuria. Her serum showed IgM antibodies to O. tsutsugamushi by ELISA (InBios International, Inc., Seattle, WA, USA). Her widal agglutination test, peripheral blood smear for malaria parasite, blood and urine culture, X-ray chest and ultrasonography of abdomen did not reveal any abnormality.

Cerebrospinal fluid (CSF) examination was normal. Adenosine deaminase was 3U/L (n<10) and venereal disease research laboratory (VDRL) test in CSF was non-reactive. Non-contrast enhanced CT scan of dorsal lumbar spine showed early osteoarthritic changes. Magnetic resonance imaging (MRI) of spine revealed altered signal intensity involving spinal cord in region of C4-D11 suggestive of LETM (Fig. 2). Her ophthalmological examination including fundus was normal. The serological test for syphilis, anti-nuclear antibodies, HIV, HBSAg and antibodies for hepatitis C were non-reactive. Her thyroid function tests, serum vitamin B-12 levels were normal. MRI of brain was also normal.

She was empirically treated with doxycycline in view of presence of eschar, which was later on confirmed as scrub typhus by presence of IgM antibodies. On the basis of MRI report she was treated with methylprednisone 1 g once daily for three days followed by oral prednisolone (1 mg/kg), low molecular weight heparin and physiotherapy. She showed improvement and at the time of discharge from hospital after two weeks of hospitalization, power in both lower limbs had further improvement and patient was able to move legs in bed. She was advised regular follow up and dose of prednisolone was tapered off over next three months. The neurological examination on follow up visits at first and third months after discharge from hospital revealed that power in lower limbs improved further, and she was able to walk with support. There was also improvement in superficial and deep sensations of lower limbs. The patient did not visit hospital after that. She was contacted regularly on telephone regarding improvement in neurological symptoms. After one year of discharge from hospital, she was able to perform daily activities without support but had some residual urinary symptoms.

**DISCUSSION**

There is a wide range of neurological manifestations reported with scrub typhus. An extensive study has shown that central nervous system was involved in almost all patients suffering from scrub typhus and meningoencephalitis as presentation in majority of patients. The manifestations like delirium, myelitis, cerebral haemorrhage, hearing loss, isolated 6th nerve palsy, bilateral 6th and 7th nerve palsies, trigeminal neuralgia, opsoclonus, transient parkinsonism, myoclonus, brachial plexopathy, polyneuropathy, acute disseminated encephalomyelitis and Guillain Barré syndrome have been reported in patients of scrub typhus.

LETM is defined as a spinal cord lesion that extends over three or more vertebral segments on MRI. On axial sections, it typically involves the centre of cord over more than two-third of spinal cord thickness (maximally affecting centrally). The clinical presentation of a patient with LETM is often dramatic and can consist of paraparesis or tetraparesis, sensory disturbances, and gait, bladder, bowel and/or sexual dysfunction. LETM is a characteristic feature of neuromyelitis optica, but such spinal lesions can also occur in various other autoimmune and inflammatory diseases that involve the central nervous system. Multiple sclerosis, sarcoidosis, Sjögren syndrome, infectious diseases with central nervous system involvement, neoplastic disorder or traumatic spinal cord injury can present with longitudinal spinal lesions. *Borrelia, Chlamydia, cytomegalovirus, mumps virus, coxsackie virus, Mycobacterium tuberculosis, Mycoplasma, enterovirus 71, hepatitis C virus, brucella, as-

![Fig. 2: MRI (T2-weighted images) of spinal cord showing hyperintensities at C4–D11 levels (Arrows).](image)
caris, toxocara and schistsoma are known to be associated with LETM\textsuperscript{9–10}.

Neuromyelitis optica is the most common cause of LETM\textsuperscript{9} but the clinical features and investigations in present case did not support neuromyelitis optica. The patient had scrub typhus with paraplegia and neuro-imaging showed LETM. Although, \textit{O. tsutsugamushi} is one of organisms implicated as a cause of transverse myelitis, but its association with LETM has not been reported in literature. Scrub typhus has reemerged in many parts of the world and it can present with various neurological manifestations. Scrub typhus should be kept as differential diagnosis in patients of fever with neurological involvement in endemic areas.

REFERENCES


Correspondence to: Dr Sanjay K. Mahajan, 25/3, U.S. Club, Shimla, Himachal Pradesh–171 001, India.
E-mail: sanjay_mahajan64@rediff.com

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