



## Distinguishing scrub typhus–related deltoid paralysis from cervical spondylosis in an elderly patient: a case report

YanJun Chen<sup>1</sup> · Kun He<sup>1</sup> · Zhifeng Xiao<sup>2</sup> · Dingkun Lin<sup>2</sup> 

Received: 24 January 2019 / Accepted: 24 May 2019 / Published online: 1 June 2019  
© Fondazione Società Italiana di Neurologia 2019

Dear Editor,

Scrub typhus is a zoonotic rickettsial infection disease in the special area named the ‘tsutsugamushi triangle’, which is from northern Japan and far-eastern Russia and bordered by Pakistan and Afghanistan in the west [1]. It is caused by *Orientia tsutsugamushi* and transmitted to human through the bite of the infected larval form (chigger) of the trombiculid mite. The symptoms of the disease include fever, headache, myalgia, cough and gastrointestinal and neurological symptoms [1]. The presence of the eschar is also helpful to the diagnosis. However, some of the neurological symptoms it causes are similar to cervical spondylosis, especially in elderly patients with cervical spine degeneration. Our goal is to clearly identify the cause and propose relevant treatment strategies. Herein, we present a case of scrub typhus–related deltoid paralysis compared with cervical spondylosis. As far as we know, there are not many such cases.

A 67-year-old male from Guangzhou, China, complained of the bilateral shoulder pain with left shoulder lacking strength. His left shoulder abduction was lost and the left arm could not lift up, but with no history of trauma. His fever had started 1 month ago, the symptoms of the shoulders followed, including severe pain, convulsion and slight weakness, and even the left arm could not lift up. He was a farmer with a history of contact with bush and grass when he was outdoors. He had observed a rash of eschar on his left elbow (Fig. 1).

Laboratory examinations yielded the following results: a normal leukocyte count ( $6.10 \times 10^9/L$ ) with a differential count of 79.2% neutrophils; erythrocyte sedimentation rate (ESR) (34 mm/h) and C-reactive protein (CRP) (60.9 mg/L) were all elevated; liver function test showed the increase of alanine aminotransferase (ALT) (53 U/L), aspartate aminotransferase (AST) (69 U/L) and  $\gamma$ -glutamyl transferase (GGT) (92 U/L). Lactate dehydrogenase (LDH) (314 U/L) was raised too; the Weil-Felix test and the detection of rickettsia for scrub typhus were positive. The above results were sufficient to diagnose scrub typhus. However, the patient recovered from fever by anti-infective therapy; the left arm still could not lift.

To evaluate the cause, electromyography (EMG) and evoked potential examination were performed, which showed that the motor nerves of the left axillary nerve and suprascapular nerve were related to axonal lesions; the nerve root or the peripheral nerve of the left median nerve got involved too; the neurogenic damages of the left supraspinatus and the paraspinal muscles near C5 and C7 were discovered. Magnetic resonance imaging (MRI) of the cervical vertebra and left shoulder showed the cervical disc herniation at C4/5 segment was mild and had excluded rotator cuff injury of the left shoulder. Ultrasonography indicated left brachial plexus radiculitis of C6 and C7 (Fig. 2).

In the physical examination, the passive movement of the left shoulder was normal and the active movement was limited

---

YanJun Chen and Kun He should be considered joint first authors.

---

✉ Dingkun Lin  
lindingkuntcm@126.com

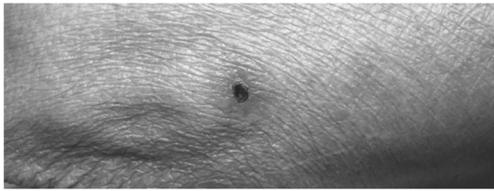
YanJun Chen  
cyj19940406@126.com

Kun He  
1183721010@qq.com

Zhifeng Xiao  
satisfying12@126.com

<sup>1</sup> The Second Clinical College of Guangzhou University of Chinese Medicine, Jichang Road No. 12, Guangzhou 510405, People's Republic of China

<sup>2</sup> Department of Orthopaedics, The Second Affiliated Hospital of Guangzhou University of Chinese Medicine, Dade Road No. 111, Guangzhou 510120, People's Republic of China



**Fig. 1** A rash of eschar was visible on the left elbow of the patient

obviously. The left deltoid was atrophic without muscle contraction. The drop test of the left shoulder was positive.

Excluding similar diseases, especially cervical spondylosis, the diagnosis of scrub typhus-related deltoid paralysis was clearer. Treatment was given with Mecobalamin (0.5mg) in intramuscular injection once a day and oral Neurotropin (a pill) thrice daily with local physiotherapy. However, the muscle strength still failed to recover; it should be a permanent nerve injury.

In this case, the patient was diagnosed with scrub typhus. He had experienced a period of fever and recovered after anti-infection treatment. Regrettably, his left shoulder was still sore and developing an inability to lift. There was no history of trauma, and the cervical disc herniation at the C4/5 segment was not associated with this condition. Therefore, the neurological damage caused by scrub typhus needs attention in this case. Scrub typhus has been reported that can lead to kinds of neurological symptoms, especially meningitis and meningoencephalitis [2]. However, peripheral nervous system involvement is rarely reported. There are few cases including brachial plexus neuropathy and Guillain-Barre syndrome [3, 4].

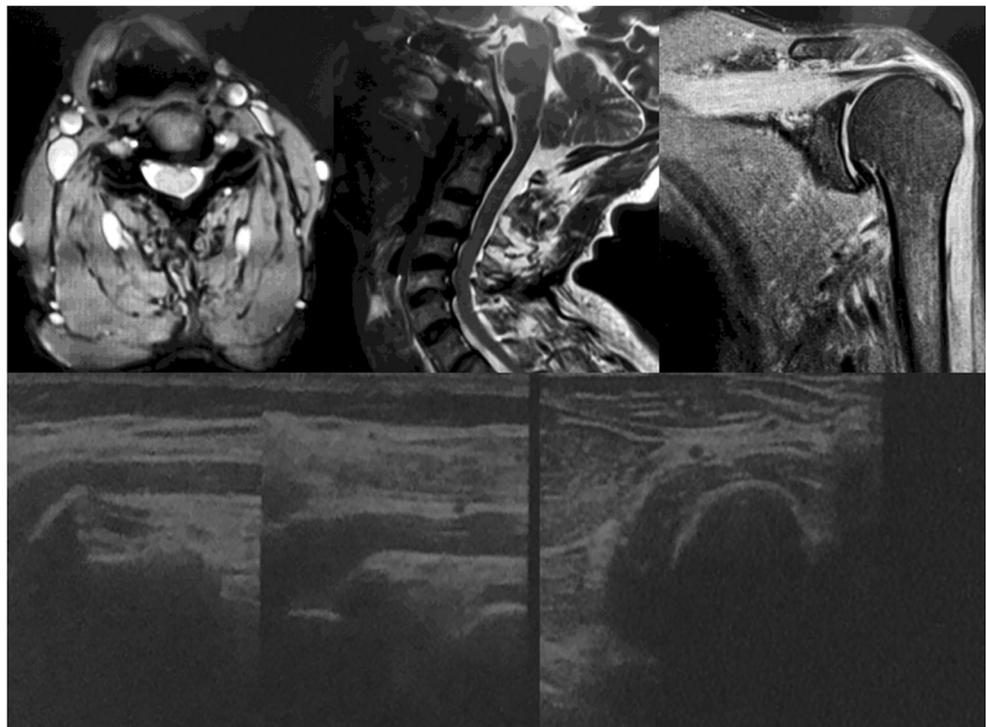
Therefore, peripheral nerve damage associated with scrub typhus is often ignored.

To the best of our knowledge, the mechanism of nerve injury by scrub typhus is not clear. It is presumed that rickettsia may invade the nervous system directly and induce extensive vasculitis [5]. Moreover, another possibility is the toxin is released as an antigen that causes allergic reactions when the pathogen is killed; the antigen has cross-components with myelin protein in the nerve root [6].

A case [7] in India is very similar to ours. A female complained about a pain in the right shoulder and a difficulty in raising her right arm above her shoulder because of scrub typhus. But the difference is that the female has recovered by anti-rickettsial therapy, and the patient in our case still cannot lift up his left arm now, even though scrub typhus has been cured. The patient had a fever for 9 days before being diagnosed with scrub typhus which may be related to the condition. It is possible that anti-infective treatment is too late.

Therefore, an early and rapid diagnosis of scrub typhus is necessary. In our case, the diagnosis was delayed in the other hospital, and no targeted treatment was given to the shoulder and the damaged nerves. Perhaps, these are the causes of the pain and the limited movement of the shoulder. Furthermore, the cervical MRI result of the patient also has a misleading effect on the diagnosis. From this case, clinicians must understand the diagnosis of scrub typhus, especially the neurological symptoms of it. Because of the neglect of scrub typhus, the best time of treatment may be missed, and nerve damage could be more serious. In addition, the main treatment for

**Fig. 2** The MRI showed that the cervical disc herniation at C4/5 segment was mild and had excluded rotator cuff injury of the left shoulder. Ultrasonography indicated left brachial plexus radiculitis of C6 and C7



scrub typhus is anti-infection at present, even with neurological manifestations. In view of this, in addition to accurate diagnosis and early anti-infective treatment, early appropriate neurotrophic and neuroprotective treatments may also contribute to the recovery.

**Acknowledgements** We are grateful to all of the technicians of EMG, MRI and ultrasonography for their assistance.

### Compliance with ethical standards

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

**Ethical approval** All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

### References

1. Mahajan SK, Mahajan SK (2017) Neuropsychiatric manifestations of scrub typhus. *J Neurosci Rural Pract* 8:421–426
2. Rana A, Mahajan SK, Sharma A, Sharma S, Verma BS, Sharma A (2017) Neurological manifestations of scrub typhus in adults. *Trop Dr* 47:22–25
3. Gangula RS, Stanley W, Vandanapu A, Prabhu MM (2017) Guillain-Barre syndrome with falciparum malaria and scrub typhus mixed infection-an unusual combination. *J Clin Diagn Res* 11:D10–D11
4. Singh SK, Vidyasagar S (2015) Brachial neuritis in association with scrub typhus: a rare presentation. *Int J Sci Res*
5. Mahajan SK, Bakshi D (2007) Acute reversible hearing loss in scrub typhus. *J Assoc Physicians India* 55:512–514
6. Lee MS, Lee JH, Lee HS, Chang H, Kim YS, Cho KH, Ahn SH, Song JH, Yoo M, Han JK, Park HY (2009) Scrub typhus as a possible aetiology of Guillain-Barre syndrome: two cases. *Ir J Med Sci* 178:347–350
7. Banda GR, Boddu SR, Ballal P, Belle J (2016) An unusual presentation of scrub typhus. *J Clin Diagn Res* 10:D7–D8

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.