

Case Study

An Uncommon Presentation of Scrub Typhus: A Case of Sixth Nerve Palsy

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A B S T R A C T

Scrub typhus, caused by *Orientia tsutsugamushi*, is an acute febrile illness with rare neurological complications, including sixth cranial nerve palsy. A 30-year-old female from an endemic region presented with fever, abdominal pain, vomiting, and diplopia. Examination revealed isolated left-sided abducens nerve palsy without meningeal signs. Laboratory tests showed elevated liver enzymes, mild CSF pleocytosis, and positive scrub typhus IgM. Intravenous doxycycline (100 mg twice daily) led to fever resolution within 48 hours and complete recovery in two weeks. This case highlights scrub typhus as a potential cause of abducens nerve palsy. Early recognition and doxycycline treatment can ensure a favourable outcome.

Keywords: Scrub Typhus, *Orientia tsutsugamushi*, Abducens Nerve Palsy, Sixth Cranial Nerve Palsy, Diplopia, Neurological Complication, Doxycycline

Introduction

Scrub typhus, caused by *Orientia tsutsugamushi*, is an acute febrile illness transmitted by infected chigger mites, predominantly affecting regions within the "tsutsugamushi triangle," including India.¹ While commonly presenting with fever, headache, myalgia, and gastrointestinal symptoms, severe cases can lead to multi-organ dysfunction. Neurological complications, though less frequent, include meningitis, encephalitis, and cranial nerve palsies, with sixth cranial (abducens) nerve palsy being particularly rare.²

In this case report, we discuss a 30-year-old female patient from a scrub typhus-endemic region who presented with unilateral sixth nerve palsy, an uncommon neurological manifestation of the disease. This case underscores the importance of considering scrub typhus in the differential diagnosis of patients presenting with acute febrile illness and isolated cranial nerve deficits, especially in endemic areas.

Case presentation

A 30-year-old female from a lower socioeconomic background, working as a housewife, presented with a history of high-grade fever, upper abdominal and peri-umbilical pain for 15 days, along with vomiting for 10 days. She developed double vision and yellowish discoloration of urine with dark-coloured urine over the past four days. On examination, she was conscious and oriented but showed left-sided sixth cranial nerve palsy. Meningeal signs, including Kernig's and Brudzinski's, were negative, and the rest of the central nervous system examination was normal. Fundus examination, visual acuity, and colour vision were normal. Hepatomegaly (2 cm below the midclavicular line) with tenderness was observed on abdominal examination, while other systemic findings were within normal limits.

Laboratory investigations revealed haemoglobin of 11.7 g/dL, total leukocyte count of 13,700/cu.mm (with neutrophils 62%, lymphocytes 35%, eosinophils 1%, monocytes 2%),

and platelet count of 206,000/cu.mm. Liver function tests showed elevated SGOT (198 IU/L), SGPT (128 IU/L), alkaline phosphatase (304 IU/L), and total bilirubin (4.2 mg/dL, direct 3.5 mg/dL). Kidney function tests were within normal limits, with urea at 50 mg/dL and creatinine at 0.6 mg/dL. CSF analysis showed elevated protein (72 mg/dL), glucose of 48 mg/dL, ADA of 10 IU/L, and a total cell count of 10 cells/ μ L, predominantly lymphocytes (90%) with a small proportion of neutrophils (10%). Serological tests for malaria, hepatitis A and E, dengue, leptospirosis, HIV, and HBsAg were negative, while scrub typhus IgM tested positive. A CT scan or MRI was not performed due to financial constraints and unavailability at the hospital.

The differential diagnosis included acute cerebral malaria, enteric fever, leptospirosis, dengue fever, tuberculosis, and scrub typhus. Given the positive scrub typhus serology, the patient was diagnosed with scrub typhus with an unusual presentation of sixth cranial nerve palsy. She was started on intravenous doxycycline (100 mg twice daily) along with supportive management for fever and hydration. Fever subsided within 48 hours of treatment initiation, and diplopia showed significant improvement by Day 5. The left sixth cranial nerve palsy resolved completely within two weeks.

Discussion

Scrub typhus, caused by *Orientia tsutsugamushi*, is a significant public health concern in the Tsutsugamushi triangle, with an incidence of 4.6 per 100,000 over 10 years and a case fatality risk of up to 13.6%.¹ It is transmitted by the bite of trombiculid mite larvae (chiggers), leading to disseminated vasculitis and vascular leakage, resulting in end-organ damage. After an incubation of 6–21 days, symptoms include fever, headache, myalgia, and gastrointestinal issues. A characteristic eschar may form, evolving from a papule to a necrotic black ulcer.² While non-specific symptoms like fever, myalgia, and lymphadenopathy are common, systemic involvement can emerge by the second week, including encephalomyelitis, encephalopathy, meningitis, cranial nerve palsies, and ocular complications.^{3–5} Isolated cranial nerve involvement is rare, attributed to micro-infarctions due to scrub typhus-induced vasculitis or nerve compression from ventricular dilation.^{6–8} Abducens nerve palsy is particularly uncommon, though cases of third nerve palsy⁹ and eighth nerve involvement causing sensorineural hearing loss and otalgia have been reported.¹⁰ For diagnosis, indirect fluorescent antibody testing is the gold standard, but ELISA is preferred due to its high specificity and sensitivity.¹¹

Our findings align with those reported by Sukiriti et al.,¹² who described a 19-year-old female from northeast India with fever for five days, followed by bilateral abducens nerve palsy. However, unlike our case, their patient

had bilateral papilledema, suggesting raised intracranial pressure. CSF analysis was normal, and MRI brain and venography were unremarkable. Despite the absence of an eschar, scrub typhus IgM ELISA was positive. The patient responded well to intravenous doxycycline, with partial improvement in lateral rectus function within 10 days. Compared to our case, where unilateral involvement was observed and symptoms resolved within two weeks, this case had a longer recovery period, likely due to the bilateral nature of the involvement.

Lee et al.¹³ reported a 24-year-old woman who initially presented with fever, chills, and myalgia, later developing rash and decreased urine output. Unlike our patient, she had an eschar in the right inguinal area, a hallmark of scrub typhus that was absent in our case. She developed left-sided abducens nerve palsy with esotropia on the second day of hospitalization. Liver function tests showed significantly elevated AST (151 IU/L), ALT (240 IU/L), and ALP (457 IU/L), similar to our patient's findings. CSF analysis revealed mild mononuclear pleocytosis (32 cells/mm³), elevated protein (51 mg/dL), and normal glucose (69 mg/dL). Fever resolved within two days of doxycycline therapy, but complete recovery of abducens nerve function took nearly four months, much longer than the two-week resolution in our patient. This suggests that early treatment initiation, as seen in our case, may contribute to faster recovery.

Sudeep et al.¹⁴ reported two paediatric cases of scrub typhus with bilateral abducens nerve palsy. Case 1 was a six-year-old female with fever for five days, followed by respiratory distress and diplopia, while a nine-year-old male with fever for seven days, followed by headache and diplopia. Unlike our patient, both cases had medial deviation of the eyes with no lateral movement and were associated with hepatosplenomegaly, periorbital edema, and eschar. Their CSF analysis was normal, and brain imaging was unremarkable in both. Treatment with doxycycline led to defervescence within 48–72 hours, with improvement in eye movements by day 4–5 and complete recovery within two weeks, which aligns with our patient's rapid recovery. However, the presence of systemic complications such as respiratory distress and hepatosplenomegaly in their cases highlights the more severe nature of scrub typhus in children compared to adults.

Ghosh et al.¹⁵ described a 14-year-old girl with isolated unilateral abducens nerve palsy, similar to our case, but without fever. MRI brain revealed mild meningeal enhancement, suggestive of meningitis, while CSF analysis showed mononuclear pleocytosis (20 cells/ μ L), elevated protein (102 mg/dL), and positive IgM for *Orientia tsutsugamushi* in both serum and CSF. The patient responded to oral doxycycline, but full recovery took six weeks, longer than our patient's two-week resolution. This difference in recovery time may be due to the presence

of MRI-confirmed meningitis in their case, which was not evaluated in our patient due to financial constraints.

The underlying mechanism of sixth cranial nerve palsy in scrub typhus is believed to be vasculitis of the vasa nervorum, direct endothelial invasion by *Orientia tsutsugamushi*, or immune-mediated inflammation. Our case and those reviewed here highlight the importance of considering scrub typhus in febrile patients with unexplained neurological deficits. While MRI findings were absent or unavailable in some cases, CSF pleocytosis

and elevated protein were common, reinforcing the likelihood of mild central nervous system involvement in scrub typhus.

Compared to previously reported cases, our patient showed a rapid and complete recovery within two weeks, likely due to early diagnosis and prompt initiation of doxycycline. In contrast, cases with bilateral involvement, papilledema, or confirmed meningitis had longer recovery periods ranging from 10 days to four months. These findings suggest that early recognition and treatment are key factors in determining neurological outcomes in scrub typhus. Table 1.

Table 1. Comparison of Scrub Typhus Cases with Sixth Nerve Palsy¹²⁻¹⁵

| Study | Age/ Sex | Symptoms | Neurological Findings | CSF Findings | Liver Function Tests | Presence of Eschar | Treatment | Recovery Time |
|--------------------|-------------|---|--|--|--|---------------------------|---|---|
| Our Case | 30/F | Fever, abdominal pain, vomiting, diplopia, yellow urine | Unilateral left 6th nerve palsy | Elevated protein (72 mg/dL), mild pleocytosis (10 cells/ μ L, 90% lymphocytes) | Elevated SGOT (198), SGPT (128), ALP (304), bilirubin (4.2) | No | IV doxycycline 100 mg BID | Complete resolution in 2 weeks |
| Sukiriti et al. | 19/F | Fever, headache, nausea, vomiting, diplopia | Bilateral 6th nerve palsy, papilledema | Normal | Normal | No | IV doxycycline 100 mg BID | Partial improvement in 10 days |
| Lee et al. | 24/F | Fever, chills, myalgia, rash, decreased urine, diplopia | Unilateral left 6th nerve palsy, esotropia | Pleocytosis (32 cells/ mm ³), elevated protein (51 mg/dL) | Elevated AST (151), ALT (240), ALP (457) | Yes (inguinal area) | Doxycycline 200 mg (1 day) | Diplopia resolved in 4 months |
| Sudeep et al. | 6/F | Fever, respiratory distress, lethargy, diplopia | Bilateral 6th nerve palsy, medial deviation | Normal | Mild transaminitis | Yes | IV doxycycline 7 days, ceftriaxone | Eye movements improved by day 4-5, full recovery in 2 weeks |
| Sudeep et al. | 9/M | Fever, headache, diplopia | Bilateral 6th nerve palsy, medial deviation | Normal | Mild transaminitis | Yes | IV doxycycline 7 days, ceftriaxone | Eye movements improved by day 4-5, full recovery in 2 weeks |
| Ghosh et al. | 14/F | Headache, diplopia | Unilateral right 6th nerve palsy, mild meningeal enhancement | Pleocytosis (20 cells/ μ L), elevated protein (102 mg/dL) | Mild transaminitis | No | Oral doxycycline 100 mg BID for 14 days | Diplopia resolved in 6 weeks |

Conclusion

In conclusion, this case adds to the limited literature on scrub typhus-associated sixth nerve palsy, reinforcing the need for high clinical suspicion in endemic areas. The absence of an eschar should not exclude scrub typhus, and early administration of doxycycline remains crucial for optimal recovery. Our findings, in comparison with previous cases, highlight that unilateral involvement, absence of raised intracranial pressure, and early treatment may lead to faster resolution of neurological symptoms.

This case underscores the need for considering scrub typhus in the differential diagnosis of febrile illnesses with atypical neurological presentations, especially in endemic regions. Early recognition and prompt treatment with doxycycline led to a favourable outcome, preventing further complications.

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References

1. Bonell A, Lubell Y, Newton PN, Crump JA, Paris DH. Estimating the burden of scrub typhus: a systematic review. *PLoS Negl Trop Dis*. 2017;11:e0005838. doi: 10.1371/journal.pntd.0005838.
2. Rajapakse S, Rodrigo C, Fernando D. Scrub typhus: pathophysiology, clinical manifestations, and prognosis. *Asian Pac J Trop Med*. 2012;5:261–4. doi: 10.1016/S1995-7645(12)60036-4.
3. Rana A, Mahajan SK, Sharma A, Sharma S, Verma BS, Sharma A. Neurological manifestations of scrub typhus in adults. *Trop Doct*. 2017;47:22–5. doi: 10.1177/0049475516636543.
4. Kim DE, Lee SH, Park KI, Chang KH, Roh JK. Scrub typhus encephalomyelitis with prominent focal neurologic signs. *Arch Neurol*. 2000;57:1770–2. doi: 10.1001/archneur.57.12.1770.
5. Rajapakse S, Weeratunga P, Sivayoganathan S, Fernando SD. Clinical manifestations of scrub typhus. *Trans R Soc Trop Med Hyg*. 2017;111:43–54. doi: 10.1093/trstmh/trx017.
6. Bhardwaj B, Panda P, Revannasiddaiah S, Bhardwaj H. Abducens nerve palsy in a patient with scrub typhus: a case report. *Trop Biomed*. 2013;30:706–9.
7. Ete T, Mishra J, Barman B, Mondal S, Sivam RK. Scrub typhus presenting with bilateral lateral rectus palsy in a female. *J Clin Diagn Res*. 2016;10:0–7. doi: 10.7860/JCDR/2016/18177.7617.
8. Lee YH, Yun YJ, Jeong SH. Isolated abducens nerve palsy in a patient with scrub typhus. *J AAPOS*. 2010;14:460–1. doi: 10.1016/j.jaapos.2010.06.016.
9. Rajadhyaksha A, Phatak S, Nolkha N, Pathan Y, Sonawale A. Rickettsial fever presenting with isolated third nerve palsy. *J Assoc Physicians India*. 2013;61:144–5.
10. Kang JI, Kim DM, Lee J. Acute sensorineural hearing loss and severe otalgia due to scrub typhus. *BMC Infect Dis*. 2009;9:173. doi: 10.1186/1471-2334-9-173.
11. Kala D, Gupta S, Nagraik R, Verma V, Thakur A, Kaushal A. Diagnosis of scrub typhus: recent advancements and challenges. *3 Biotech*. 2020;10:396. doi: 10.1007/s13205-020-02389-w.
12. Bhattacharjee S, Debbarma B, Debbarma RK, Das G. Scrub Typhus Presenting as Bilateral Sixth Nerve Palsy. *Cureus*. 2024 Mar 22;16(3):e56692. doi: 10.7759/cureus.56692. PMID: 38646216; PMCID: PMC11032509.
13. Lee YH, Yun YJ, Jeong SH. Isolated abducens nerve palsy in a patient with scrub typhus. *Journal of American Association for Pediatric Ophthalmology and Strabismus*. 2010 Oct 1;14(5):460–1.
14. C SK, R M, Nori H, K P, Nallasamy K, Angurana SK. Bilateral Lateral Rectus Palsy in Children with Scrub Typhus. *Indian Journal of Pediatrics*. 2022 Jan 22;89(6):632–2.
15. Ghosh R, Biswas S, Mandal A, De K, Bandyopadhyay S, Sardar SS, et al. Scrub Typhus Presenting as Unilateral Abducens Nerve Palsy. *Neuro-Ophthalmology*. 2021 Jun 4;46(2):99–103.