CASE REPORT

Erythema migrans associated with partial Horner's syndrome

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SUMMARY

Lyme disease is a tick-borne illness caused mainly by three species of spirochaete *Borrelia*—*B. burgdorferi*, *B. afzelii* and *B. garinii*. It has three stages of presentation—early localised, early-disseminated and late Lyme. Erythema migrans is the most common manifestation of Lyme disease, and is usually seen 7–14 days after the tick bite. Patients seldom remember the tick bite. Patients may often present with neurological manifestations indicating neuroborreliosis. These manifestations range from a simple nerve palsy to severe complications such as papilloedema, myelitis or meningitis. We present a case of a 37-year-old woman who presented with partial Horner's syndrome, which was associated with erythema migrans, and other signs of Lyme disease.

BACKGROUND

Lyme disease is a tick-borne illness, caused mainly by three species of spirochaete *Borrelia*—*B. burgdorferi*, *B. afzelii* and *B. garinii*. It was first described in 1977 in the form of arthritis.¹ Since then, there have been various manifestations of Lyme disease described in the literature. Neurological manifestations can range from simple nerve palsy to severe complications such as papilloedema, myelitis or meningitis, depending on the extent of involvement in neuroborreliosis.

CASE PRESENTATION

A 37-year-old Caucasian woman presented to the emergency department, with fever of 102.5°F (39.1°C), headache and fatigue, accompanied by left eyelid drooping. Her history was significant for partial epilepsy. She had been seizure free for 6 years. She was actively involved in outdoor activities and frequently went hiking in the New Jersey area. She denied any memory of a tick bite. She was admitted for further work up and treatment. There was no change in bladder or bowel habits. No further fevers were reported or recorded in the hospital. On examination, she was alert, awake and oriented to time, place and person. Vital signs were stable. On neurological examination, the left pupil was 1–2 mm smaller than the right pupil; and the left eyelid was 1–2 mm lower than the right eyelid (figures 1 and 2). There was no change in visual acuity. Neither facial erythema nor loss of sweating was noted. On funduscopy, no papilloedema was noted. There were no pronator drift and no cerebellar signs. The rest of the cranial nerve, sensory and motor examination was within normal limits. The rest of the physical examination was essentially

normal. On the second day of her admission, a 10×10 cm rash was noticed on the patient's left leg, in the popliteal fossa (figure 3).

INVESTIGATIONS

Laboratory analysis showed normal leucocyte count of 6500/cmm (n=4500–11,000/cmm) with haemoglobin of 14.5 mg/dL (n=12–16 mg/dL). Renal and liver function tests were within normal limits. CT of the head was negative for any acute intracranial pathology. CT of the chest was negative for lung mass or Pancoast tumour. MRI of the brain and MR angiography (MRA) of the head and neck were negative for stroke or vascular anomaly. *B. burgdorferi* total antibody by ELISA was positive at 1205 Unit/mL (n=0–160 U/mL). Blood smear was negative for babesia, and ehrlichia and anaplasma serology was also negative. Cerebrospinal fluid (CSF) analysis showed normal total white cell count (0–5 cu/mm) with lymphocytes of 13% (40–80%), and normal protein and glucose content with positive IgM antibody index CSF 1.08 (<0.80). Serum western blot was found to be positive for IgM antibodies but negative for IgG antibody to *B. burgdorferi*.

TREATMENT

The patient was started on oral doxycycline 100 mg two times per day and was discharged.

OUTCOME AND FOLLOW-UP

On follow-up in the clinic, the patient's ptosis had improved and gradually resolved. She eventually had a repeat western blot 6 weeks later, which was then positive for IgG antibodies, thus indicating the presence of Lyme disease.

Figure 1 Left pupil 1 to 2 mm smaller than the right pupil and left eyelid 1 to 2 mm lower than the right eyelid with compensatory raising of the left eyebrow.

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Figure 2 Left pupil 1 to 2 mm smaller than the right pupil and left eyelid 1 to 2 mm lower than the right eyelid with compensatory raising of the left eyebrow.

DISCUSSION

Lyme disease is a tick-borne illness caused by the spirochaete *Borrelia*. It has three stages of presentation—early localised, early-disseminated and late Lyme disease. Early localised Lyme disease is only accompanied by an erythema migrans rash whereas early-disseminated Lyme disease can present with neurological or cardiac symptoms along with the rash. Erythema migrans is the most common manifestation of Lyme disease, and is usually seen 7–14 days after the tick bite.² It is a painless rash with the most common sites of occurrence being the axilla, groin, popliteal fossa or belt line. Most patients do not even remember getting the tick bite.³ The presenting symptoms can be fever, myalgia, arthralgia or a headache along with the rash.⁴

Partial Horner's syndrome is a neurological entity defined by the presence of miosis and ptosis without anhidrosis.⁵ Lyme disease associated with Horner's syndrome due to sympathetic nerve involvement has been described in the literature.⁶ Partial Horner's syndrome is usually caused by a lesion of the preganglionic nerve fibres at the level of the internal carotid artery, or postganglionic nerve involvement at the level of first thoracic (T1) vertebrae.⁷ Possible causes can include a stroke or local tumour, but in 40% of cases, the causes are unidentified.⁸ Diagnosis is made clinically and imaging is carried out only to rule out life-threatening conditions such as carotid artery dissection. Neurological manifestation of Lyme disease includes cranial nerve palsy, meningitis, radiculopathy, mononeuropathy multiplex and, very rarely, cerebellar ataxia and

encephalomyelitis. The facial nerve is the most common nerve involved,^{9–10} but cases have been reported with isolated involvement of the abducens nerve.¹¹ Our case demonstrates signs of partial Horner's syndrome associated with erythema migrans.

Presence of erythema migrans is sufficient to diagnose Lyme disease, especially in endemic areas.^{12–13} Most patients do not remember a tick bite. Leucocyte count and red blood cell count remain normal in Lyme disease. The presence of such abnormalities should raise the possibility of co-infection with babesia and ehrlichiosis in endemic areas.¹⁴ Diagnosis is made based on clinical presentation and serological tests. Serological testing is performed as a two-step procedure, and can be used to confirm Lyme disease.¹³ The first step is an ELISA, which may not be positive in the initial 1–2 weeks of infection. It is followed by the presence of IgG in western blot, which is usually positive 4–6 weeks after the exposure. CSF is usually normal though it may show antibodies in meningitis. Our patient was from an endemic area and was at high risk for tick bite exposure due to her regimen of hiking in the woods. Her neurological symptoms were accompanied by classic erythema migrans. Laboratory findings were negative for ehrlichiosis or babesiosis. CSF analysis was negative for meningitis. No abnormalities were found in MRI and MRA of the brain. The treatment of choice in uncomplicated cases is oral doxycycline. Patients with meningitis or complicated neuroborreliosis are treated with intravenous cephalosporin or penicillin for 2–3 weeks.² Our patient was eventually treated with oral doxycycline and discharged home. She was followed up later in the clinic with eventual resolution of all symptoms. The cause of the nerve lesion is still unclear, however, the IgG seroconversion and resolution of eye symptoms with antibiotics points to a causal association of partial Horner's syndrome with Lyme disease (erythema migrans) in this case.

Learning points

- ▶ Lyme disease can present with a variety of neurological manifestations such as partial Horner's syndrome.
- ▶ It is essential to consider this in the differential diagnosis of patients presenting with isolated neurological symptoms, especially in endemic areas.
- ▶ Clinical signs of Lyme disease, such as erythema migrans, can be easily missed or can present days after the tick bite, and thus a complete physical examination is essential.
- ▶ Uncomplicated cases can be treated with oral antibiotics and demonstrate complete recovery.

Figure 3 Erythema migrans, 10×10 cm, in the left popliteal fossa.

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Contributors IV contributed in the management of the patient, literature review of current guidelines and writing of the case. AA contributed in the literature review of current guidelines and writing of the case.

Competing interests None declared.

Patient consent Obtained.

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