

A Case of Neuroborreliosis in a Maltese Patient

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Abstract

Introduction: Lyme disease is the most common tick borne disease in the Northern Hemisphere. Its endemicity in Malta is however not known, as no specific studies have yet been carried out. Malta. We report here the case of a Maltese lady with a significant travel history and features of a cranial neuropathy and polyradiculoneuropathy confirmed to have what to our knowledge is the first case of Neuroborreliosis on the Maltese Islands.

Case: A 38 year old female presented with right facial weakness, sensory symptoms of her upper limbs and pain in the lower back radiating down both lower limbs. Neurological examination confirmed features of a lower motor neuron facial palsy on the right and predominantly lumbo-sacral polyradiculoneuropathy. Initial blood and imaging investigations were unremarkable. CSF analysis revealed a lymphocytic pleocytosis. Symptoms deteriorated and a repeat lumbar puncture indicated a worsening lymphocytic pleocytosis. On questioning she admitted to having lived in Bavaria, Germany for a number of months in the year prior to presentation. Serum antibodies for *Borrelia* proved positive. CSF infection with *Borrelia* was also confirmed on specific testing. She was subsequently treated with a four week course of ceftriaxone which resulted in significant

Discussion: Neurological symptoms of *Borrelia* typically occur months to years after initial inoculation of infection. Characteristic features include cranial nerve palsies more commonly of the facial nerve and meningoradiculitis with lymphocytic pleocytosis on CSF analysis. This case highlights the importance of careful evaluation of even remote travel history in patients with such presentation.

Key words

Borrelia; Malta; Ceftriaxone; Facial Paralysis; Polyradiculoneuropathy;

Introduction

Lyme disease is the most common human tick-borne disease in the Northern Hemisphere.¹ Responsible pathogens are species of spirochete bacteria belonging to the genus *Borrelia*, which are inoculated into the skin via a tick bite, from ticks of the genus *Ixodes*. Typically patients present initially with non-specific symptoms such as headaches, malaise, muscle soreness and fever, and with a characteristic rash – erythema chronicum migrans.² These symptoms however do not occur in every single case of Lyme disease, and presentation can be insidious. We present what to our knowledge is the first case of neuroborreliosis diagnosed on the Maltese Islands.

Case

A 38 year old lady presented to Mater Dei Hospital with an eight day history of pain and tingling sensation at her right upper limb and low back pain radiating down both lower limbs. Five days prior to presentation she had developed a right sided facial weakness that was treated unsuccessfully as “Bell’s palsy” with prednisolone. Her past medical history was unremarkable and the patient denied any recent travel history of note.

Examination on admission revealed a lower motor neuron facial weakness on the right side. On examination of the extremities the tone and power were normal. Reflexes were normal in the upper limbs but were absent in the lower limbs. Sensory

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improvement of her symptoms, and resolution of the lymphocytic pleocytosis on repeat CSF analysis.

examination revealed patchy loss of sensation to light touch and reduced sensation to pin prick in the right upper limb and both lower limbs. Gait was normal.

Routine bloods on admission were found to be within normal limits. Erythrocyte Sedimentation Rate (ESR) was 6mm in the 1st hr and C-Reactive Protein (CRP) was <6mg/L.

Chest X-ray was found to be normal. Magnetic resonance imaging (MRI) of the brain and whole spine was also normal.

A lumbar puncture revealed a lymphocytic pleocytosis with a lymphocyte count of 200×10^6 cells/L. The cerebrospinal fluid (CSF) protein was raised at 2756mg/L and CSF glucose was 2.8 mmol/L. CSF was negative for cryptococcal antigen, india ink and acid fast bacilli. Blood glucose level was 6.3mmol/L. CSF testing for oligoclonal bands was negative.

Nerve conduction studies showed a mild patchy demyelinating motor polyneuropathy.

Her symptoms got progressively worse and the pain could not be controlled with analgesics including codeine and amytriptiline. At this point ESR was found to be elevated at 64mm in the 1st hr but CRP remained normal.

A repeat lumbar puncture revealed a lymphocytic meningitis with a markedly higher lymphocyte count at 1290×10^6 cells/L and a higher protein count (3000mg/L) when compared to the first lumbar puncture. Flow cytometry of the CSF lymphocytes was indicative of a reactive process.

On specific questioning about travel history the patient admitted that she had lived in the countryside in Germany for a number of months during the previous year. Serum infectious screen revealed a positive *Borrelia* Immunoglobulin G. Western Blot for *Borrelia* on a serum sample further confirmed this. Treatment with ceftriaxone was therefore started.

Repeat MRI of the whole spine with contrast showed abnormal leptomeningeal enhancement along the cauda equina roots. Specific testing on CSF revealed the presence of *Borrelia* antibodies.

Echocardiogram revealed no abnormalities and electrocardiogram showed normal sinus rhythm with no evidence of heart block.

While an inpatient receiving antibiotic treatment the patient experienced increasing facial pain and radicular low back pain, which was eventually controlled with pregabalin.

However after a four week course of ceftriaxone she showed a marked improvement with significant reduction in the CSF protein level and lymphocyte count.

Six weeks following discharge the patient was asymptomatic except for the lower motor neuron facial weakness which was also showing signs of improvement.

Discussion

When infection with *Borrelia* occurs, the disease progresses through three stages. Following the tick bite, dissemination of *Borrelia* occurs over a number of days through skin, spreading to various organs over months to years.³⁻⁴ Prevention of inoculation of infection can be attained by paying careful attention to wash scalp, armpits and groin properly when travelling to high risk areas, as ticks must be attached to their hosts for prolonged periods of time in order to inoculate the host.⁵

Classification has changed slightly. Refer to British association guidelines which divide them into early localized, early disseminated and late rather than in stages. Neurological symptoms can occur in both the early disseminated (facial and meningoradiculitis) as well as in the late stage where it resembles more MS.

Lyme disease is divided into three stages, early localized, early disseminated, and late disease.⁴ The first stage refers to the early localized infection occurring in the first month after the bite. The presentation is of a non-specific febrile illness and a characteristic “bulls-eye” rash of isolated erythema chronicum migrans may be seen. This is seen in 80% of individuals who contract Lyme Disease.⁶ The appearance of the rash should warrant prompt treatment with doxycycline to prevent further spread.

Early disseminated disease occurs weeks to months after the bite and is secondary to haematogenous spread. Joint and cardiac involvement may be present with joint pains, heart block and fibrinous pericarditis.⁴ Neurological modes of presentation can also be seen, with these frequently being cranial and peripheral radiculoneuropathies.⁷ Presentation with these symptoms indicate dissemination into CSF. Seventh nerve palsy is the commonest cranial neuropathy, occurring in up to 60% of patients with neuroborreliosis. The inflammatory radiculopathy seen in Lyme Disease is referred to as Bannwarth's

Syndrome⁸ and is characterized by lymphocytic pleocytosis in the CSF and sharp pain with nocturnal exacerbations that may be unremitting for weeks or months.⁹ This presentation can mimic a mechanical radiculopathy, however, in patients with Lyme disease, there is no history of antecedent injury and findings on non-contrast imaging studies are usually unimpressive. Specific magnetic resonance imaging findings are of cervical, thoracic, and lumbar nerve root contrast enhancement¹⁰ – hence the importance of carrying out a contrast study on this patient.

Late disease refers to chronic infection, where symptoms persist for several months after initial inoculation. Late neuroborreliosis may consist of previously described mononeuropathies and polyradiculopathies which persist for more than 6 months. Late polyneuropathy is often observed in association with acrodermatitis chronica atrophicans (ACA) – a typical dermatological manifestation that may result in widespread skin atrophy. CNS manifestations of late neuroborreliosis can present with cognitive decline, gait disorders and autonomic symptoms such as impaired bladder control.⁷

Borrelia infection is diagnosed with indirect methods to detect serum antibodies to *B. Burgdorferi*. This is based on a 2-step method by using an initial enzyme immunoassay (EIA), or an enzyme-linked immunosorbent assay (ELISA) or immunofluorescence assay (IFA), followed by confirmation of a positive or equivocal initial test by immunoblot or Western blot.¹¹⁻¹³

Treatment consists of high dose antibiotics. In this case a four week course of intravenous ceftriaxone was used.¹⁴ A positive response to treatment was confirmed by the improvement in the patient's symptoms soon after starting treatment and improvement in the CSF picture at the end of treatment.

Studies have shown that the earlier antibiotics are initiated the more effective the treatment response will be. A double-blind, randomised trial to investigate the efficacy of oral doxycycline versus intravenous ceftriaxone in the treatment of European Lyme Neuroborreliosis showed that both drugs offer equally effective results.¹⁵⁻¹⁶

Recommended dosage forms in Lyme Neuroborreliosis are a two to three week course of twice daily oral doxycycline 200mg or a two to four week course of daily intravenous ceftriaxone 2g.¹⁴

Doxycycline is however contraindicated in pregnancy and breastfeeding, with ceftriaxone preferred in these cases. These treatment modalities have been shown to be largely effective, however complete cure can never be guaranteed, and persisting symptoms despite treatment are not uncommon.¹⁷

Conclusion

Lyme disease can present very insidiously and may lead to severely disabling symptoms if it remains untreated. Although not typically associated with Malta, Borreliosis should always be considered in the differential diagnosis of patients presenting with lower motor neuron facial weakness and features of polyradiculitis and meningitis with a significant travel history, as prompt treatment results in a much better prognosis.

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