Case Reports

An Unusual Presentation of Lyme Neuroborreliosis

L Kitto & C McKenna

Abstract:
Back pain is a common symptom among patients presenting to the acute medical unit. We describe the case of a 55-year-old man with a brief history of fatigue and severe back pain, unresponsive to escalating doses of opiate analgesia. Blood tests and imaging studies were unremarkable and a functional diagnosis was considered. Several weeks into his admission he developed a lower motor neurone facial nerve palsy. He was treated with antibiotics for an incidental finding of a hospital-acquired pneumonia on imaging, which remarkably led to the resolution of his facial palsy and allowed a dramatic reduction in analgesia. This triggered further investigations; identifying Lyme neuroborreliosis as the cause of his symptoms.

Keywords:
Lyme disease, Lyme neuroborreliosis, neuropathic pain, facial nerve palsy.

Learning Points:
- Lyme Disease (LD) is increasing in incidence in Western Europe.
- The combination of neuropathic pain and cranial nerve palsy, particularly facial nerve palsy, should lead to the consideration of LD.
- LD can present in the absence of the characteristic erythema migrans rash (in approximately 20-30% of cases)
- Identification of risk factors for tick exposure is important but it should be noted that many patients are unable to recall a tick bite.
- Early consideration of the diagnosis of LD in the AMU allows timely diagnosis and establishment of antimicrobial treatment, which improves long-term outcome.

Case Presentation

A 55-year-old Caucasian man presented to the acute medical admissions unit with a three-week history of generalised fatigue and severe back, neck and right shoulder pain. He was a Type 1 diabetic on insulin, with adequate glycaemic control (HbA1c 65mmol/mol) and no end organ damage. Other past medical history of note included three presentations with pericarditis, chronic compartment syndrome of both lower legs and bilateral frozen shoulders. Several weeks prior to the onset of pain he had undergone a distension arthrogram of his left shoulder.

He gave a history of a dull, constant ache between his shoulder blades and a sharp, burning pain radiating down his right arm, exquisitely tender to even light touch. His pain was severe, unremitting and extremely difficult to manage. Pain was notably worse at night and was largely unresponsive to serial escalation of painkillers. Having been opiate naive on admission, he was quickly titrated to high doses of morphine sulphate, requiring almost hourly breakthrough analgesia, particularly overnight. TENS machine and lidocaine patches were unhelpful. Gabapentin was added and titrated to maximum dose with only minimal reduction in opiate requirements.

The patient was apyrexial throughout his admission. Neurological examination, including fundoscopy was unremarkable. Hyperalgesia and allodynia were present in the distribution previously described. There was an erythematous, macular rash in the same distribution, which would relapse and remit with the severity of pain.

Routine blood tests were within normal range. Additional tests including C-reactive protein, plasma viscosity, creatine kinase, thyroid function, HIV serology, immunoglobulins and anti-nuclear antibody were also normal. The patient underwent MRI imaging of his whole spine, which was unchanged from a previous MRI, demonstrating chronic degenerative lumbar spine and minor cervical spine changes, with no nerve root compression.

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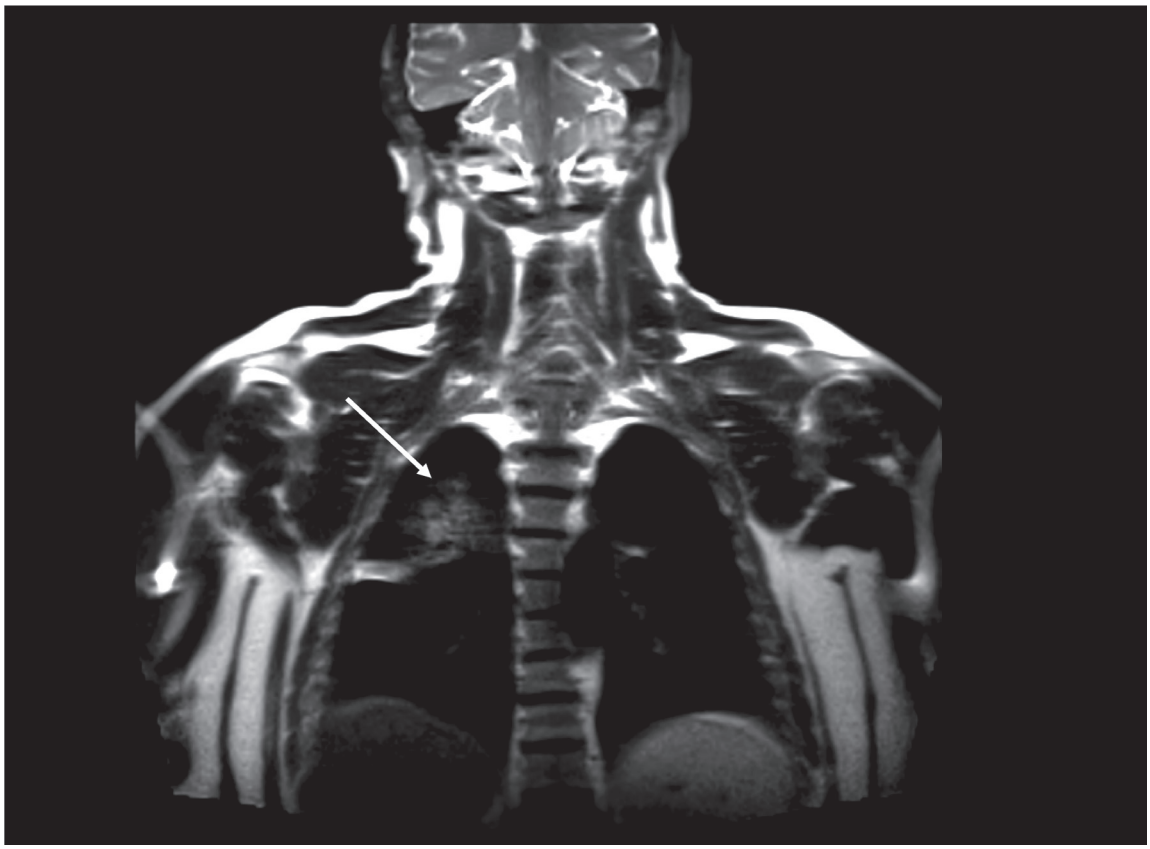


Figure 1. MRI Brachial Plexus, showing consolidation in the apex of the right lung (arrow).

A complex regional pain syndrome or functional neurological disorder were considered the most likely initial diagnoses given the absence of any objective abnormalities. However, after two weeks as an inpatient he developed a unilateral, lower motor neurone facial nerve palsy, triggering further investigation. MRI brain was normal. Due to ongoing pain an MRI brachial plexus was performed which did not demonstrate a cause for his pain but did show unexpected consolidation in the right upper zone (Figure 1), which was not seen on chest radiograph. This was managed as a hospital acquired pneumonia with Piperacillin-Tazobactam. Two days following initiation of antimicrobial therapy his facial nerve palsy resolved and his pain improved, allowing reduction in opiate doses.

Cerebrospinal fluid (CSF) analysis was abnormal; protein was elevated at 1560mg/L, with lymphocytic pleocytosis - 304 white blood cells/mm^3 (90% lymphocytes). On the basis of these results serum and CSF were sent for Western Blot analysis, which confirmed the presence of antibodies specific to *Borrelia burgdorferi* (Bb), the spirochete responsible for LD.

These findings led to the diagnosis of Bannwarth's syndrome. On revisiting the history the patient reported previous tick bites and was an avid hill walker. There was no history of erythema migrans. He was converted to once daily intravenous ceftriaxone and analgesia requirements continued to decline. He completed a four-week course of antibiotics via the ambulatory medical unit and made a slow recovery over many months.

Discussion

Lyme disease (LD) is a well-recognised multi-system disorder with increasing incidence worldwide, requiring early treatment to prevent long-term complications.[1] Lyme neuroborreliosis (LNB) is the neurological manifestation of the systemic infection caused primarily by three species of spirochetes of the *Borrelia burgdorferi* (Bb) sensu lato genogroup, transmitted to humans by the bite of infected ticks. Clinical features of LNB are diverse and presentation can be acute or chronic. Acute LNB usually occurs three to six weeks after infection and most frequently presents with a painful meningoradicultis (Bannwarth's syndrome).[2] Whilst determining the presence of risk factors for tick exposure is useful, many patients are unable to recall a tick bite.[3]

The clinical hallmarks of Bannwarth's syndrome (BS) – also called Garin-Bujadoux syndrome[4] –

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include radicular pain, with or without paraesis, which may be accompanied by cranial neuropathy.[4,5,6] The nature of the pain may provide another clue to the underlying diagnosis of LNB and this is worth exploring in more detail with the patient. The pain of BS is severe and can last for weeks to months after initial infection. The intensity and localisation of pain may vary on a daily basis and is commonly worse at night,[5] as described in the case above.

Erythema migrans cannot be relied upon in the diagnosis of LD; it is absent in approximately 20-30% of cases[7,8] and uncommon in BS.[9] As a result, patients may not seek medical attention until the more debilitating manifestations of later disease are apparent.[7] The challenge for physicians is early recognition of LD, even in the absence of EM. A distinct rash was one of the presenting features in this case in the form of a uniform patch of erythema, which relapsed and remitted with pain severity. We have not found a similar report in the existing literature but postulate that the rash may have been related to underlying neuropathy, microvascular or autonomic changes.

Complex regional pain syndrome or a functional neurological disorder were considered to be the most likely differential diagnoses in this case. It was not until the patient developed a facial nerve palsy that lumbar puncture was undertaken. Fifty percent of patients with acute LNB have cranial nerve involvement[2] and development of this sign in association with radicular pain should prompt urgent investigation to rule out LNB.

The presence of consolidation on MRI was unexpected, particularly in the absence of respiratory symptoms, hypoxia or an inflammatory response. Respiratory involvement is unusual in LD, although cough has been reported[10] and LNB has been implicated as a cause of respiratory failure.[11] We suspect that the finding of consolidation on MRI was incidental; however, initiation of antimicrobial therapy and resulting improvement of cranial neuropathy served to support the diagnosis of LNB. The absence of an inflammatory response is perhaps unusual; previous case reports have demonstrated elevated CRP in LD.[12]

Diagnosis of LNB can be challenging and requires an index of suspicion. Given the heterogeneous nature of presentation, both clinical and laboratory findings are necessary. The 'European Federation of Neurological Societies' recommends that for a definite diagnosis of LNB, all of i) neurological symptoms suggestive of LNB ii) CSF pleocytosis and iii) detection of Bb specific antibodies in CSF, are required.[13] Whilst neuroimaging is usually negative, it is useful to exclude other pathological processes. The presence of normal imaging studies in patients who present with neuropathic pain should prompt consideration of LD.

In this case, Western Blot analysis for Bb-specific antibodies in serum and CSF confirmed the diagnosis (Table 1). The presence of stronger banding patterns for antibodies within the CSF (denoted by + signs) and antibody reacting to p58 antigen (not present in serum) were suggestive of neuroborreliosis. Elevated protein and lymphocytic pleocytosis supported the diagnosis. In some cases of LNB, antibodies are detectable in CSF whilst serum testing is negative.[14] Furthermore, both serum and CSF testing are limited by low sensitivity in early LD (less than six weeks) and serum antibodies may also be detected for years after successful eradication of infection.[13] As a result, immunological testing must be interpreted in the clinical context.

Table 1. Strength of banding pattern denoted by + signs.

Bb Antigen	Strength of Antibody Banding Patterns on Western Blot	
	Serum	CSF
p58		+
VlsE	++	+++
p41	++	+++
OspC	+	++

Early treatment of LD is associated with improved outcome and more complete resolution of symptoms.[1,5,8,15] The preferred parenteral drug for LNB is ceftriaxone (2 or 4g daily) because it is highly active against Bb in vitro, crosses the blood-brain barrier and has a long serum half-life, allowing once daily dosing. Alternative parenteral choices are cefotaxime and penicillin,[1] explaining why Piperacillin-Tazobactam for an alternative indication may have resulted in clinical improvement in this case.

Conflict of Interest

The authors have no conflict of interest to declare.

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