Case Report: Lyme Disease and Complex Partial Seizures

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ABSTRACT

A case of complex partial seizure disorder associated with late stage neuropsychiatric Lyme disease is presented. The patient showed a progressive development of somatic, cognitive, psychiatric, and neurologic symptoms. Reliance upon a conservative criteria for the interpretation of immunological testing caused an initial delay in diagnosis and treatment, resulting in more severe symptoms including a complex partial seizure disorder. Early diagnosis and treatment of Lyme disease is suggested to prevent the development of more severe sequelae, such as complex partial seizure disorder. When patients present with a complex partial seizure disorder and a multisystem illness, Lyme disease should be considered in the differential diagnosis.

Key words: seizures, Babesiosis, neuroborreliosis, cognitive

INTRODUCTION

Seizure disorders are sometimes a manifestation of late stage neuropsychiatric Lyme disease. There are a number of references to this association in the medical literature.[1-17] A case history is presented to describe the emergence of a seizure disorder in association with late stage Lyme disease.

CASE REPORT

A 46-year-old female patient lived in a Lyme endemic area and recalled an incident in which she and her 8-year-old daughter sustained multiple tick bites at the same time approximately 5 years previously (the daughter was subsequently diagnosed with Lyme disease). The patient did not recall any ECM-like bulls eye rash or flu-like illness at the time. However, she noticed the gradual onset of increasing symptoms over the next two years which initially included arthralgias of the thumbs and aching hands bilaterally, night sweats, shortened menstrual cycles, insomnia, and unexplained irritability and anger.

Two years after the tick bite, the patient sprained her ankle and had difficulty healing from this injury. She also noted the uninjured ankle was hurting as well.

Following the ankle injury, there was a rapid increase in the development of symptoms including memory impairments; spelling difficulties; loss of executive functioning; becoming lost in familiar places; depression; numbness and tingling of the left side of her face; pain under her left eye; twitching of her left eye; tinnitus; ear pain; myoclonic jerks; jerking movements of the left shoulder; involuntary movements of her fingers, hands, arms, and legs; burning pain of her right hip; lower back pain on her right side; nerve pain; numbness and tingling of both legs; restless leg syndrome; a pulling in of the right foot followed by a jerking of the right leg; involuntary toe movement; chills; and fatigue.

She saw several physicians and had multiple diagnoses including an adjustment reaction from a fertility problem, multiple sclerosis, Huntington's, and moving toe and painful leg syndrome.

She was referred to a neurologist who ordered serology testing for *Borrelia burgdorferi* antibodies. A reactive enzyme immunoassay (1.11) was confirmed by repeat analysis (> 0.99 positive), IgM Western blot was reactive (39 and 41 kd bands), and IgG Western blot was interpreted as negative (23, 28, 41, 93 kd bands were present) by Smith Kline Beecham Labs. The testing was considered negative since there were only four bands on the Western blot IgG.

A magnetic resonance imaging (MRI) scan was also negative. The strobe light during an electroencephalogram (EEG) resulted in a seizure-like episode. Although spikes were seen on the EEG, no seizure was recorded.

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During a subsequent lumbar puncture, an apparent complex partial seizure occurred.

A second MRI scan a year later demonstrated scattered foci of abnormal signal within the periventricular white matter, more confluent in the periatrial region. However, a second physician interpreted this MRI as normal.

Subsequently, a family physician diagnosed the patient with Lyme disease based upon clinical grounds and started treatment with intravenous ceftriaxone. A second seizure occurred during intravenous treatment. There was a significant clinical improvement with 10 weeks of intravenous treatment. After discontinuing the intravenous antibiotics, the patient relapsed and was treated with a second 10-week course of ceftriaxone. The patient again improved but more slowly. The patient recorded her symptoms and reported improvement of cognitive and emotional symptoms. After discontinuing the second course of intravenous antibiotics, there was a return of myoclonic jerks, and later seizure activity on a daily basis. Seizures were triggered by caffeine, light flickering through a row of trees on the highway, exercise, or during symptom flares associated with antibiotic treatment (apparent Jarish–Herxheimer reactions). They sometimes began with blurred vision, followed by increasing tinnitus, drowsiness, and a sense that her body was floating. During these episodes, her right arm stiffened accompanied by a twitching of her right toes, which progressed to her feet and calf muscles. The right foot then bent inward, and her legs began jerking. After her legs stopped jerking, her head turned from side to side as far as her head could turn. After the head movements stopped, her abdomen contracted, as if doing sit-ups. These contractions forced the air out of her lungs. After several minutes, the seizures stopped. She felt tired after these episodes.

The patient was referred to another physician experienced in the evaluation and treatment of Lyme disease. The Lyme IgG/IgM antibody test was equivocal at 1.03 with a reactive cut off of 1.2. Lyme Western blot testing for IgM was positive with 23-25, 31, 37, 41, and 58 Kd bands. IgG was positive with 23-25, 28, 31, 34, 41, 58, 73, and 83 kd bands (Ingenex, Menlo Park, CA).

The *Babesia microti* IgM titer was negative, and the IgG titer was reactive at 1:80. There was a confirmation with positive *B microti*-in situ (RNA), multiple merozoites only (Ingenex). No blood smear was reported. Human granulocytic ehrlicheosis (HGE) titer was 1:40 for IgM and 1:80 for IgG. Human monocytic ehrlicheosis (HME) titer was 1:80 for IgM and 1:80 for IgG (Ingenex). The findings of the *Babesia*, HGE, and HME testing added support for the presence of tick-borne diseases. However, it should be noted that a negative blood smear and nonreactive IgM test of *Babesia* antibody does not support the diagnosis of acute babesiosis.

A psychiatric assessment performed 6 months after intravenous antibiotic treatment was discontinued demonstrated the following signs and symptoms: decreased ability to sustain attention span, decreased ability to allocate and prioritize attention, easily distracted by frustration, auditory hyperacusis, visual hyperacusis, decreased working memory, decreased short-term memory, slowness retrieving words and names, becoming lost in familiar locations, letter reversals, spelling errors, word substitution errors, depersonalization, poor concentration, "brain fog"(slowness and inaccuracy of processing), decreased capacity to plan and prioritize, obsessive thoughts, mental apathy, decreased frustration tolerance, sudden abrupt mood swings, exaggerated startle reflex (including acoustic startle), explosive anger, decreased social functioning, decreased job performance, family problems, compensatory compulsions, dropping objects from her hand, crying spells, depression, panic attacks, generalized anxiety, not well rested in the morning, mid and early insomnia accompanied by seizures, episodes of anorexia and weight loss, episodes of overeating accompanied by weight gain, decreased libido, decreased capacity for pleasure, menstrual irregularity, intolerance to cold, decreased body temperature (average 97.6°F), night sweats, chills, cervical radiculopathy, tension headaches, intolerance to bright light and fluorescent lights, conjunctivitis, eye pain, dry eyes, left sided Bell's palsy, tinnitus, hearing loss, dizziness, low threshold for motion sickness, choking on food, absence and complex partial seizures, numbness, tingling, sensory loss, burning, stabbing sensations, paresis, tremor, twitching, muscle tightness, restless leg, myoclonic jerks, herniated discs, equivocal Rhomberg, a sensation of being bit by fleas, vibration sensations on the bottom of the feet, a sensation of an outer ear infection, tightness and crepitations of joints, periostitis of the right tibia, myalgia, tarsal tunnel syndrome, chest pain, racing pulse, shortness of breath, cough, sinusitis confirmed by MRI, recurrent urinary track infections, and vaginal pain.

It was noted that the symptoms gradually progressed over a period of 5 years since the initial onset of the illness. Symptoms fluctuated throughout the day and were increased perimenstrually and by stress. Antibiotics initially increased these symptoms (including the seizures) followed by a subsequent improvement. Symptoms were noted to increase when antibiotics were stopped.

The patient has subsequently improved in response to a complex treatment approach. The current treatment is clarithromycin, paroxetine HCI, gabapentin, clonazepam, magnesium and B_{12} shots (one a week), and doxycycline 300 mg at dinner.

DISCUSSION

This patient presented with a systemic illness, and progressive development of increasing somatic neurological, cognitive, and psychiatric symptoms. Although the clinical signs and symptoms were compatible with a diagnosis of Lyme disease, and could not be explained by any other diagnostic entity, the diagnosis was not confirmed by the immunological criteria many consider necessary for the diagnosis of Lyme disease. The diagnosis of Lyme disease is based upon clinical grounds. However, laboratory testing may or may not confirm the diagnosis. This patient had some tests positive for 4 tick-borne diseases—Lyme disease, babesiosis, HME, and HGE. This suggests that the patient was exposed to tick-borne diseases. The question exists whether other unknown tick-borne diseases might also be present. The presence of these diseases might be considered coinfections. If there is a synergistic interaction between these microbes, it would be considered an interactive coinfection. However, it is difficult to demonstrate such interactions when the copresence of such microorganisms and their effect on the host is not well understood.

The patient had symptoms that could be compatible with babesiosis and some laboratory findings supported this diagnosis. However, there are no clearly defined chronic central nervous system symptoms associated with chronic babesiosis.

Babesiosis is noted to have similarities to malaria. Cerebral malaria has been extensively studied and is associated with a number of mental symptoms including seizures, depression, memory deficits, irritability, and aggression.[18,19] Although the presence of both *B microti* and *B burgdorferi* cannot be proven, neither can one rule out the possibility that they contributed in some manner to the development of the seizures or other neuropsychiatric symptoms. Further investigation is needed in this area.

CONCLUSION

This case demonstrates the development of a complex partial seizure disorder in association with late stage neuropsychiatric Lyme disease. Early diagnosis and treatment is suggested to prevent the development of this and other manifestations of neuroborreliosis. Lyme disease should be considered in the assessment of patients presenting with the recent onset of a complex partial seizure disorder.

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