Case Report

Association of Lyme Disease and Schizoaffective Disorder, Bipolar Type: Is it Inflammation Mediated?

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ABSTRACT

Lyme disease has been reported to be associated with various psychiatric presentations. *Borreliaburgdorferi* (Bb) can present with symptoms similar to schizophrenia and bipolar disorder. It has been suggested that inflammation incurred during the Bb infection leads to neurodegenerative changes that result in schizophrenia-like presentations. We report a case of a 41-year-old male with a past history of Bb infection who presents with psychosis. Later in the course of his hospitalization, he developed mood symptoms and was diagnosed with schizoaffective disorder, bipolar type. This case highlights the diagnosis and treatment of a patient with the unique presentation of schizoaffective disorder, bipolar type in the setting of previous Bb infection.

Key words: *Inflammation, lyme disease, psychosis, schizoaffective disorder*

INTRODUCTION

Lyme disease is highly prevalent across Europe and the eastern parts of North America.[1] In 2011, the Centers for Disease Control reported that 96% of the reported cases of lyme disease occurred in 13 US states: Connecticut, Delaware, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, Virginia, and Wisconsin.[1] Among these 13 states, there is a high prevalence of schizophrenia in Connecticut, Maryland, New Jersey, Pennsylvania, and Wisconsin.[2] Lyme disease was the most commonly reported vector borne illness in 2012 and therefore should warrant further study into its varied clinical presentations.[1] It has been reported that the areas of the United States with the highest prevalence of lyme disease also have the highest rates of schizophrenia.[2,3]

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CASE REPORT

A 41-year-old male was admitted to the co-occurring inpatient unit at the Sheppard Pratt Health System, Baltimore, Maryland, USA in April 2013. The presenting problem was two suicide attempts that he states were due to command auditory hallucinations from the devil. The family found the patient as he was attempting to strangle himself with a sheet. He again attempted to commit suicide while in the emergency department by trying to suffocate himself with a pillow. He reported delusions of being sent from God for a mission, stating, 'I am feeling God's presence, I'm trying to save the world, I believe that it is my time to die.' He also had auditory hallucinations stating that 'God and the devil speak to me and tell me I need to leave the Earth.' There were no obvious mood symptoms at the time of presentation. He was on no psychiatric

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medications at the time of admission and did not have an outpatient psychiatrist. His wife stated that his symptoms had been worsening over the previous few weeks and his hallucinations appeared to occur more frequently at night. She stated that during the day he made bizarre and hyper-religious statements. He was drinking alcohol, consuming six to eight beers per night, four times per week.

His highest level of education is a high school diploma. He is employed full time with the public works department. He currently lives with his wife and children.

Past history

The patient had one previous psychiatric admission in 2009 prior to this presentation. At that time, he presented with predominantly manic symptoms with psychosis; he was started on valproic acid and quetiapine at that time, which was discontinued after a few months by the patient due to poor insight. The patient was diagnosed with bipolar disorder I with psychotic features at that time. There is no family history of psychiatric disorders.

A medical work up was completed and he was found to have elevated LDL and total Cholesterol with low HDL. Thyroid-stimulating hormone (TSH) was found to be high but T3 and T4 were within normal limits. He also had an elevated Alanine transaminase (ALT). Rapid plasma reagin (RPR) was negative and glucose, electrolytes, blood urea nitrogen, and creatinine were all within the normal limits. A medicine consult was done for hyperlipidemia and hypertension for which he was started on simvastatin 20 mg daily and lisinopril 20 mg daily. The working diagnosis for this patient was schizophrenia. Aripiprazole was started and was gradually increased to 30 mg PO daily; aripiprazole was chosen due to the patient's obesity and metabolic syndrome.

After a few days, the patient became increasingly confused and disoriented; the ammonia level was ordered as well as the basic metabolic panel, both of which were within normal limits. The patient's confusion continued to worsen and the patient had a fall, he was sent to the ER for an evaluation of altered mental status and elevated blood pressure. Head CT scan was performed that showed no abnormalities. No medical cause of the altered mental status could be determined. The patient was medically cleared and returned to the inpatient unit.

The patient's wife told the treating psychiatrist that he was treated for lyme disease in 2006. At the time of diagnosis, the patient was treated with a 3-week course of doxycycline after which the lyme disease symptoms resolved. A lyme antibody enzyme immunoassay was ordered which returned positive for IgG and IgM band p23. A confirmatory Western blot assay for IgG and an indirect immunofluorescence assay for lyme IgM were both subsequently performed and were positive. It was determined by the internist that no antibiotic treatment was necessary now as he had been treated with a three week course of doxycycline 7 years prior and there were no signs of active *Borreliaburgdorferi* (Bb) infection such as rash, arthralgia, or recent tick bites.

The patient was getting only approximately four hours of sleep per night and was started on zolpidem 10 mg by mouth at bedtime. The patient continued to suffer from insomnia so the dose was increased from 10 to 15 mg and then finally to 20 mg.

During the third week of inpatient treatment, several days after being on aripiprazole 30 mg, psychotic symptoms began to improve. His auditory hallucinations improved; however, he was still experiencing some paranoia. During this time, he began to develop manic symptoms, which included dancing for hours at a time on the inpatient ward, increased sexual arousal and inappropriate sexual statements and behavior with female staff and patients on the unit, increased energy and decreased need for sleep. With the addition of the mood symptoms, the diagnosis was changed to schizoaffective disorder, bipolar type as he had met DSM-IV-TR criteria of 2 weeks of psychotic symptoms independent of mood symptoms, which developed during the third week of hospitalization.

The patient was started on divalproex 500 mg by mouth at bedtime which was increased to 750 mg on day two and he was discharged on day three. Therefore, we were unable to get a divalproex level. Divalproex was chosen over other mood stabilizers because the patient and his wife reported a good response to divalproex when he had exhibited manic symptoms 4 years prior.

On the combination of aripiprazole 30 mg daily and divalproex 750 mg at bedtime the patient showed improvement in both psychotic symptoms and mood symptoms. At the time of discharge the patient denied any auditory hallucinations or suicidal ideation. His mood symptoms had improved, with some hypomanic symptoms still remaining.

DISCUSSION

This case highlights the management of a patient with schizoaffective disorder, bipolar type, in the setting of a past *Borreliaburgdorferi* (Bb) infection with positive lyme titers. This case is unique in that

it is, to the best of our knowledge, the first case report of schizoaffective disorder, bipolar type in a patient with a history of Bb infection. There have been cases reported in the past of patients presenting with both mood disorders with or without psychosis and psychotic disorders without mood symptoms.[4-6] There is also a published abstract of two patients with schizophrenia and schizoaffective disorder, bipolar type with a history of lyme disease.[7] This case highlights the difficulties associated with assessing the evolving presentation of this patient to arrive at the correct diagnosis as well as selecting the appropriate treatment regimen for his illness.

It has been well documented that Bb infections that have progressed to neuroborreliosis can present with a wide array of psychiatric symptoms including psychotic and mood symptoms including: Paranoia, delusions, olfactory, auditory and visual hallucinations, major depression, catatonia, and mania.[8-17] Several cases have shown that patients can experience an occurrence of psychiatric symptoms even after treatment with antibiotics.[4,8] In particular, a patient with no family history of psychiatric illness that experienced a relapse of panic attacks and auditory hallucinations 1 year after antibiotic treatment for lyme disease.[8] It has recently been suggested that patients who have been treated for lyme disease may present years later with psychotic symptoms secondary to inflammatory mediated neurodegenerative damage incurred during the Bb infection.[18] This theory coincides with the inflammatory theory that has been proposed for the etiology of schizophrenia.[19-25] It has been suggested that in neurodegenerative diseases, uncontrolled inflammation is the driving force behind disease progression.[22] It has been proposed that interactions between damaged neurons and dysregulated, overactive microglia result in a self-propagating cycle of prolonged inflammation that drives the disease process.[22] A similar mechanism has also been proposed for the etiology behind bipolar disorder with microglial activation and alterations in peripheral cytokines implicated in the disease process.[23] As a result of these associations, there has been much work recently on the role of anti-inflammatory therapeutics such as cyclooxygenase-2 inhibitors, aspirin, and minocycline as an adjunctive therapy in the treatment of schizophrenia and bipolar disorder with some promising results thus far.[26-28] It is possible that the use of early anti-inflammatory therapy in patients diagnosed with lyme disease may prove successful in preventing inflammatory-mediated neurodegenerative damage. While the neuropsychiatric manifestations of lyme disease are rare, it is important to recognize them and begin treatment early as they can become permanent and irreversible without timely treatment.

The patient in this case presents with an onset of psychiatric symptoms several years after antibiotic treatment for Bb infection, which could be the result of inflammatory-mediated neurologic insult. While previous studies have shown that persistent chronic Bb infection is unlikely to be the cause of psychotic symptoms in patients with a history of Bb infection, Lyme-induced neurodegenerative changes remain a very real possibility.[29]

To our knowledge, this is the first case report of schizoaffective disorder, bipolar type in a patient with a history of Bb infection. This case highlights the effective management of Bb-associated schizoaffective disorder with an antipsychotic and a mood stabilizer. There currently is little literature in regards to psychosis in the setting of Bb infection and in light of the widespread prevalence of lyme disease in the northeastern United States as well as across Europe and other parts of North America. This is an area that could benefit from further research. There is an emerging theory of inflammation in psychotic and mood disorders and an established association between Bb infection and psychiatric disorders. Future studies may consider investigating the efficacy of early anti-inflammatory treatment in lyme disease patients to prevent long-term psychiatric manifestations.

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