Limited Opening Secondary to Lyme Disease in an 8-year-old Child

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ABSTRACT

In the United States, Lyme disease is the most common vector-born disease.[1] It often presents with a wide variety of symptoms that may delay its diagnosis and present challenging patient management issues. The purpose of this report was to discuss the case of an 8-year, 6-month-old Hispanic male who presented to a hospital emergency room with restricted mandibular opening and was diagnosed with Lyme disease after an initial period of uncertainty regarding the diagnosis.
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In the United States, 49 states have reported cases of Lyme disease, with the highest prevalence in the northeastern, north central, and Pacific coastal regions.[1,5] In 1977, Lyme disease's symptoms were properly defined as the result of an outbreak of what was believed to be arthritis in a cluster of children in and around Lyme, Conn.[5] The name of the town became the common name for the disease. Lyme disease is caused by a spirochete known as *Borellia burgdorferi*.[6] It is transmitted to humans by the bites of infected black-legged ticks.[6] There is no evidence of human-to-human transmission.[5] As ticks are carried by travelers and migrating birds, Lyme disease has spread across the United States.[7]

Lyme disease has spread across the US Pacific coast via the western black-legged tick.[5] Other species of ticks found in the United States have not been shown to transmit *B burgdorferi*.[5,8] Black-legged ticks live for 2 years and have 3 feeding stages: larvae, nymph, and adult.[8] When a young tick feeds on an infected animal, the tick takes the bacterium into its body along with the blood meal.[8] The bacterium then live in the gut of the tick.[8,9] When the tick feeds again, it can transmit the bacterium to its new host.[8,9] Although adult ticks often feed on deer, these animals do not become ill and act as carriers of the disease.[7] Ticks usually transmit Lyme disease to another small rodent or animal, but sometimes the new host is a human.[9] Most cases of human illness resulting from infection occur in the late spring and summer when the tiny nymphs are most active and human outdoor activity is greatest.[7,9]

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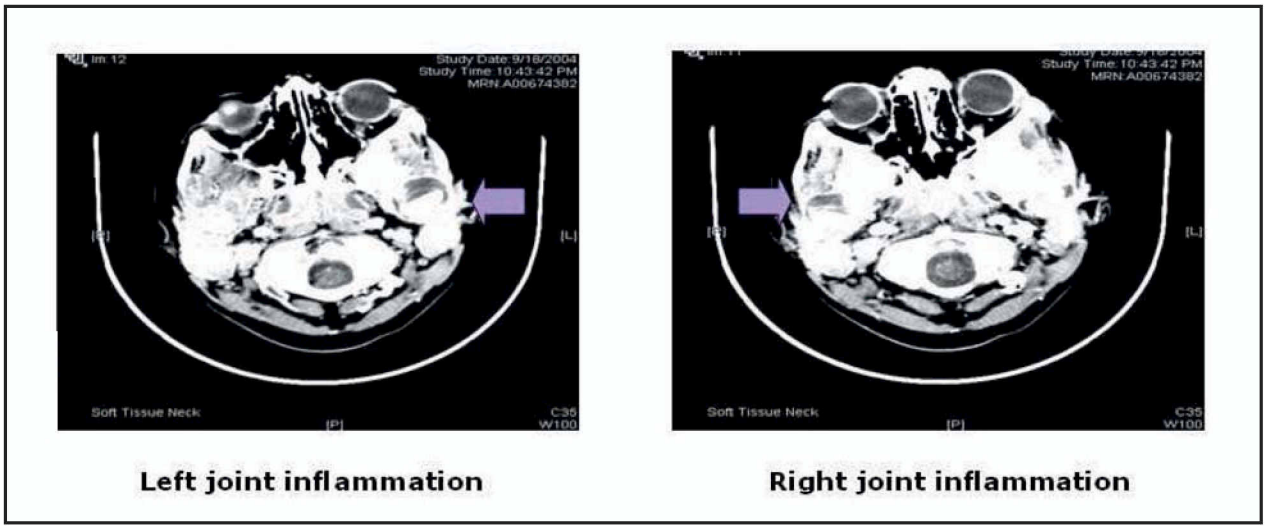

Figure 1. Computed tomography scan of an 8-year-old male subsequent to diagnosis of Lyme disease.

The first line of defense against Lyme disease and other tick-borne illnesses is avoidance of tick-infested habitats. Landscaping and integrated pest management can also prevent contact with diseased ticks.[10] When outdoors, the use of personal protective measures such as bug repellents, protective clothing, regular checks for ticks and promptly removing any attached ticks will also assist in Lyme disease prevention.[10,11]

If Lyme disease is contracted, in most cases, it can be treated successfully with a course of antibiotics.[12] The standard treatment in pediatric patients with Lyme disease in its early stage is 50 mg/kg of amoxicillin every 24 hours for 14 to 21 days.[13,14] In children older than 12 years old, 100 mg of doxycycline 3 times a day for 14 to 21 days can also be used effectively.[14] Doxycycline can stain the developing permanent teeth in young children and unborn babies and thus should not be prescribed to children younger than 8 years old, pregnant women, or breastfeeding mothers.[14] As an alternative, these patients are treated with amoxicillin, cefuroxime, or penicillin. Patients allergic to penicillin may be given clindamycin.[13,14] Steroids are usually not recommended.[13-15]

Lyme disease characteristically progresses through 3 stages of infection if left untreated.[16] Chief complaints during the initial stage are usually fever, arthralgias and myalgias, headache, malaise, and stiffness of the neck.[16,17] A patient in the second stage may present with lymphocytic meningitis, neuritis, mild encephalitis, and cardiac conduction defects.[18] If left untreated, the disease can progress to the third stage with debilitating arthritis and chronic central nervous system disease.[17,18]

A positive diagnosis of Lyme disease is typically confirmed by the appearance of a lesion known as erythema chronicum migrans (ECM) or with antibody detection and western blot tests.[19,20]

An ECM is found near or around a tick bite and usually presents on the peripheral extremities, buttocks, or trunk[5,18] (Figure 2). Within 3 to 4 weeks of the bite, the rash increases in size to a diameter as large as 50 cm and, in some patients, shows partial clearing and induration of the center of the involved area.[2,15,18]

Laboratory findings from affected patient serum includes: elevated erythrocyte sedimentation rate (ESR), cryoprecipitates, an initially elevated serum IgM antibody titer with a later occurring elevation of serum IgG antibody titer, normal complement C3 levels, and an absence of rheumatoid factor or antinuclear antibodies.[21] During phases of remission, the ESR shows significant reduction, but not always to normal levels.[22] The western blot is one testing method where the patient's blood is cross-reacted with a series of antigens that are derivatives of *B burgdorferi's* proteins.[13,19] Other effective tests are an immunoflorescent assay (IFA titer) or an enzyme linked immunoassay (ELISA) method.[13,19]

Lyme disease patients can also present with a variety of arthrides. Patients in several studies commonly reported pain in large joints.[15,16,18] Patients also reported pain in one or both temporomandibular joints (TMJs) and limited mouth opening, either concurrent or alternating with knee symptoms.[5,23] Joint pain episodes are typically short, lasting 1 week on average, followed by periods of remission after which the pain may recur.[15,23]

The pleomorphic and seemingly unrelated clinical manifestations of Lyme disease may mimic other serious medical problems and create a diagnostic challenge that invites misdiagnosis and improper treatment planning. This can certainly occur when a patient exhibits symptoms that mimic chronic temporomandibular disorders (TMDs) or chronic jaw pain and occlusion problems.[24]

The following is a case report of an 8-year, 6-month-old Hispanic male who presented with acute closed lock of the temporomandibular joint that eventually led to the diagnosis of Lyme disease.

CASE REPORT

An 8-year, 6-month-old Hispanic male from Bronx, NY, presented with a chief complaint of TMJ pain, mouth opening difficulty, stiff neck and frequent headaches. His past medical history was unremarkable. The patient's parents reported no known allergies, no past hospitalizations, and an up-to-date immunization record. An extra-oral examination was conducted. No ecchymosis, asymmetry or other visible signs of trauma were noted. Intraoral examination revealed a maximal incisal opening of 10 mm. The patient reported pain in the TMJ region when attempting to open his mouth more than 10 mm. No soft tissue pathology or abnormalities were noted in the vestibular regions. Tenderness, however, was noted upon palpation of the masseter muscle.

The mouth was gradually opened by addition of tongue blades until a 30-mm opening was achieved with only mild discomfort over a 30 minute period. A maxillofacial computed tomography (CT) scan was ordered, as well as a complete blood count (CBC) with differential and comprehensive metabolic panel (CMP). The CMP results showed a markedly elevated ESR of 104 mm/hour (norm=15 mm/hour). All other laboratory values were within normal limits. Suspecting muscle trismus, the patient was instructed to apply warm compresses, dispensed 400 mg of ibuprofen to be taken every 6 hours to relieve pain, recommended a soft diet, and appointed to the dental clinic for a follow-up and evaluation with an orofacial pain specialist.

On follow-up, the patient and his parents reported notable improvement with the use of ibuprofen and warm compresses. The patient was able to open 31 mm freely without any pain or difficulty. A panoramic radiograph was obtained and revealed no pathology or abnormalities. Interestingly, the CT scan was reviewed by an oral and maxillofacial surgeon and orofacial pain specialists on staff and inflammatory sites were noted bilaterally in the TMJs. As a result of these findings, the child and parents were specifically asked again of any history of trauma. The patient revealed that he had fallen in the bathtub about 2-weeks prior and hit the back of his head.

An initial diagnosis of TMJ arthralgia was made based on the reported history of falling in the bathtub and TMJ inflammation. The patient was instructed to continue taking 400 mg of ibuprofen every 6 hours for 7 days as an anti-inflammatory. The patient was referred to his pediatrician for a complete physical examination and laboratory tests, including CBC and CMP.

At the subsequent dental visit, which occurred 4 weeks after the initial visit, there was definite improvement in opening and a significant decrease in pain noted compared to the initial visit. The patient was advised to continue care with his pediatrician and his regular dentist and to return to the dental clinic if any problems persisted or recurred.

The patient returned to the St. Barnabas Hospital emergency department 5 months later with bilateral knee joint and swelling. The pediatric medical resident on duty recognized the patient as a case being followed by the pediatric dental department, and informed the pediatric dental department of the patient's return. On clinical exam, the patient had no fever or urticaria. Knee aspiration was accomplished, and the aspirate was sent to the lab for evaluation. The western blot test demonstrated a very high serum antibody count of 3.86 (norm=0.00-0.99), which was strongly suggestive of Lyme disease, and the child was thus given a course of amoxicillin for 21 days. The patient's pediatrician stated that the family had informed him that they had gone camping in upstate New York two months prior to the child's first emergency department visit, but the parents did not realize the importance or relevancy in mentioning this. Eighteen months after completing a 3-week course of Amoxicillin (50mg/kg) treatment, the child reported no signs or symptoms of Lyme disease. Follow-up laboratory tests were administered to confirm findings.

Figure 2. Erythema chronicum migrans (reprinted with permission of Dermatlas).[27]

DISCUSSION

Lyme disease should be diagnosed based on symptoms, physical findings and the history of possible exposure to infected ticks. As the child in this case lived in the inner-city and did not mention the presence of a rash or skin irritation, Lyme disease was not initially suspected. Over half of all patients may report no history of a rash, however, and if a rash is present, it may often be confused with other dermatologic conditions.[5,15,18] In children, a rash associated with Lyme disease is commonly found in the head and neck region.[7,15,17,18]

The child in this case report presented initially with a chief complaint of acute anteriorly dislocated non-reducing TMJ discs (acute closed-lock) without any concomitant joint or arthride symptoms. Knee-joint pain is a typical presentation of Lyme disease, while the TMJ is the fourth most common affected joint.[1,3] Patients may present with TMJ pain, ear pain, a stiff neck, and claudication of the masticatory muscles, which may be secondary to Lyme disease. Neuropathic facial pain, Bell's palsy, masticatory musculature pain and TMJ pain are characteristic of Lyme disease and may cause a patient to seek a health care professional.[15,25] TMD symptomatology usually occurs early in the course of Lyme disease,[26] making these symptoms an early indicator of possible Lyme disease.

Diagnostic arthroscopy of the TMJ of a Lyme disease-infected patient usually reveals significant synovial inflammation and swelling, which is similar to that seen in other Lyme affected joints.[3,24] Although inflammation of the child's TMJ was discovered by CT scan, his history of head trauma prevented accurate initial diagnosis.

As the clinical manifestations of Lyme disease can easily appear to be a multitude of other serious diseases, a meticulous evaluation, proper questioning, and an accurate history are vital. It is important to diagnose and treat Lyme disease early because treatment is more effective in the disease's early stages and will minimize the chances of severe complications as it progresses.[5,25] Left undiagnosed and untreated, Lyme disease can cause irreversible neurological changes and damage in up to 5% of these patients.[2,5,24]

When presented with acute anteriorly dislocated non-reducing TMJ discs, questions should be asked about the patient's home setting, other joint problems and recent trips or excursions to places where ticks are present. Clinical examination should include evaluation for the presence of the diagnostic ECM rash. This case illustrates that physicians and dentists should be cognizant of the potential for Lyme disease to affect the temporomandibular joint. Lyme disease should be included in the differential diagnosis of acute closed lock of the temporomandibular joint.

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