

The Integrative Treatment of Lyme Disease

by Steven J. Bock, MD

Reprinted with Permission from the International Journal of Integrative Medicine, May/June 1999

Picture this scenario: You have a patient who started feeling fatigued, a kind of fatigue she had never felt before. Various joint started aching in different places, starting with the big joints (hips, knees), elbows, ankles, fingers and toes. She complains of headaches and pain in the back of the neck. She has problems remembering names or retrieving thoughts. She has no history of arthritis, and no personal or family history of depression.

You elicited a history of flu symptoms a few months ago, but there's no evidence of a tick bite or bull's eye rash, i.e., erythema chronicum migrans (ECM). On the other hand, your patient lives in - or recently traveled to - an endemic area for Lyme disease. She gives you the history she gave to her general practitioner. Physical examination and initial Lyme test were negative, she was given symptomatic treatment for her symptoms.

Unfortunately, this scenario can happen to all-too-many physicians. Lyme disease starts as a centralized process in the area around the bite, then progresses to an early, then late disseminated state. Approximately 40% to 50% of patients never find a tick bite or ECM rash. Lyme disease can easily be dismissed in it's early stages. Infection can lead to chronic Lyme disease.

Confusing condition

Why is it so difficult to diagnose Lyme disease? *Borrelia burgdorferi*, a bacterial spirochete, causes the condition. This type of bacteria can invade all parts of the body, including skin, muscles, joints, nervous system, the cardiovascular system, ocular tissue, sinus tissue, gastrointestinal tract, and lungs. Lyme disease can also mimic different illnesses and syndromes. It is an infection that triggers a variety of host responses, depending on the individual. The spirochete actually burrows into lymphocyte cells, and exits with the cellular membrane surrounding itself.(1) Thus, it can stimulate an immunological response, including autoimmune mechanisms. Patients with HLA-DR4 and HLA-DR2 genotypes may have genetic predisposition's to chronic Lyme disease.(2) At least one laboratory study reports the IL6-deficient mice have decreased TH2 responses and increased Lyme arthritis.(3)

The complex interaction of the *Borrelia* spirochete, the host, and the immune response that the bacterium elicited, can explain the varied and often confusing persistence of fatigue and other symptoms of the chronic Lyme patient, even after antibiotic treatment.(4.5.6) It is possible that dead spirochetes, fragments of spirochetes-with or without the persistence of live spirochetes-cause inflammation, cytokine and immune dysregulation, and autoimmunity by molecular mimicry. Autoimmune reactions include positive anticardiolipin antibodies, positive antinuclear antibody (ANA), and positive anti-thyroid antibodies.

Unanswered Questions

"No one knows why in some patients with late Lyme disease, symptoms eventually diminish or disappear, whereas in other patients, the symptoms persist. The bacteria survive in numbers too low to be detected by conventional tests, yet high enough to produce illness," (8) according to the national Institute of Allergic and Infectious Disease (NIAID). NIAID is now using the term "persistent Lyme disease syndrome" (PLDS). NIAID states, "We don't know whether these symptoms associated with PLDS are caused by one or more of the following: an ongoing infection with BB (*Borrelia burgdorferi*), another tick borne pathogen, re-infection with BB, an autoimmune or primary response associated with the initial infection, or some yet-to-be-identified mechanism."(9)
Unanswered questions regarding PLDS include:

What type of antibiotics are most effective?
How long should they be taken?
Do benefits last with antibiotic therapy,
and if so, for how long?
What outcomes can be used to determine
a sufficient treatment?

Chronic Lyme disease most often produces persistent arthritis, nervous system problems, and cardiac symptoms. It can have many different presentations, depending on

- 1) which body system is affected,
- 2) the individual's response to the infection, and
- 3) the time between initial onset and diagnosis.

Patients can go from physician to physician and get multiple diagnoses, including arthritis, anxiety, depression, and neurological problems such as memory deficits and cognitive dysfunction. (7) Cognitive dysfunction involves brain processing and word retrieval, and can present as a brain disorder. Borreliosis causes a chronic infection of the nervous system and may produce a syndrome indistinguishable from multiple sclerosis. Fatigue presents as a spectrum that includes fibromyalgia symptoms, all the way to chronic fatigue immune dysfunction syndrome.

Diagnosis

Antibody assays of *Borrelia burgdorferi* (BB) can provide evidence of current or previous infection. However, positive tests of BB antibodies do not always indicate current infection, and patients with active Lyme disease can test negative on antibody testing.

Lyme disease is a clinical diagnosis. Testing confirms the diagnosis. First-stage testing is the Enzyme Link Immunoabsorbent Test, and Indirect Immunofluorescence Microscopy. Western Blot (immunoblot) assays are used for secondary-level testing. The Western Blot tests the serum for the presence of numerous KDA antibodies (both IgM and IgG), such as the 18, 21-25, 28, 30, 31, 34, 39, 41, 45, 58, 66, 83, and 93. A Western Blot IgM test of two bands (e.g., 23, 42, or 39, 41) is a positive IgM test. Five bands on IgG testing constitutes a positive Western Blot analysis by Center for Disease Control (CDC) standards. This is set up on a research basis to make sure no false positives are included in Lyme studies. Many Lyme-positive patients have evidence of three or four bands on testing. Sero negativity shows about 15% of the time. Sero negativity refers to a negative antibody result, even though the patient has the disease.

Patients may be susceptible to more serious disease when delaying treatment secondary to unrecognized sero negative testing. Patients have had negative testing for up to five years after the onset of symptoms. Patients diagnosed with multiple sclerosis (MS), living in an epidemic Lyme area, with atypical signs for MS, deserve to be studied fully with Lyme and cerebrospinal fluid (CSF) testing to determine if Lyme disease is an etiology.

Other tests that can be used to support a diagnosis of Lyme disease are polymerase chain reaction (PCR) testing (DNA amplification testing), and the LUAT (Lyme Urinary Antigen Capture Test).⁽¹²⁾ A study by Bayer in 1996 showed that a sizable group of patients diagnosed on clinical grounds as having Lyme disease, may still excrete *Borrelia* DNA in the urine, despite antibiotic therapy. This is done using a five-day course of antibiotics such as cefuroxime axetil. One takes a urine test on the third, fourth, and fifth day of antibiotic therapy, checking for Lyme antigen. Many a case has been diagnosed while waiting for the results to come back.

An exaggeration of symptoms, a Jarisch herxheimer reaction (which is due to the spirochete's reaction to being destroyed, similar to what occurs in case of syphilis), or an improvement in symptoms may indicate that the problem is related to Lyme disease. When encountering resistance to therapy, consider tick-borne co-infection with babesiosis or ehrlichiosis. Babesiosis can present with flu-like symptoms, fever, chills, and low blood count. Ehrlichiosis presents with fatigue, severe headaches, muscle pain, leukopenia, thrombocytopenia, and elevated liver enzymes. Current testing includes serology peripheral blood smears for babesiosis and PCR studies.

Treatment

An integrative medical treatment of Lyme disease starts by considering the whole picture. Look at the patient's recent disease history and symptomatology, genetic tendencies, metabolism, past immune function problems or infection, history of antibiotic treatment and duration of treatment co-infection, nutritional and micronutritional status, and psychospiritual factors.

Treatment depends on the clinical course. an early diagnosis of Lyme disease - by ECM rash, flu symptoms, arthralgia, and other Lyme symptoms-necessitates a six-week course of antibiotics. Supplement this treatment with probiotics to protect the intestinal flora.

The majority of patients seen at Rhinebeck Health Center in New York have chronic symptoms, suggesting possible chronic Lyme disease. The conventional medical community views Lyme disease as readily treatable with four weeks of antibiotics.⁽¹³⁾ Despite the general avoidance of antibiotics in this integrative practice, this author finds that many Lyme patients need prolonged courses of antibiotic therapy.

Patients presenting within Lyme symptomatology are often erroneously labeled as "hypochondriacs." If a patient with chronic Lyme disease has not had an adequate course of antibiotics, but has continuing symptoms with chronic infection, antibiotics are recommended. Choices include cefuroxime axetil (2,000 mg a day), doxycycline (300 mg a day), clarithromycin (2,000 mg a day), or azithromycin (500 mg a day). Some patients respond well to penicillin G benzathine and penicillin G procaine suspension long-acting penicillin LA, 2.4 million units IM per week (always test for PEN-G allergy by RAST testing). If intravenous therapy is needed, one can use sterile ceftriaxone sodium, starting at two grams per day; azithromycin at 500 mg per day; or doxycycline at 200 to 400 mg per day.

Background on Lyme Disease

Lyme disease has become the most common tick-borne disease in the United States. The areas at highest risk are the Northeast, Upper Midwest, and Northern California. The most prevalent time of year for infection is from May to September. The deer and mouse population are the reservoir for the disease. Recent studies have found that acorns are food for the white-footed mouse. Oak trees shed their acorns every three years, with 70% to 75% of the trees shedding their acorns in synchronous fashion. It has also been shown that the year after a big acorn drop, increased cases of Lyme disease are recorded. It is possible that this is due to the increase mouse population.(10)

Data for 160 Patients Treated for Lyme Disease Showed:

History of tick bite	27%	Affected feet	30%
ECM rash	34%	Temporomandibular joint (TMJ) dysfunction	9%
Arthralgia	67%	Affected wrist	1.5%
Swollen joint	47%	Cyclic headaches, every 21 to 28 days	77%
Abnormal MRI	6%	Paresthesia (prickly, tingling sensation)	55%
Stiff neck	91%	Dizziness	64%
Myalgia	27%	Ringling in the ears	29%
Affected knees	65%	Hearing loss	15%
Affected hands	35%	Seizures	2.5%
Affected shoulder	30%	Rheumatoid factor positive	10%
Affected hips	31%		

In addition, approximately 65% of patients are sero positive at initial diagnosis, and approximately 20% sero convert as the treatment begins. 11

Monitoring Patients' Responses

Because Lyme disease is a clinical diagnosis, one critical aspect is the patient's response to treatment. The patient's response to previous intervention determines each step in his or her subsequent treatment. For instance, if a patient has a herxheimer reaction 3 and 1/2 weeks into treatment, it is our experience that he or she should be treated with antibiotics for approximately five to six more weeks. Clinically, I'd like to see fix to six weeks of asymptomatic condition, or a plateau at an acceptable level of symptoms, as a guide to the end point of antibiotic therapy. this decreases the chance of relapse after antibiotic treatment. Even with two to three months of antibiotic treatment, recurrences have occurred with no evidence of new tick bite. Treatment for any co-infection may also be necessary.

Natural Medicine and Lyme Disease

Patients with Lyme disease are placed on a nutritional regimen that includes anti-inflammatory eicosanoids, such as fish oil and borage seed oil. A high potency multivitamin/mineral formula is also used. Since muscle pain and spasm are present in many cases, a calcium/magnesium supplement is usually prescribed. Extra magnesium is recommended if symptoms are predominantly of a fibromyalgia symptoms are secondary to the underlying disease. CoQ10 and other mitochondrial nutrients (e.g., carnitine and lipoic acid) promote energy production. Intravenous nutrients, such as vitamin C and B vitamins, are often utilized for immune function enhancement.

The use of electroacupuncture (EAV) is recommended for therapy-resistant problems. This technique picks up underlying deficiencies or excesses of certain acupuncture readings, e.g., liver, large intestine or spleen. It also reportedly detects toxicities that interfere with the body's healing (e.g., mercury toxicity, elimination problems or pesticide toxicity).

When a patient is placed on antibiotic therapy, it is imperative to give him or her probiotics (e.g., *Lactobacillus acidophilus* or *bifidum*) and *Saccharomyces boulardii*. This prevents imbalance in the intestinal flora, which could lead to intestinal dysbiosis and/or *C.dificile* infection.

Chronic candidiasis and intestinal dysbiosis are frequently encountered in the treatment of Lyme patients. In some cases, natural anti-fungal therapy is utilized. Nystatin or fluconazole can also be used. Occasionally, intestinal cleansing is necessary. Milk thistle extract can help prevent potential dysfunction of liver enzymes from antibiotic therapy.

Cognitive Enhancement in Lyme Disease

Cognitive difficulties are part of the neurologic syndrome of chronic Lyme disease. The severity of cognitive dysfunction in Lyme disease can fluctuate from day to day and from week to week. Cognitive difficulties can manifest as an inability to start projects, difficulty in doing multiple tasks, getting lost going places, memory loss, concentration problems, personality changes and irritability.⁽¹⁴⁾ Psychiatric problems include panic disorder, bipolar disorder, paranoia, schizophrenia, obsessive-compulsive disorder, and in children, attention deficit disorder.⁽¹⁵⁾

These findings are often documented on neuropsychological testing and SPECT scan. Findings on scans show decreased blood flow to parts of the brain. Supplements that help with cognitive enhancement include L-Acetyl-Carnitine and antioxidant compounds. Herbal extracts such as *Gingko Biloba* can also help. For others, cognitive enhancement medications, such as pregnenolone, may be more effective.

In some cases, cognitive abilities improve when sub-clinical hypothyroid problems are treated. Again, one must treat the associated anxiety, depression and sleep disorders. Neurobiofeedback can also help treat the cognitive dysfunction associated with Lyme disease.

Stress and the Lyme Patient	
Stress affects the Lyme patient in various ways. The disease is chronic. Obviously, this often creates frustration, anxiety, and fearfulness. Stress can cause immunosuppression. It can also affect the hypothalamic pituitary adrenal axis, manifesting as hypoadrenia. This can exacerbate the prior condition and present as fatigue, chronic exhaustion, chronic dizziness, chronic headache, low blood pressure, low blood sugar, and anxiety.	
It is important to provide an integrative program for managing the effects of stress on the body:	
1. Relaxation techniques and stress-reduction management, including the use of biofeedback.	5. For the anxiety associated with chronic Lyme disease, B vitamins, magnesium, and valerian are recommended. These are usually preferable to medical tranquilizers such as Ativan®, Xanax®, and Klonopin® for panic attacks and anxiety. I have seen good results with <i>Garum Armoricum</i> for mixed anxiety and depression.
2. Chronic disease groups for general emotional support.	
3. general immune support (e.g., maitake or reishi mushrooms, ginseng, astragalus).	
4. Endocrine enhancement, concentrating on nutritional and herbal support for the adrenal gland. This includes vitamin C, vitamin B6, pantothenic acid, and possibly DHEA (measure levels before and after treatment)..	

Acupuncture and other Alternative Modalities

One of the postulates of Chinese medicine is that an imbalance of chi (energy flow of the body) causes illness, and that applying acupuncture to certain "meridian" points on the body can correct this imbalance. The World Health Organization now recognizes Acupuncture as an appropriate treatment for chronic muscular pain, fibromyalgia syndrome, radicular pain, neck pain, muscle tension, headache, low back pain, arthritis and substance abuse.

Acupuncture is also used for problems related to autonomic dysfunction, fatigue, and insomnia. Studies have shown a decreased electrical resistance at acupuncture points, and also that 50% to 70% of acupuncture points correspond to Dr. Travell's trigger points.(16) A treatment regimen of acupuncture in Lyme disease, combined with physical therapy, can reduce pain, increase mobility, and improve fatigue states.(17) However, one often finds acupuncture treatment can aggravate the symptoms of a herxheimer reaction.

In chronic Lyme disease patients, depending on the clinical situation, various other modalities can be instituted. This involves the use of natural immune-modulating peptides to boost the immune system by supporting the suppressor T-cell function.

With proper complementary or progressive medical approach, and by combining conventional and alternative therapies, we can hopefully lead patients with Lyme disease toward better health.

Preventing Lyme Disease	
As with all illnesses, prevention is easier, safer, and less costly than treatment. The following tips can help your patients avoid infection of the Lyme disease bacterium in the first place.	
<ul style="list-style-type: none">• Avoid tick-infested areas, especially in May, June, and July.	<ul style="list-style-type: none">• After being outdoors in tick infested areas, remove, wash, and dry clothing.
<ul style="list-style-type: none">• Wear light-colored clothing so ticks are clearly visible.	<ul style="list-style-type: none">• Inspect the body thoroughly and carefully. Remove any attached ticks.
<ul style="list-style-type: none">• Wear long-sleeved shirts, pants, and a hat, and closed shoes and socks.	<ul style="list-style-type: none">• .Swab the bite area thoroughly with an antiseptic to prevent bacterial infection.
<ul style="list-style-type: none">• Tuck pant legs into socks or boots and tuck shirt into pants.	<ul style="list-style-type: none">• If you find a tick, tug gently but firmly with blunt tweezers near the "head" of the tick until it releases it's hold on the skin.
<ul style="list-style-type: none">• Apply insect repellent to pants, socks, shoes, and exposed skin.	<ul style="list-style-type: none">• To reduce the risk of infection, try not to crush the tick's body or handle the tick with bare fingers.
<ul style="list-style-type: none">• Walk in the center of trails to avoid overgrown grass and brush.	<ul style="list-style-type: none">• Check pets for ticks

References

1. Dorwood D, Fischer: In vitro evidence for lymphocytic membrane cloaking by *Borrelia burgdorferi*. Lyme Disease Foundation, Scientific Conference, April, 1998.
2. Steere AC, Dwyer E, Winchester R: Arthritis with HLA-DR4 and HLA-DR2 alleles. *New England Journal of Medicine* 323:219-223, 1990.
3. Anquita J, Timcon M, Samanta S, Barthols SW, flavell RA, Fikrig E: *Borrelia burgdorferi* infection: interleukin-6 deficient mice have decreased TH-2 responses and increased Lyme arthritis. *Journal of Infectious Diseases* 178(5):1516-1525, November 1998.
4. Luft BJ, Steinman CR, Dattwyler R: Invasion of the Central Nervous System by *Borrelia burgdorferi* in Acute Disseminated Infection. *JAMA* 267(10), march 1992.
5. Georgelis K, Peacoche M, Klempner MS: Fibroblasts Protect the Lyme Disease Spirochete, *Borrelia burgdorferi*, From Ceftriaxone in Vitro. *Journal of Infectious Diseases* 166:440-4444, 1992.

6. Preac-Mursic V, Weber K, Pfister, et al: Survival of *Borrelia burgdorferi* in Antibiotically Treated Patients With Lyme Borreliosis. *Infection* 17:355-359, 1989.
7. Papavone: Neuropsychiatric Manifestations of Lyme Disease. *Journal of American Osteopathic Association* 98(7):373-378, July 1998.
8. National Institute of Allergic and Infectious Disease, NIH fact Sheet, May 1997.
9. Ibid.
10. Communication: Institute of Ecosystem Studies, Millbrook, NY.
.
11. Fein L: Multivariable analysis of 160 patients with Lyme disease. Lyme disease conference, April 19, 1996.
.
12. Harris N: Antigen detection of *Borrelia burgdorferi* in urine. Lyme Disease Scientific Conference, April 1998.
.
13. Nadelman RB, Wormser GP: Lyme Borreliosis. *The Lancet* 15(352):557-565, August 1998.
.
14. Communication: Dr. Marian Rissenberg, Neuropsychology. Cognitive Characteristics of Lyme Disease, 10th Annual International Conference, NIH, April 28-30, 1997.
.
15. Fallon N, et al: Psychiatric manifestations of Lyme Borrelia: *Journal of Neuropsychology* 54:263-268, 1997.
.
16. Travell J, et al: *Myofascial Pain and Dysfunction*. Baltimore: Williams & Wilkins, 1993.
.
17. Riederer P, Tenk H, Werner H, Bischko J, Rett A, Krisper H: Manipulation of neurotransmitters by acupuncture: a preliminary communication. *J Neural Transm* 37(1):81-94, 1975.
.