Julie A. Griffith, M.D., M.S.
Neurology Health Center
Pediatric & Neurology
1099 D. St., Suite 208
San Rafael, Ca 94901
Phone (415) 925-1616
Facsimile (415) 259-4011

UNDERLINE OR CIRCLE THE SYMPTOMS OR THE SIGNS YOU HAVE HAD RECENTLY OR PAST FEW MONTHS. NOTE HOW LONG AGO OR HOW OLD YOU WERE (MONTH AND YEAR) SINCE YOU HAVE HAD THESE SYMPTOMS OR SIGNS.

Babesia (Babesiosis) infection:

Babesia is a parasite and is a co-infection of Borrelia burdorfer: the spirochetal bacteria is which causes "Lyme disease"

Babesia is a protozoan spread by ticks, blood transfusion, the placenta and breast feeding. Despite there being13 known forms to date, current testing only looks for two of them.

Babesia causes mental/emotional symptoms. Babesia affects the head/brain more so, where as Bartonella affects the gut and joints (and also the head, since Bartonella can cause seizures). Babesia can also cause the following symptoms which--

Abnormal sensations of hand and feet
Air hunger
Appetite swings
Dizziness, vertigo, racing heart (worse at night) to preventricular contractions tachycardia (fast heart rate)
Cough
Difficulty with directions, gets lost in familiar place
Difficulty with simple linear thinking
Fatigue
Fear, obsessive compulsive disorder, anxiety or panic
Fevers
Gastrointestinal dysmotility (constipation, irregular movement of gastrointestinal tract, suboptimal contraction and/or coordination of gastrointestinal contractions
Headache
Hemolysis (red blood cell rupturing)
Imbalance without true vertigo (off balance)
Intermittent blurred vision
Intolerance to hot and cold with chills being dominant
Mild encephalopathy (slow brain waves/ almost lethargic)
Mild fluid imbalance overloaded, dehydrated
Migraines (throbbing headaches)
Occasional fever
Orthostatic hypotension (light headed when moving from lying to sitting or lying or sitting to standing) to rare hypertension (high blood pressure)
Pressure sensation (more than headache) behind eyes, top head or back of head
Sensations in head, hot spots, numbness, crawling, crown tenderness

Severe depression
Severe sleep disturbance, delayed sleep onset, frequent waking, difficulty falling back to sleep
Shaking chills
Shortness of breath
Suicidal ideation
Short term memory deficits, concentration difficulties, progressive disabling memory difficulties
Sweats, drenching, worse at night
Tinnitus (ringing of the ears)
Vice like sensations to wrist, ankles
Weird dreams to nightmares
Wrist/hands/ankles/feet: may have abnormal temperature sensations, pain, burning, or numbness

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Bartonella (involves brain, gut and skin connect tissue)

Bartonellosis, also known as cat scratch fever)
Spread by bites from infected ticks and in utero

Abnormal liver enzymes
Bartonella-sole pain, ankle pain
Crawling, burning, multiple sensations
Encephalopathy
Endocarditis
Feet: sensitive, painful soles, worse getting out of bed and standing usually bilateral
Flu-like malaise
Headache severe ice pick in and around eyes, migraine
Hemolysis with anemia
Hepatomegaly
High fever
Immune deficiency
Jaundice
Lymphadenopathy
Liver: mildly elevated liver enzymes (AST, ALF), mild hepatomegaly, gallbladder dysfunction, gerd, upper right belly pain
Milder problem with Cognitive, memory, emotion sx but not as disabling as babesia
Myalgias
Myocarditis
Lymphatic, mild spenomegaly, boggy lymphadenopathy, , seldom hard but often painful
Pain joint (knees, large or small joints) wandering, unilateral, can be swollen, seldom not, periarticular, minor joint trauma forever to heal, and /or headache
Painful bones of feet, foot and ankle can both be painful papular or angiomatous rash
Skin: rashes, papualr, stria abdomen and upper legs, acne crusty
Somnolence
Sore throat
Splenomegaly
Subcutaneous nodules, can be tender
Weakened immune response
Worse cervical chains, popliteal fossa, vague tightness chest, puffy above the clavicles L>R Eyes conjunctivitis pain in and around eyes, intermittent blurred vision

Babesia foot pain
Bartonella sole pain, ankle pain
Borrelia heel specific pain

Ehrlichia
(Ehrlichiosis)

Bites from infected ticks
Elevated liver enzymes
Headaches are sharp, knife-like, and often behind the eyes.
Muscle pain, not joint pain, and can be mild or severe.
Myalgias
Low WBC count, elevated liver enzymes, and (rarely) inclusions seen in the WBCs.
ongoing fatigue
Persistent leucopenia
Rarely see diffuse vasculitic rash, including palms and soles (less than 10%).
Rapid onset of initial illness with fever, headache, prostration.
Rapid response to treatment.
Thrombocytopenia

Name: _____ Date: _____

This list is provided by Joseph Burrascano, MD, Internist, (Ret.)
Board of Directors, International Lyme & Associated Diseases Society

CHECK LIST OF ***CURRENT*** SYMPTOMS: This is not meant to be used as a diagnostic scheme, but is provided to streamline the office interview. Note the format- complaints referable to specific organ systems and specific co-infections are clustered to clarify diagnoses and to better display multisystem involvement.

Have you had any of the following in relation to this illness? (CIRCLE "NO" OR "YES")

Tick bite	*N Y*	*"EM" rash (discrete circle)*	*N Y*
Spotted rash over large area	*N Y*	*Linear, red streaks*	*N Y*

	CURRENT SEVERITY				CURRENT FREQUENCY				
SYMPTOM OR SIGN	NONE	MILD	MODERATE	SEVERE	NA	NEVER	OCCASIONAL	OFTEN	CONSTANT
Persistent swollen glands									
Sore throat									
Fevers									
Sore soles, esp. in the AM									
Joint pain									
Fingers, toes									
Ankles, wrists									
Knees, elbows									
Hips, shoulders									
Joint swelling									
Fingers, toes									
Ankles, wrists									
Knees, elbows									
Hips, shoulders									
Unexplained back pain									
Stiffness of the joints or back									
Muscle pain or cramps									
Obvious muscle weakness									
Twitching of the face or other muscles									
Confusion, difficulty thinking									
Difficulty with concentration, reading, problem absorbing new information									
Word search, name block									
Forgetfulness, poor short term memory, poor attention									
Disorientation: getting lost, going to wrong places									
Speech errors- wrong word, misspeaking									
Mood swings, irritability, depression									
Anxiety, panic attacks									
Psychosis (hallucinations, delusions, paranoia, bipolar)									
Tremor									
Seizures									
Headache									
Light sensitivity									
Sound sensitivity									
Vision: double, blurry, floaters									
Ear pain									

Name: _____ Date: _____

	CURRENT SEVERITY				CURRENT FREQUENCY				
SYMPTOM OR SIGN	NONE	MILD	MODERATE	SEVERE	NA	NEVER	OCCASIONAL	OFTEN	CONSTANT
Hearing: buzzing, ringing, decreased hearing									
Increased motion sickness, vertigo, spinning									
Off balance, "tippy" feeling									
Lightheadedness, wooziness, unavoidable need to sit or lie									
Tingling, numbness, burning or stabbing sensations, shooting pains, skin hypersensitivity									
Facial paralysis-Bell's Palsy									
Dental pain									
Neck creaks and cracks, stiffness, neck pain									
Fatigue, tired, poor stamina									
Insomnia, fractionated sleep, early awakening									
Excessive night time sleep									
Napping during the day									
Unexplained weight gain									
Unexplained weight loss									
Unexplained hair loss									
Pain in genital area									
Unexplained menstrual irregularity									
Unexplained milk production; breast pain									
Irritable bladder or bladder dysfunction									
Erectile dysfunction									
Loss of libido									
Queasy stomach or nausea									
Heartburn, stomach pain									
Constipation									
Diarrhea									
Low abdominal pain, cramps									
Heart murmur or valve prolapse?									
Heart palpitations or skips									
"Heart block" on EKG									
Chest wall pain or ribs sore									
Head congestion									
Breathlessness, "air hunger", unexplained chronic cough									
Night sweats									
Exaggerated symptoms or worse hangover from alcohol									
Symptom flares every 4 wks.									
Degree of disability									

For complete Burrascano Guidelines: **http://www.lymediseaseassociation.org/drbguide200509.pdf**

UNDERLINE ALL SYMPTOMS THAT MATCH YOU

SORTING OUT LYME AND ASSOCIATED CO-INFECTIONS

In addition to *Borrelia burgdorferi* (Bb), ticks may carry and transmit other infections. Furthermore, patients with disseminated Lyme complicated by these co-infections are usually immunocompromized and may also manifest signs and symptoms of reactivated latent infections and opportunists. All can add to morbidity and may need to be treated.

Because of the large number of these other infections, the cost of reliably testing for all of them as a matter of routine is prohibitive. Also, as in the case with Bb infection, laboratory tests for them are often insensitive. Thus there is a need to sort it all out clinically to provide guidance in testing and treatment. Here are some clues:

CLASSIC LYME (Bb infection)-

- Gradual onset of initial (viral-like) symptoms- this often makes it difficult to pinpoint when the infection began

- Multisystem- almost always, in disseminated stages, involves more than one part or system (i.e. joint pain plus cognitive dysfunction).

- Migratory- first a knee will hurt, then over time this may lessen and the elbow or shoulder acts up, and later the joints calm down but headaches worsen.

- Stiff joints and loud joint crepitus, especially the neck ("Lyme shrug").

- Headaches are often nuchal and associated with stiff, painful and crepitant neck.

- Afternoon fevers, often unnoticed- most Lyme patients have subnormal temperatures in the AM but rise to 99+ by early to mid-afternoon. No obvious sweats.

- Tiredness and limited stamina- often is a strong need to rest or even nap in the afternoon, especially when the flushed face and elevated temperature appears.

- 4-week cycles- Bb activity, and thus symptoms, wax and wane in a cycle that repeats roughly every four weeks. This cycle, if clear, can guide your treatments.

- Slow response to treatment, with an initial symptom flare in most ("Herxheimer-like reaction") then improvement over weeks, punctuated by the monthly symptom flares. Likewise, if treatment is ended too soon, an initial period of well-being will gradually, over a few weeks, be replaced by a return of symptoms.

- EM rash in 25% to 50%

BARTONELLA & "BARTONELLA-LIKE ORGANISMS"-

- Gradual onset of initial illness.

- CNS symptoms are out of proportion to the musculoskeletal ones- if a patient has no or minimal joint complaints but is severely encephalopathic (see below), then think of Bartonella/BLO.

- Obvious signs of CNS irritability can include muscle twitches, tremors, insomnia, seizures, agitation, anxiety, severe mood swings, outbursts and antisocial behavior.

- GI involvement may present as gastritis or abdominal pain (mesenteric adenitis).
- Sore soles, especially in the morning.

- Tender sub-cutaneous nodules along the extremities, especially outer thigh, shins, and occasionally along the triceps.

- Occasional lymphadenopathy.

- Morning fevers, usually around 99. Occasionally light sweats are noted.

- Elevated vascular endothelial growth factor (VEGF) occurs in a minority, but the degree of elevation correlates with activity of the infection and may be used to monitor treatment.

- Rapid response to treatment changes- often symptoms improve within days after antibiotics are begun, but relapses occur also within days if medication is withdrawn early.

- May have papular or linear red rashes (like stretch marks that do not always follow skin planes), especially in those with GI involvement.

BABESIA SPECIES-

- Rapid onset of initial illness, often with sudden onset of high fever, severe headaches, sweats and fatigue, thus it is easy to know when infection began.

- Obvious sweats, usually at night, but can be day sweats as well.

- Air hunger, need to sigh and take a deep breath; dry cough without apparent reason.

- Headaches can be severe - dull, global (involves the whole head, described like the head is in a vise).

- Fatigue is prominent, does not clear with rest, and is made worse with exercise.

- Mental dullness and slowing of reactions and responses.
- Dizziness- more like a tippy feeling, and not vertigo or purely orthostasis.

- Symptoms cycle rapidly, with flares every four to six days.

- Hypercoaguable states are often associated with *Babesia* infections.
- Rarely, splenomegaly

- Very severe Lyme Disease can be a clue to *Babesia* infection, as it will make Lyme symptoms worse and Lyme treatments less effective.

EHRLICHIA/ANAPLASMA-

- Rapid onset of initial illness with fever, headache, prostration.

- Headaches are sharp, knife-like, and often behind the eyes.

- Muscle pain, not joint pain, and can be mild or severe.

- Low WBC count, elevated liver enzymes, and (rarely) inclusions seen in the WBCs.

- Rarely see diffuse vasculitic rash, including palms and soles (less than 10%).

- Rapid response to treatment.

DNA VIRUSES (HHV-6, EBV, CMV)

- Persistent fatigue, made worse with exercise.

- Sore throat, lymphadenopathy, and other viral-like complaints.

- May see elevated liver enzymes and low WBC counts.

- Autonomic dysfunction.

CO-INFECTIONS IN LYME

PIROPLASMOSIS (Babesiosis)

GENERAL INFORMATION

It had been thought that Babesia microti is the only significant piroplasm affecting humans. Now it is believed that many of the over two dozen known species of piroplasms can be carried by ticks and potentially be transmitted to the human. Unfortunately, we have no widely available tests for these non-microti species. That is why, again, a clinical diagnosis is required.

Piroplasms are not bacteria, they are protozoans. Therefore, they will not be eradicated by any of the currently used Lyme treatment regimens. Therein lies the significance of co-infections- if a Lyme patient has been extensively treated yet is still ill, and especially if they are experiencing atypical symptoms, suspect a coinfection.

From the literature:

- "Co-infection generally results in more intense acute illness, a greater array of symptoms, and a more prolonged convalescence than accompany either infection alone."
- "Spirochete DNA was evident more often and remained in the circulation longer in co-infected subjects than in those experiencing either infection alone."
- "Co-infection might also synergize spirochete-induced lesions in human joints, heart and nerves."
- "Babesia infections may impair human host defense mechanisms…"
- "The possibility of concomitant Babesia infection should be considered when moderate to severe Lyme Disease has been diagnosed."

Babesia infection is becoming more commonly recognized, especially in patients who already have Lyme Disease. It has been published that as many as 66% of Lyme patients show serologic evidence of co-infection with Babesia microti. It has also been reported that Babesia infections can range in severity from mild, subclinical infection, to fulminant, potentially life threatening illness. Subclinical infection is often missed because the symptoms are incorrectly ascribed to Lyme. Babesia infections, even mild ones, may recur even after treatment and cause severe illness. This phenomenon has been reported to occur at any time, including up to several years after the initial infection! Furthermore, such Babesia carriers pose a risk to the blood supply as this infection has been reported to be passed on by blood transfusion.

SYMPTOMS

Clues to the presence of Babesiosis include a more acute initial illness- patients often recall a high fever and chills at the onset of their Lyme. Over time, they can note night sweats, air hunger, an occasional cough, persistent migraine-like headache, a vague sense of imbalance without true vertigo, encephalopathy and fatigue. The fulminant presentations are seen in those who are immunosuppressed, especially if asplenic, and in advanced ages. They include high fevers, shaking chills and hemolysis, and can be fatal.

DIAGNOSTIC TESTS

Diagnostic tests are insensitive and problematic. There are at least thirteen, and possibly as many as two dozen Babesia forms found in ticks, yet we can currently only test for B. microti and WA-1 with our serologic and nuclear tests. Standard blood smears reportedly are reliable for only the first two weeks of infection, thus are not useful for diagnosing later infections and milder ones including carrier states where the germ load is too low to be detected. Therefore, multiple diagnostic test methods are available and each have their own benefits and limitations and often several tests must be done. Be prepared to treat based on clinical presentation, even with negative tests.

• SEROLOGY- Unlike Lyme, Babesia titers can reflect infection status. Thus, persistently positive titers or western blots suggest persistent infection.
• PCR- This is more sensitive than smears for B. microti, but will not detect other species.
• ENHANCED SMEAR- This utilizes buffy coat, prolonged scanning (up to three hours per sample!) and digital photography through custom-made microscopes. Although more sensitive than standard smears, infections can still be missed. The big advantage is that it will display multiple species, not just B. microti.
• FLUORESCENT IN-SITU HYBRIDIZATION ASSAY (FISH)- This technique is also a form of blood smear. It is said to be 100-fold more sensitive than standard smears for B. microti, because instead of utilizing standard, ink-based stains, it uses a fluorescent-linked RNA probe and ultraviolet light. The Babesia organisms are then much easier to spot when the slides are scanned. The disadvantage is that currently only B. microti is detected.

TREATMENT
Treating Babesia infections had always been difficult, because the therapy that had been recommended until 1998 consisted of a combination of clindamycin plus quinine. Published reports and clinical experience have shown this regimen to be unacceptable, as nearly half of patients so treated have had to abandon treatment due to serious side effects, many of which were disabling. Furthermore, even in patients who could tolerate these drugs, there was a failure rate approaching 50%.

Because of these dismal statistics, the current regimen of choice for Babesiosis is the combination of atovaquone (Mepron, Malarone), 750 mg bid, plus an erythromycin-type drug, such as azithromycin (Zithromax), clarithromycin (Biaxin), or telithromycin (Ketek) in standard doses. This combination was initially studied in animals, and then applied to Humans with good success. Fewer than 5% of patients have to halt treatment due to side effects, and the success rate is clearly better than that of clindamycin plus quinine.The duration of treatment with atovaquone combinations for Babesiosis varies depending on the degree of infection, duration of illness before diagnosis, the health and immune status of the patient, and whether the patient is co-infected with Borrelia burgdorferi. Typically, a three-week course is prescribed for acute cases, while chronic, longstanding infections with significant morbidity and co-infection will require a minimum of four months of therapy. Relapses have occurred, and retreatment is occasionally needed. Problems during therapy include diarrhea, mild nausea, the expense of atovaquone (over $600.00 per bottleenough for three weeks of treatment), and rarely, a temporary yellowish discoloration of the vision. Blood counts, liver panels and amylase levels are recommended every three weeks during any prolonged course of therapy as liver enzymes may elevate. Treatment failures usually are related to inadequate atovaquone levels. Therefore, patients who are not cured with this regimen can be retreated with higher doses (and atovaquone blood levels can be checked), as this has proven effective in many of my patients. Artemesia (a nonprescription herb) should be added in all cases. Metronidazole or Bactrim can also be added to increase efficacy, but there is minimal clinical data on how much more effective this will be.