

# BABESIOSIS: A BROAD DIFFERENTIAL FOR A COMMON DIAGNOSIS

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## Case Introduction

GM is a 57-year-old male with past medical history of hypertension and recurrent kidney stones who presented to emergency department with three weeks of worsening back pain after acute musculoskeletal twisting injury which developed further into five days of new onset fevers, headaches, nausea and decreased oral intake. He reported persistent belching. He was seen at urgent care prior to presentation for back pain 6 days ago without relief.

He described localized pain without numbness, tingling or radiation down the legs. He described subjective fevers, intermittently for 5 days relieved with Tylenol or Ibuprofen. No other positive ROS noted. He lives with wife who denies similar symptoms. He works as a landscaper. Denies tobacco or illicit drug use. Admits to social alcohol use. No known drug allergies. Surgeries include appendectomy 6 years ago.

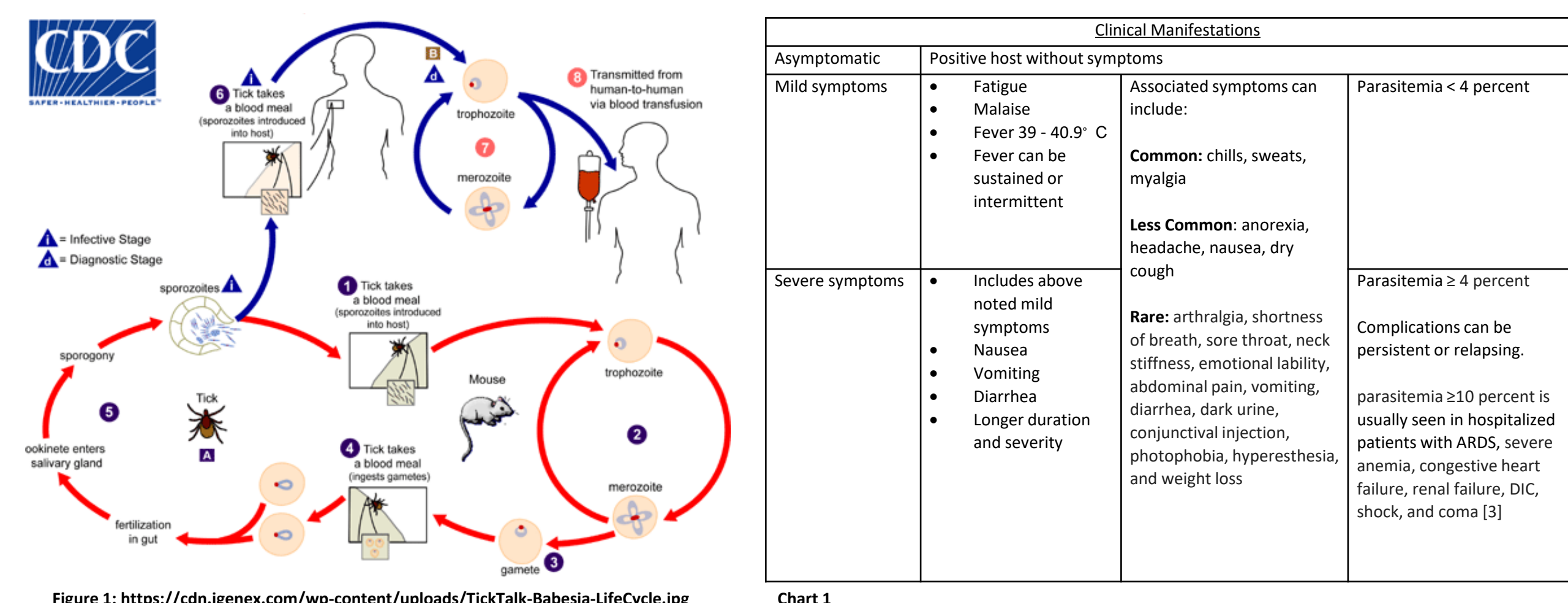
## Babesiosis

- Babesiosis is an infectious disease transmitted by nymphal stage of the Ixodes scapularis, a tick vector (see Figure 1). These ticks tend to travel on deer that are commonly found close to wooded habitats in populated areas.
- This is highly endemic to the northeastern and midwestern United States.
- Incidence can be difficult to quantify since symptoms are usually mild or absent [1].
- Some individuals are more at risk including immunocompromised, asplenia patients and elderly.

Coinfection with other infectious diseases can occur since the Ixodes Scapularis tick is a vector for multiple pathogens including: Borrelia burgdorferi, Anaplasma phagocytophilum, Borrelia miyamotoi, Borrelia mayonii. Commonly noted, patients contract Lyme's disease concomitantly with Babesiosis in approximately two-thirds of cases. [2,3].

### Clinical manifestations

The infection varies from asymptomatic hosts to severe disease with possible relapse (Chart 1).



**Physical exam:** Vital signs will be significant for fever and hypoxia. Otherwise, commonly physical exam is benign. Occasionally there may be some splenomegaly or hepatomegaly noted. Uncommon physical findings include scleral icterus, jaundice, mild pharyngeal erythema, and retinopathy with splinter hemorrhages with or without retinal infarcts [4]. Lymphadenopathy is absent.

**Labs:** Initial labs may show [4,5]:

- low hematocrit
- low hemoglobin
- elevated lactate dehydrogenase
- low haptoglobin,
- reticulocytosis.
- thrombocytopenia
- liver enzymes can be mildly elevated
- elevated total and indirect bilirubin
- elevated blood urea nitrogen
- elevated serum creatinine levels
- peripheral smear and parasitemia are key components in diagnosis.
- white blood cell count can be decreased, normal or elevated. Therefore has little assistance in diagnosis.

**Imaging:** Imaging is not particularly helpful in the diagnosis of babesiosis, but rather it is helpful to rule out other sources of infection or causes.

## Case description

Upon presentation patient was febrile, remainder of vital signs were stable and his physical exam was pertinent for some lumbar musculoskeletal strain.

### Labs on admission:

126 (L)	92 (L)	18	121 (H)	7.70	14.6	53 (L)
3.4 (L)	25.6	1.02			43.1	
CrCL: >90	ALT: 88 (H)	Urinalysis: Hazy, +2 Bili, +2 Hgb, +2 protein, 16 RBC				
GFR: 81 (L)	T. Bili: 2.4 (H)	Urine Culture: Negative				
Ca: 8.4 (L)	Alk Phos: 52	Blood Culture: Negative				
Lactate: 1.0	AST: 90 (H)					
CrCL: >90	Lipase: 12					
GFR: 81 (L)	Amylase: 10 (L)					

When compared to expected labs seen with typical babesiosis infections our patient had both consistent and inconsistent findings.

Thrombocytopenia, transaminitis and elevated total bilirubin were consistent with labs for babesia.

He did not display the typical signs of anemia or renal involvement.

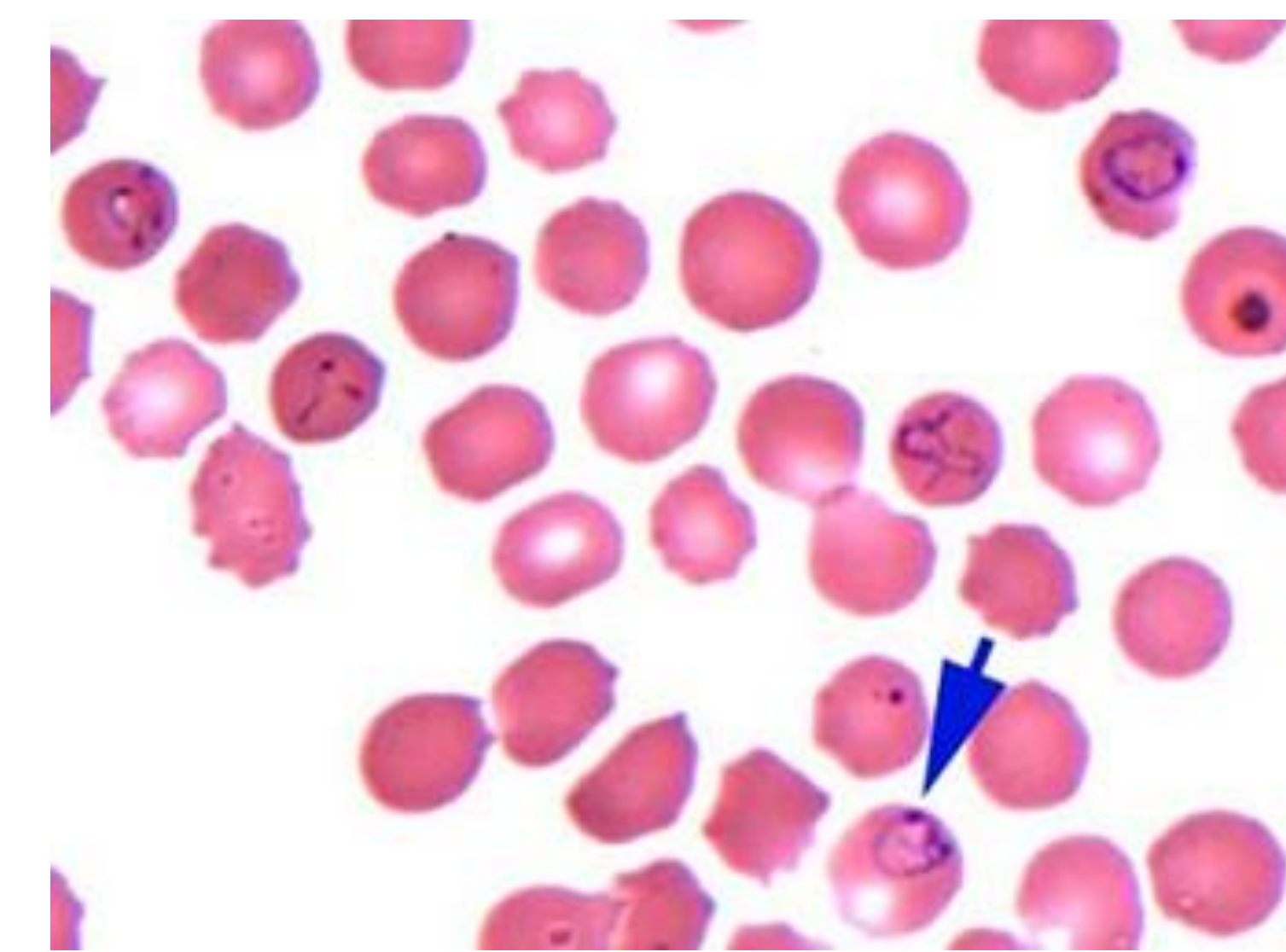
Importantly, some labs that were negative allowed for the medical team to decrease the differential list.

EKG, urinalysis, urine culture and blood cultures were negative for infection. Evidence of hemoglobinuria was initially concerning for nephrolithiasis, but imaging and physical exam did not support this.

The diagnosis was made after a peripheral smear was positive for intraerythrocytic parasites consistent with babesia by light microscope examination. Commonly the Maltese cross formation is seen intracellularly. Further labs confirmed the diagnosis with a parasite level.

### Immunology preformed

Initial parasite load found to be 2% babesia species as well as positive for Lyme's disease (Chart 2).



[https://www.cdc.gov/odpd/images/casestudies/2017/Case433nov2017\\_A.jpg](https://www.cdc.gov/odpd/images/casestudies/2017/Case433nov2017_A.jpg)

Immunology	Result	Reference Range
PSA Total		
Anaplasma Ab, IgG	< 1:64 *	
Anaplasma Ab, IgM	< 1:20 *	
Anaplasma Ab, Interpretation	see note *	
E chaffeensis IgG Ab	< 1:64 *	
E chaffeensis IgM Ab	< 1:20 *	
E chaffeensis Interpretation	see note *	
Ehrlichia Comment		
Lyme Disease Ab(IgG),Blot	POSITIVE * (A)	
Lyme Disease Ab(IgM),Blot	POSITIVE * (A)	
Lyme Disease DNA		
Lyme 18KD IgG Ab	REACTIVE * (A)	
Lyme 28KD IgG Ab	NON-REACTIVE *	
Lyme 39KD IgG Ab	REACTIVE * (A)	
Lyme 58KD IgG Ab	REACTIVE * (A)	
Lyme 93KD IgG Ab	REACTIVE * (A)	
Lyme 23KD IgM Ab	REACTIVE * (A)	
Lyme 39KD IgM Ab	REACTIVE * (A)	
Lyme 41KD IgM Ab	REACTIVE * (A)	
Lyme IgG	Negative *	
Lyme IgM	Positive * (A)	
Malaria Prep		
Parasitemia Count	2.00	
Rocky Mtn SF IgG	NOT DETECTED *	
Rocky Mtn SF IgM	NOT DETECTED *	
Lyme 23KD IgG Ab	NON-REACTIVE *	
Lyme 30KD IgG Ab	NON-REACTIVE *	
Lyme 41KD IgG Ab	REACTIVE * (A)	
Lyme 45KD IgG Ab	NON-REACTIVE *	
Lyme 66KD IgG Ab	NON-REACTIVE *	

Chart 2

### Hospital course:

Patient was admitted for nine days. He underwent CT abdomen and pelvis to rule out possible kidney stone. He had MRI of lumbosacral spine to rule out abscess which showed no abnormalities. He had an abdominal ultrasound secondary to elevated LFT's. CT head and neck was within normal limits. He also underwent a lumbar puncture which showed CSF cell count, protein, glucose all to be normal strongly suggesting against any kind of CNS infection at that time.

He continued to have cyclic fevers requiring recurrent doses of Tylenol and Ibuprofen. He had severe sweats that were treated with Ipecacks to the groin and axillary region.

### Specialists' synopsis

- Gastroenterology:** In setting of acute infection (Babesia), elevated LFT's is more likely secondary to the etiology and not underlying liver disease. Abdominal ultrasound showed hepatosplenomegaly without evidence of liver disease. LFT continue to rise. Would expect LFT to rise in setting of acute infection.
- Hematology:** Suspicious that underlying cause of thrombocytopenia was secondary to parasitemia. Medication review negative for drugs that can cause thrombocytopenia. Remained stable and increased as parasite levels decreased.
- Infectious diseases:** Peripheral smear is positive for intracellular parasites consistent with babesia. Cyclic fevers can be seen with parasitemia. Fevers improved as parasitemia percentage declined. Lyme IgM and IgG western blot was positive, showing a likely co-infection.

## Treatment

- IV Azithromycin and Atovaquone for Babesiosis
- Doxycycline for Lyme's disease
- A total of 14 day course was required as well as repeat parasitmeia.

## Discussion

A thorough history is a crucial component that drives a physician's differential diagnosis.. Babesiosis symptoms vary in severity, are vague and commonly include gradual onset of fatigue and malaise, fevers, sweats and myalgia without diagnostic physical exam findings.

This patient presented with common symptoms leading to a vast differential. The initial differential includes multiple infectious diseases such as Lyme's, Ehrlichia, and Anaplasmosis. But differential based on initial history and physical was also concerning for possible nephrolithiasis secondary to his past medical history and labs. Abscesses can cause cyclic fevers, meningitis can cause back pain with headaches. Commonly, liver dysfunction and medication mismanagement can also cause these similar vague symptoms.

## Conclusion

The differential for babesiosis can be vast secondary to the typical prodromal symptoms. GM developed babesia without a known history of tick bite. However due to his occupation as a landscaper he was commonly exposed to wooded areas. His location is also a notable clue, he resides in the northeast region. These are factors that could assist in narrowing the differential diagnosis. Therefore, it is important to consider babesiosis in the differential even without evidence of a tick bite or rash. Another take-away point for this case is that there can be concomitant medical problems exhibited at the same time. This patient was found to have a co-infection with Lyme's disease which is commonly seen in two-thirds of babesia cases [3].

## Literature cited

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