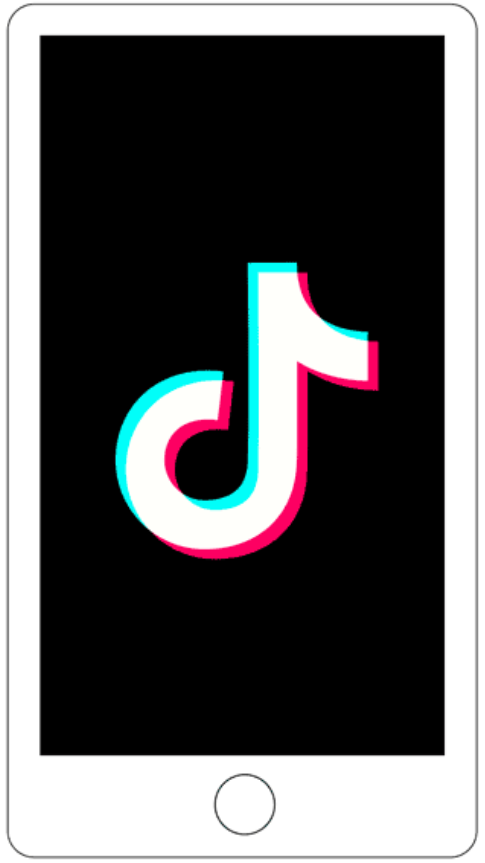
November 16, 20201
Ron Galbraith MD
Tick Talk



Introduction

Objectives

Understand when to suspect a tick-borne infection

Diagnose common tick-borne infections

Manage common tick-borne infections

Nomenclature and Tick Vector

Disease	Organism	Tick Vector
Lyme Disease	Borrelia burgdorferi	Ixodes scapularis
HME (human monocytic ehrlichiosis)	Ehrlichia chaffeensis	Ixodes scapularis
HGA (human granulocytic anaplasmosis)	Anaplasma phagocytophilum	Ixodes scapularis
Babesiosis	Babesia microti	Ixodes scapularis*
RMSF (Rocky Mountain Spotted Fever)	Rickettsia rickettsia	American dog tick Rocky Mountain wood tick AZ – Brown dog tick

When to suspect tickborne illness

Geography/season and exposure to ticks

Different clinical presentation by organism

- “Rickettsiaceae”
  - Very ill, ~FUO, don’t improve with vancomycin/zosyn
  - Very ill + rash (palms/soles)
  - thrombocytopenia, leukopenia, mild transaminitis
- Lyme
  - Rash
  - In endemic areas, on differential diagnosis for clinical syndromes in different systems
- Babesia
  - hemolysis

Microbiology

Organisms are different from what we normally see in the hospital

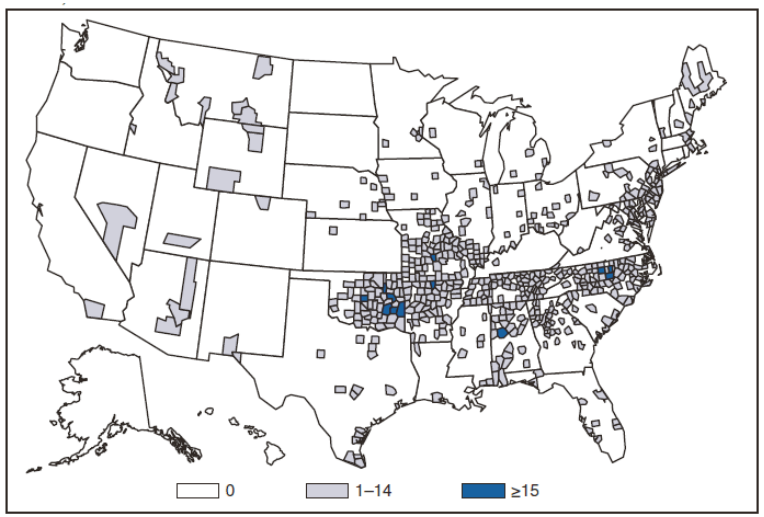
	Rickettsiaceae	Lyme = Borelia burgdorferi	Babesia = Babesia microti
	RMSF, HME, HGA	Lyme Disease	Babesiosis
Type of organism	Intercellular gram negatives	Spirochete (like syphilis)	Red cell parasite like malaria
visualization	Can see Erlichiosis in monocytes, Anaplasmosis in granulocytes	Only see light microscopy	Can see in rbcs in light microscopy

When to suspect tickborne illness

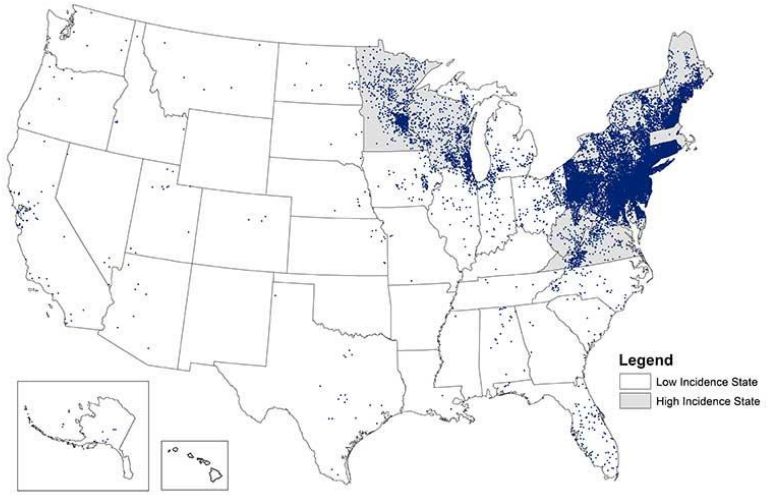
Geography, season, and exposure to ticks (most patients do not remember tick bite of nymphal Ioxodes)

- typically, can occur any time in the year but peaks in summer

RMSF

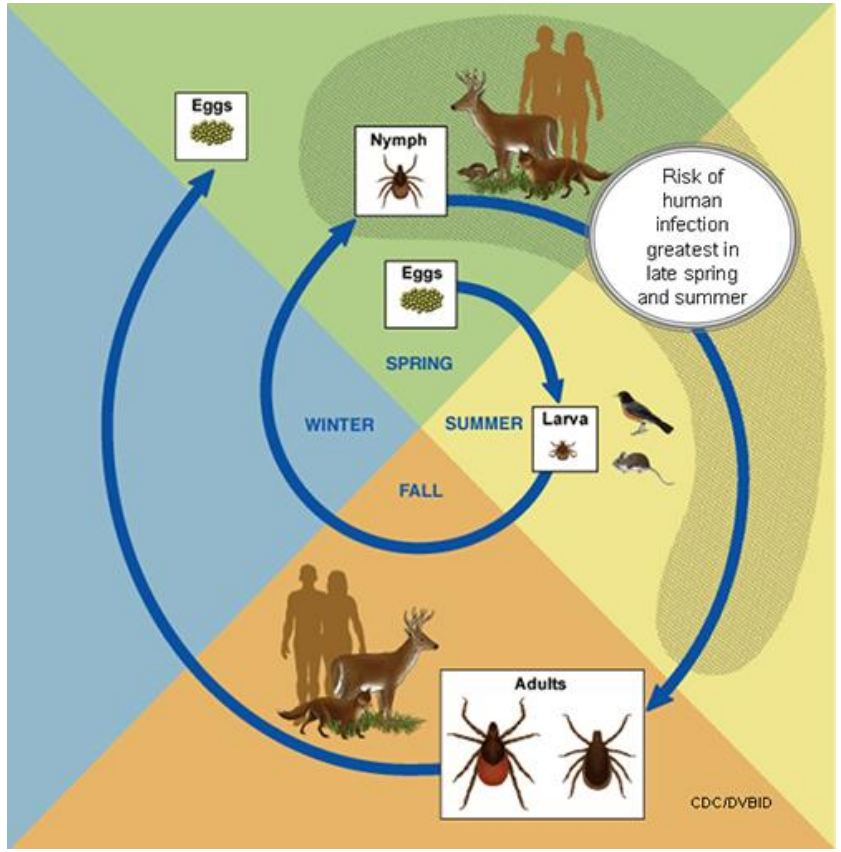


LYME



When to suspect Ixodes scapularis-borne infections

Organism	Tick vector
Borrelia burgdorferi (Lyme)	Ixodes scapularis
Ehrlichia chaffeensis	Ixodes scapularis
Anaplasma phagocytophilum	Ixodes scapularis
Babesia microti	Ixodes scapularis (also transfusion)
Rickettsia rickettsia (RMSF)	American dog tick Rocky Mountain wood tick AZ – Brown dog tick



How do you make diagnosis?

You typically are treating empirically

Can’t culture these

Old school

- microscope – look for organisms in rbc (parasite smear for Babesia) or wbc (buffy coat for Anaplasma and Ehrlichia)
- Serologies/Western blot

PCR for blood for RMSF (but low sensitivity)

How do you typically treat?

"Rickettsiaceae"
- doxycycline

Lyme
- Doxycycline
- Amoxicillin, Ceftriaxone
- Prophylaxis with doxy 200mg x1 if they meet all criteria
  - Attached deer tick x 36+ hours
  - Can start ppx within 72h or tick removal
  - Local infection rates of ticks with B burgdorferi is >20%
  - Doxycycline not contraindicated

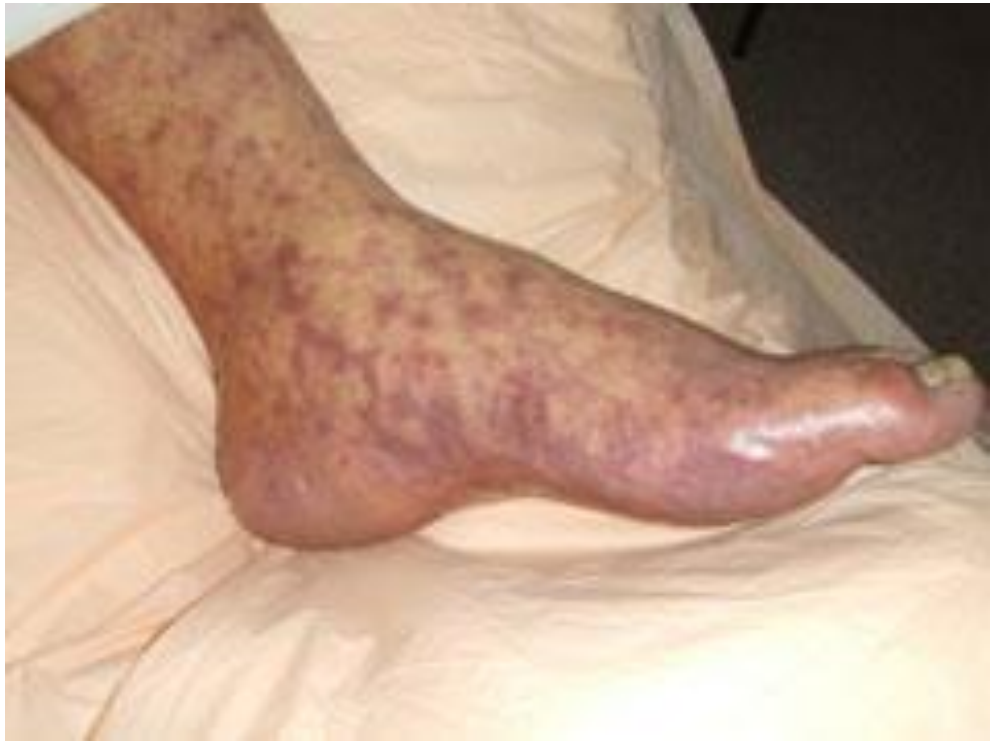
Babesia
- Mild
  - Azithromycin/atovoquone
- severe
  - Clinda/quinine
  - Azithromycin/Atovoquone

Case 1

45M is transferred to BUMC for evaluation for persistent fevers, headache, nausea/vomiting who developed a rash after admission at IHS Kayenta.

After 3 days, no improvement despite empiric vancomycin and piperacillin/tazobactam

Case 1



Case 1

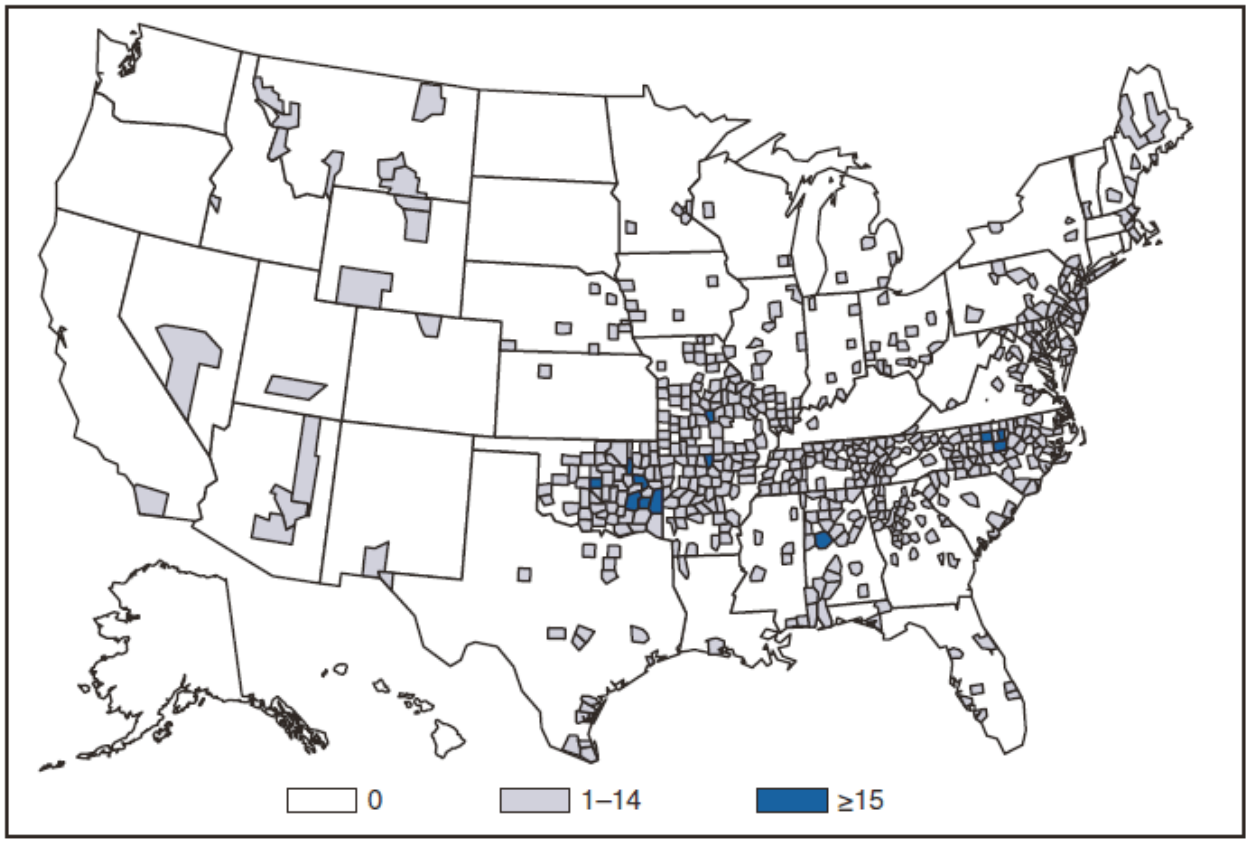
labs notable for

bcx ngtd, gc/ch neg, RPR NEG

Next reasonable treatment

- A. Add ceftriaxone
- B. Add penicillin IM injection
- C. send Rickettsia serology panel
- D. Stop antibiotics, start methylprednisolone
- E. Add doxycycline

Case 1: RMSF – typically not in AZ/NM, or even in Rocky Mountains



Case 1: RMSF

Diagnosis

- Typically treat empirically
- Confirmatory testing
  - serial serology
  - skin biopsy
  - blood pcr

Management

- doxycycline

Case 2 – you are doing an away rotation in July in New York City

56M from Long Island p/w fever, malaise, myalgias

Exam notable for no rash, fever to 102

Labs:

- COVID-19 NEG x3
- Wbc 1.5, Hg 14, Plt 80
- AST/ALT 240/300
- Lyme EIA NEG
- Blood cultures ngtd

Case 2

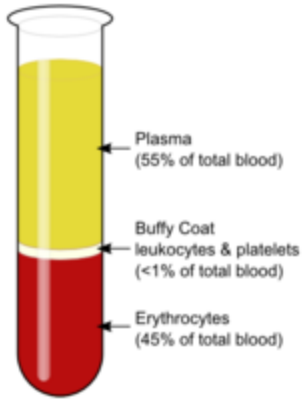
He is still febrile and ill appearing despite 3 days of vancomycin and zosyn, your next step in management is:

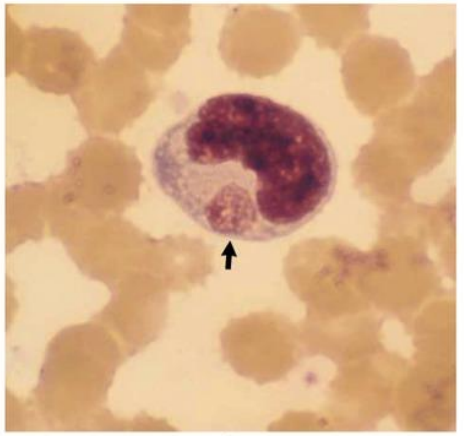
- A. add po doxycycline
- B. Add po azithromycin
- C. Stop vancomycin/zosyn, start IV ceftriaxone
- D. start methylprednisolone

Case 2: Ehrlichia and Anaplasma

Diagnosis
- “buffy coat”
- antibodies

Management
- doxycycline

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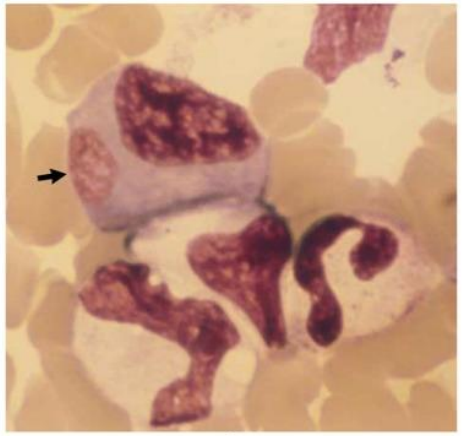
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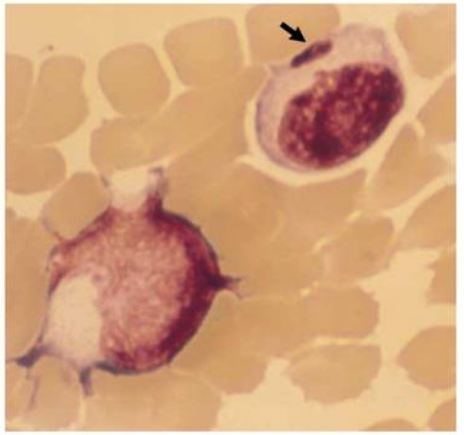
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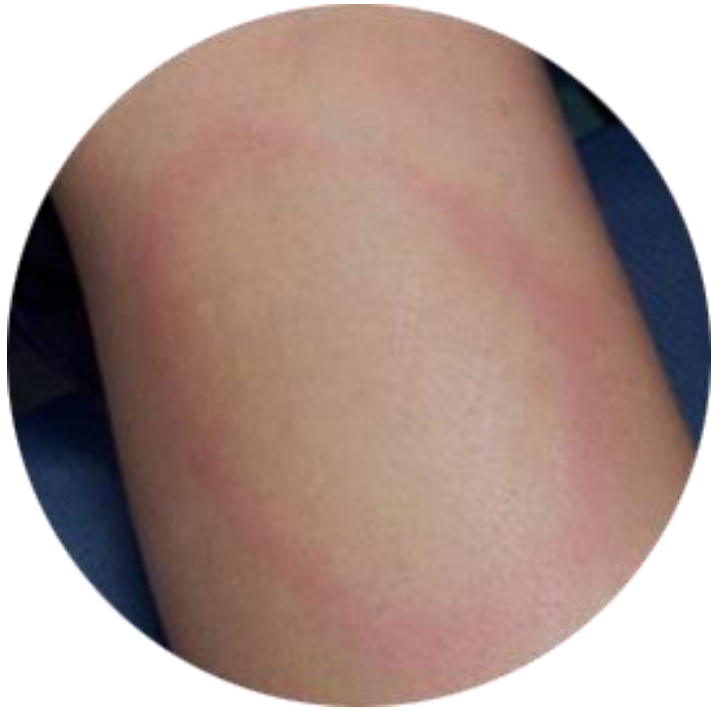
Case 3 – Still in New York City

54W with htn/hl/dm p/w rash 2-3 weeks after hiking in Hudson Valley, does not recall being bit by a tick



Case 3

Lyme antibody testing neg

Most reasonable next step in management is:

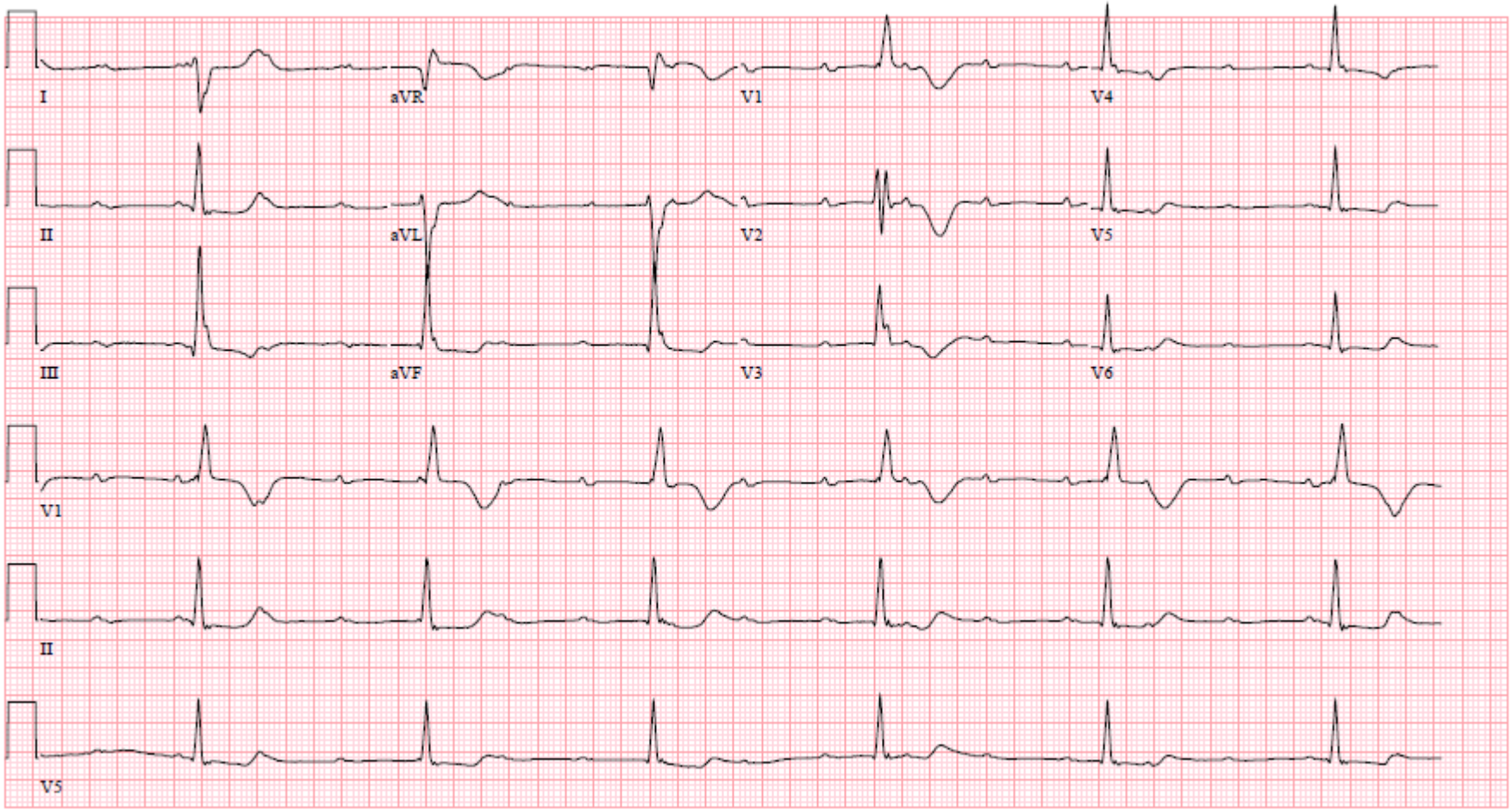
- A. Doxycycline 200mg x1 dose
- B. Doxycycline 100mg bid x 1 week
- C. Repeat Lyme testing in 2 weeks
- D. Send Erhlichia and Anaplasma ab

Case 3 – Erythema migrans

Characteristics	N %
homogenous	59%
Central erythema	32%
Central clearing	9%
Punctum present	31%
Vesicular/ulcerated	7%
Blue center	2%

Case 4 – still on rotation in NYC ER

32M from Long Island with no pmhx p/w episode of syncope in setting of fatigue



Case 4

Labs:

- TSH wnl, troponin neg x1, electrolytes wnl
- Lyme serology: EIA positive, Western Blot pending

What is the next step in managing the patient?

- A. Wait for Western blot and echo
- B. Place permanent pacemaker if initial blood cultures are negative
- C. start IV ceftriaxone treatment
- D. start PO doxycycline treatment

Case 4: Stages of Lyme disease – *Borrelia burgdoferi*

*Need to be able to recognize heart block

Lyme is caused by Borrelia burgdorferi, a spirochete like syphilis, similar in its stages

Of note, there can be long periods of latent infection

Stage	Time from onset (bite)	Organs involved
Early localized	< 1 month	Skin
Early disseminated	Weeks-months	Skin, CNS, Cardiac
Late	Months-years	Arthritis (knees), rarely CNS
Post		Not caused by live organism

STARI

“Southern Tick-Associated Rash Illness”

Erythema migrans + mild flu like illness temporally associated with Lone Star tick

Thought to be a Borrelia spp but not proven

Not just in Southeast anymore

Case 5

32M from case #3 improved initially with high dose ceftriaxone, back to normal rhythm, just prior to discharge developed fever and malaise

- Exam – somewhat ill appearing, conjunctival icterus
- Labs-
  - Hg 8.5 (2 days prior 15)
  - Cr 1.7 (1.1 at baseline)
  - LDH 500, Tbili 4.0, dbili 1.0, haptoglobin 5 (low)

Case 5

Your next step in treatment is

- A. Continue ceftriaxone, add doxycycline
- B. Stop ceftriaxone, start doxycycline
- C. Continue ceftriaxone, add azithromycin + atovaquone
- D. continue ceftriaxone, add methylprednisolone

Case 5: Babesia microti

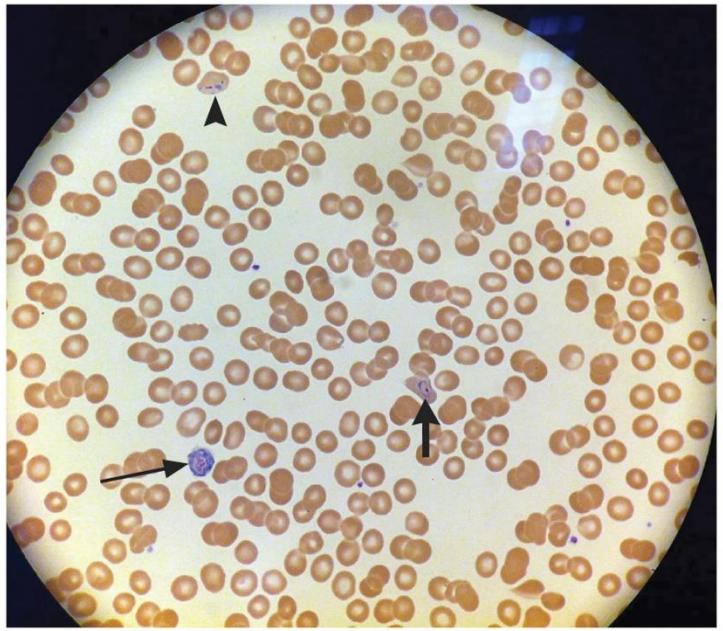
*Need to be able to recognize hemolysis

Diagnosis

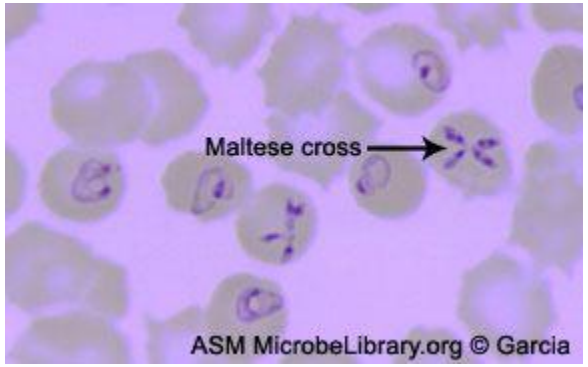
- Can be caused by blood transfusion, blood is screened in endemic areas
- Coinfections along with Lyme not uncommon

Treatment

- atovoquone/azithromycin



Case 5: “maltese cross”



Take home points

Tickborne illness come from (1) rickettsia group (2) Borrelia and (3) Babesia; and have different clinical syndromes

Suspect tickborne illness with geographic/seasonal tick exposure and when not improving with standard hospital treatment

Rickettsia group causes acute febrile illness, sometimes rash

Borrelia (Lyme) causes rash then disseminates throughout body

Babesia causes hemolysis

When in doubt, give doxycycline

Thank you

Any questions?

references

Cdc.gov/parasites/babesiosis/index.html

Mandell. Principles and Practice of Infectious Diseases

Board review book

Azdh.gov/preparedness/epidemiology-disease-control/rocky-mountain-spotted-fever/index.php#surveillance-monitoring; accessed 7/15/2020

May 25, 1995
N Engl J Med 1995; 332:1417
DOI: 10.1056/NEJM199505253322105; Erlichiosis, images in clinical medicine NEJM

November 6, 2014
N Engl J Med 2014; 371:1833-1837
DOI: 10.1056/NEJMcps1313772 “A Chilly Fever”

references

Azdhs.gov/documents/preparedness/epidemiology-disease-control/rocky-mountain-spotted-fever/rmsf-handbook.pdf