Lyme Disease

Do’s, Don’ts and Tips
From the Pittsburgh Epidemic

Andrew Nowalk, MD, PhD
Division of Infectious Diseases
Children’s Hospital of Pittsburgh of UPMC
Disclosures

- I have no financial disclosures or other conflicts of interest to disclose related to the subject of this lecture.

- Recommendations reflect Lyme disease guidelines from the IDSA and AAP

Clinical Infect Dis 2006;43:1089
AAP Red book 30th edition: Ch. 287
Objectives

- Describe the ongoing epidemic of Lyme disease in western Pennsylvania
- Define stage-based diagnostic and treatment strategies
- Outline the Do’s, Don’ts and Tips in Lyme management
- Talk through common and challenging cases
Reported Cases of Lyme Disease—United States, 2015

Each dot represents one case of Lyme disease and is placed randomly in the patient’s county of residence. The presence of a dot in a state does not necessarily mean that Lyme disease was acquired in that state. People travel between states, and the place of residence is sometimes different from the place where the patient became infected.
Things change
Lyme disease cases in Pennsylvania by region

Cases

year


NC NE NW SC SE SW
CHP Lyme cases, 2002-2016

Cases

Outpatient
Inpatient
Emergency

CHP cases by month and site

- Summer and fall concentration
- Cases year round
Confirmed Lyme disease cases by age and sex—United States, 2001-2015
Stages
## Development of Lyme disease symptoms

<table>
<thead>
<tr>
<th>1-4 weeks</th>
<th>1-6 months</th>
<th>&gt;6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early</strong></td>
<td><strong>Disseminated</strong></td>
<td><strong>Late</strong></td>
</tr>
<tr>
<td><em>Erythema migrans (single)</em></td>
<td><em>Erythema migrans (single or multiple)</em></td>
<td><em>Chronic mono/oligoarthritis</em></td>
</tr>
<tr>
<td>Constitutional symptoms:</td>
<td></td>
<td>Sporadic polyarthritis</td>
</tr>
<tr>
<td>Fever</td>
<td>Carditis (heart block)</td>
<td>Constitutional symptoms</td>
</tr>
<tr>
<td>Myalgia</td>
<td>Cranial nerve palsy (VII)</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>Meningitis</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>Septic” arthritis</td>
<td></td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>ROO</td>
<td></td>
</tr>
<tr>
<td>Arthralgia</td>
<td>Constitutional symptoms</td>
<td></td>
</tr>
</tbody>
</table>

If untreated

- Early
- Disseminated
- Late

If untreated, Constitutional symptoms.
### Progression of Lyme Disease Testing

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#### Don’t test!
- 85% of ELISA/WB negative!
- Clinical diagnosis

#### Test!
- 40-50% positive with multiple EM
- 90% with CNS/cardiac involvement
- Average 7/10 IgG bands
- Clinical diagnosis still important
- CSF PCR bad!

#### Test!
- 100% of ELISA/WB positive!
- Average 9/10 IgG bands
- Joint fluid PCR good!

If untreated:

- Don’t test!
- Test!
IgM alone is an unreliable test – be wary!
Case #1

- 26 year old female with 2 days of headaches, “low grade fever” and rash
- Recent camping trip to state park
- Rash on elbow
1st stage: Early Disease

- Erythema Migrans (EM)
  - 8-9 days after tick bite

- General symptoms
  - Fever
  - Headache
  - Arthralgia
  - Myalgia
  - Fatigue
Erythema migrans

- Occur in 80% of cases
- Missed EM
  - Hairline
  - Buttocks
- Untreated lesions typically expand (hence *migrans*) to an average of 15 cm

Erythema migrans
Early disease

**Diagnosis**

- DON’T test!
- ELISA/WB negative in ~85% cases
- Clinical diagnosis
- Benadryl and time...

**Treatment**

- Shorter = 14 days of therapy
- DO use doxycycline as 1st line x 14 days
- Amoxicillin for <8 yo, doxycycline allergic
Testing only confuses EM diagnosis, and even convalescent titers are often negative.
Case #2

- 26 yo male with right facial droop and headache
- No tick bite
- Walks his dog through Highland Park every night
- No history of EM rash
**2nd stage: Disseminated Disease**

- >6 weeks after initial tick bite
- **Most common presentations**
  - Multiple EM
  - Facial nerve palsy
  - Meningitis
  - “Septic” arthritis
  - FUO (becoming more common)
  - Carditis (rare but worrisome)
Neurologic complications

- More common in children than adults
- ~25% of CHP visits
- Multiple diagnoses
  - Cranial nerve palsies
  - Meningitis
  - Radiculoneuritis (very uncommon in children)
Cranial nerve palsies

- Most common pediatric presentation of CNS Lyme
- 7th nerve > all others
- MRI findings > exam findings
- Responds well to therapy
- Steroid and acyclovir NOT indicated (may be harmful)

Radiology. 2009;253:167
Laryngoscope. 2017;127:1451
Meningitis

- More common in children
- Very similar clinically to aseptic meningitis
  - Moderate pleocytosis (~100 WBC/ 90% lymphs)
  - Similar time period (summer months)
- Rule of 7s
  - Longer symptoms (7 days)
  - Cranial nerve palsy in 30-50% (7th nerve)
  - Mononuclear CSF predominance (70%+ mononuclear cells)
Cardiac complications

- More common in adults
- Roughly 1/3 each with 1°, 2°, and 3° AVB, occasional carditis
- Rare in neurologic Lyme
- Reports of sudden cardiac deaths in adults
Three Sudden Cardiac Deaths Associated with Lyme Carditis — United States, November 2012–July 2013

Lyme disease* is a multisystem illness caused by Borrelia

Case Reports and Public Health Investigation

Pennsylvania Department of Health
2013 - PAHAN - 273 - 12 - 17 - ADV
Sudden Cardiac Deaths Associated with Lyme Carditis

DATE: 12/17/2013
TO: Health Alert Network
FROM: Michael Wolf, Secretary of Health
SUBJECT: Sudden Cardiac Deaths Associated with Lyme Carditis
DISTRIBUTION: Statewide
Disseminated disease

**Diagnosis**
- DO test
- ELISA/WB positive in 90+% cases
- Clinical diagnosis also important
- EKG to screen for AVB

**Treatment**
- DON’T go short – 21-28 days of therapy
- Doxycycline for all
- IV initially ONLY for carditis, meningitis
- Palsies may resolve on their own – suspect any summer time Bell’s as Lyme even if it is gone!
Case #3

- 35 yo male with left knee swelling
- Injured his knee in fall playing soccer, swelling present for 6 weeks
- More tired, joint aches
3rd stage: Late Disease

- Occurs >6 months after initial infection
- Common in adults
- Prominent constitutional complaints
Arthritis

- Can occur early or late
- "Rheumatic"
  - Stiff and swollen > red/tender
  - Joint effusions can be dramatic
  - ROM often preserved
- Typically monoarticular
- Knees (>90%), other joints rare
Chronic disease

**Diagnosis**
- **DO trust the test**
- **ELISA/WB positive in 100% cases!**
- **Lyme PCR on joint fluid**

**Treatment**
- **DON’T** start with IV
- 28 days of doxycycline
- IV for resistant disease
- Consider joint aspiration (diag/ther)
- Adjunct NSAIDs (naproxen + famotidine) improve outcomes with Lyme arthritis when started early
Case #4

- 27 yo female comes to your office hours with tick in her ear
- She discovered it this morning after weekend camping in Butler
- They wonder what to do?!
Lyme tick bite prophylaxis

- CDC guidelines for tick bite prophylaxis indicate use in areas where >20% of ticks are infected (western PA = 50-70%)

- The CHP ID division recommends prophylaxis in the following situation
  - The tick is identified as deer tick
  - The tick has been attached for at least 36 hours
  - Prophylaxis can be started within 72 hours of removal
Prophylaxis guideline

- We recommend doxycycline in a single dose
  - 200 mg for adults or children >45 kg
  - 4 mg/kg for all children <45 kg

- Expected efficacy is 80%+

- Remember to instruct patients on use of DEET and other tick avoidance in the future (see the CDC site)
Controversies

The Lyme Disease Conspiracy
by Joseph J. Burrascano, Jr., M.D.
Reprinted from Senate Committee Hearing on Lyme Disease

Dying of Lyme disease: Case fatality rate nearly 100%

If you have Lyme Neuroborreliosis you will likely succumb to it eventually if you don’t receive proper, open-ended treatment.

Because the big problem is that the overwhelming majority of neuro-Lyme is misdiagnosed as something else. Example: Lyme disease (neuroborreliosis) is a common cause of ALS, but ALS as a “disease on its own” is more profitable and prestigious, so if you have ALS symptoms and test
Be wary of non-FDA approved testing and home grown labs for Lyme
Final thoughts

- Lyme disease remains epidemic in our area
- Use testing appropriately and appreciate false positives and false negatives
- We are happy to help with challenging cases
Questions?