Legionnaire's Disease

HAOPS 2019 Primary Care Update **GS Murphy, MD**

Legionella are parasites of amoebas and are generally found in fresh water. In humans they infect macrophages and the monocytes.

Legionella are Gram negative rods but stain poorly with safranin…better visualized with fuschin as the counterstain. They require special media for rapid growth, and Buffered Charcoal Yeast Extract (BCYE) agar is ideal. **You need to ask your lab to look for Legionella to assure the correct medium is used.**

Humans are exposed from inhalation or aspirating droplets. Many exposures can be related to proximity to hot or warm water systems, cooling towers, decorative fountains, springs, showers, or old plumbing recently repaired. Recent travel is a factor in 15% of cases.

Legionella cause about 2% of Community Acquired Pneumonia requiring hospitalization and 13% of Hospital Acquired Pneumonia. About 15% of cases are seen in epidemics, with the rest sporadic. Think about Legionella when a pneumonia patient is not responding to cell-wall antibiotics.

Case fatality rates are 10% for CAP and 25% for HAP. About 6000 cases are reported to CDC annually, but it is believed to be under reported and under diagnosed. It is a reportable disease in Hawaii.

Only 5% of exposed become infected. Risk factors for acquiring Legionnaire's disease include male sex, smoking, chronic heart disease, diabetes, end stage renal disease, transplant, immune suppression, age over 50 years, and cancer. It is less common in children.

Incubation is 2-10 days, median 5d.

Legionella causes an acute, consolidating pneumonia. Clinically, the pneumonia produced can be indistinguishable from pneumococcal pneumonia. Sputum is purulent 50% of time. Some patients will have systemic symptoms. Lab values may show hyponatremia, hypophophotemia, leucopenia, thrombocytopenia, or elevated LDH, LFTs, CK, and WBC, but none of these findings is sensitive or specific.

Legionella genus has multiple species pathogenic to humans, but *L. pneumophila* causes most disease. There are multiple serotypes of *L. pneumophila*.

Legionella pneumophila serotype 1 causes 60-90% of cases in US.
L. pneumophila serotype 6 is often seen in Ontario.
L. longbeachae causes 30-50 cases in Australia and NZ and is prevalent in Asia. It is believed to be soil based.
Other Legionalla species principally infect immune suppressed patients.

Diagnosis is made by simultaneous sending two tests: Sputum culture for Legionella AND Legionella Urine Antigen.

Urine antigen test is 90% sensitive for *L. pneumophila* serotype 1, 60% for serotype 6, but will miss non-*pneumophila* species.
Culture increases sensitivity and produces an isolate that is important for epidemiologic investigations.

Even sputum or tracheal aspirate contaminated with epithelial cells will grow Legionella, so BAL is rarely necessary.

Recent studies show that PCR of body fluids is helpful in getting a more rapid diagnosis of Legionella.

Immunity is mostly cell mediated, but antibodies do eventually get made and serology tests can be useful after the fact if there is a 4 fold increase in titer.

Treatment is with a Macrolide or a Fluoroquiniolone. Beta-lactam antibiotics do NOT work, nor do cephalosporins, carbapenems, or chloramphenicol.

Use either Azithromycin or Levofloxacin:

Azithromycin 500mg qd for 5-7 d

- Can shorten to 3-5 d in mild cases, if not immunosuppressed.

OR Levofloxacin 750 mg qd for 5-7 d

- Or Levofloxacin 500 mg qd for 7-10 d.

There is no person to person spread, so patients do not need to be isolated.

All hospital acquired infections should lead to an epidemiologic investigation within the hospital. Test other pneumonia patients in house and look for a source.

Prevention is through proper maintenance of water systems, especially with halogenations.

What is Pontiac Fever?

A self limited, febrile illness, **without pneumonia**, associated with exposure to Legionella, and seen mostly in outbreaks. Symptoms are fever, myalgias, headaches, sometimes with cough, arthralgias and abdominal pain. Incubation is short: 4 hrs to 60 hrs. Duration is 3-5 days. No treatment is required.