Legionella Schema

Welcome back Clinical problem Solvers! This is Sid, a current fourth-year medical student at UCSF and today I am super excited to talk to you about an illness script for one of my favorite organisms—Legionella!

Legionella is a fastidious GNR which requires special media to grow on culture. There are over 50 sub-species, the most common of which is Pneumophilia 1. These features will be relevant when we discuss the diagnosis of legionella—more on this to come! Legionella has an incubation period of 2 to 14 days until symptom onset. It is a waterborne pathogen that is transmitted mainly through aerosol inhalation from contaminated water sources. The vast majority of cases are sporadic although outbreaks can occur in both hospital and community settings. About a quarter of cases are travel-associated, and it is important to think of legionella in the differential for fever in a returning traveler especially if there are consistent features. Over half of cases also occur in the summer and autumn.

Next, let's talk briefly about risk factors. Legionella can affect all populations, but the risk is increased with older age and immunosuppression which is often the case for many infections in general. It is important to note that a large majority of cases occur in individuals over 50.

Let's transition into our next topic, the clinical features of legionella. Legionella is multisystem disease with prominent pulmonary features. Many infections with legionella are said to be "influenza-like" due to overlapping non-specific symptoms such as fever, shortness of breath, and myalgias. Legionella is also associated with a temperature-pulse dissociation, or relative bradycardia in association with fever, which can be suggestive of the diagnosis. However, it is important to note that any intracellular organism can cause this phenomenon including mycoplasma pneumoniae, which can present similarly though typically occurring in younger individuals. The clinical presentation of legionella can be incredibly varied. The most common pulmonary manifestation is unilobar pneumonia, but multifocal opacities and even less commonly nodular/cavity lesions can occur as well. Diarrhea as an additional finding is often suggestive of the diagnosis and is thought to occur as a result of cytokine release and intestinal inflammation. Headaches are nonspecific but can also occur with legionella, and encephalitis is a rare but important complication.

Various lab abnormalities are associated with legionella and reflect its multiorgan involvement. A classic finding that often raises the suspicion for legionella is hyponatremia which is a common finding in many pulmonary processes in general. However, hyponatremia is much more common in pneumonia caused by legionella than in pneumonias caused by other organisms and is thought to be secondary to SIADH although the exact mechanism remains unclear. Mild AST and ALT elevations below 300 are common findings and indicate hepatic or muscle involvement. Elevated serum creatinine is nonspecific and can also occur with renal involvement. CPK elevations typically less than 5,000 can be seen and indicates involvement of skeletal muscle. Leukocytosis, specifically with lymphopenia, is also a common finding.

Remember that pneumonia accompanied by these features raise the suspicion for legionella, but no individual finding or combination is pathognomonic.

Now is a great time for us to talk about ways to establish the diagnosis! The urine antigen test is limited to pneumophilia 1, but remember that this is by far the most common species. In most cases, this is an appropriate first-line test given its rapid turnaround time and high specificity. Because this test only detects pneumophilia 1 and has imperfect sensitivity, a negative test should be followed by another test such as sputum culture if suspicion remains high. Serology can also be performed but is often clinically impractical in acute infection due to delay in antibody production. Sputum culture on special media is considered the gold standard for diagnosis and detects all subspecies with relatively high sensitivity and excellent specificity.

Let's move on to talking about treatment! Levofloxacin and azithromycin are the preferred agents for treating Legionella in immunocompetent patients as they have excellent lung penetration, achieve high intracellular concentration, and are active against all sub-species. Empiric treatment for community acquired pneumonia often includes one of these agents for coverage of legionella and other atypical organisms.

That was a ton of information, so let's take a moment to summarize! Recall that legionella is a waterborne pathogen with unique microbiologic features. Remember that risk is significantly higher in older and immunocompromised individuals. Think of legionella as a multiorgan process with distinguishing features such as diarrhea and hyponatremia. Remember that a urine antigen is a great initial test for diagnosis and can be followed by sputum culture if negative. Finally, remember that treatment is with levofloxacin or azithromycin.

We hope you enjoyed this schema. Until next time, clinical problem solvers!