Bug of the Month: Legionella pneumophilia

Recently, a story was in the news about an 82-year old Italian woman who died of Legionnaires disease believed to be contracted from the water at her dentist’s office. In the US, the CDC and ADA have issued guidance about water quality in dental practices to prevent transmission. The story served as a reminder about exposure to Legionella.

The organism Legionella pneumophilia was identified after an outbreak of pneumonia among attendees of the 1976 American Legion Convention held at a hotel in Philadelphia.

The spectrum of illness associated with Legionella infection varies. It can result in asymptomatic sero-conversion, an illness called Pontiac Fever which is a flu-like illness without pneumonia or as Legionnaire’s disease which involves pneumonia. An extra pulmonary infection can occur but is rare. Legionella can cause community acquired or health care acquired illness.

The organism is aquatic. It is chlorine tolerant so it can survive water treatment and gets into potable water systems in small numbers. It can be found in drinking water in homes, healthcare facilities, hotels, and in man-made aquatic environments such as decorative water features, whirlpool spas, and evaporative coolers. Legionella can inhabit and survive in biofilms and it reproduces inside protozoa such as amoebae. Disruption of biofilms and ruptured vacuoles shed from infected protozoa release the organisms into the water.

Transmission occurs by aspiration so may be associated with intubation, surgery requiring general anesthesia, and naso-gastric tubes. Inhalation of aerosols containing Legionella organisms is also a mode of transmission. Aerosolization by nebulizers and humidifiers, respiratory devices, by water features and spas can lead to inhalation of the organisms. Surgical wounds can become contaminated by the organisms in tap water. This organism is not transmitted person to person. As with all patients, standard precautions are used when caring for a patient with Legionella infection.

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Risk factors for infection for Legionnaire’s disease include advanced age, smoking, alcohol abuse, chronic pulmonary disease, male gender, and immunosuppression.

L. pneumophilia pneumonia is caused by the organism entering the lungs by aspiration or inhalation. For health care acquired cases, aspiration is the most common mechanism. This organism tends to cause more severe pneumonia than other pathogens. The incubation period is 2-10 days. The cough caused by Legionnaire’s disease is slightly productive and pleuritic chest pain is usually present. A new infiltrate is usually present on chest X-Ray which may progress to multiple lobes. Fever may be high. Some experience GI symptoms such as nausea, vomiting, abdominal pain, and watery diarrhea. Hyponatremia and abnormal liver function tests may be present. Attack Rate is 0.1% to 5% in exposed persons; mortality is less than 10% since Quinolone therapy became available. For treatment, quinolones or macrolides are the drugs of choice.

Pontiac Fever is a community associated self-limiting disease caused by L. pneumophilia. The onset is usually 24-48 hours post exposure. Symptoms include high fever, chills, body aches and headache but pneumonia is not involved. Persons recover in 2-5 days even without treatment. Attack rate can be as high as 95% in exposed persons.

To confirm legionnaire’s disease, lab tests are necessary. Sensitivity of cultures is 80% or more but special media are required to culture the organisms. If Legionella infection is suspected, the lab should be notified. A urinary antigen test is available but is only sensitive for serogroup 1 and cannot detect other serogroups or other species of Legionella. Of the estimated 18,000 cases of Legionella infection that occur annually in the United States, about 10% are diagnosed.

Preventive measures include prohibiting portable room humidifiers. Respiratory equipment such as nebulizers and ventilator bag should be rinsed with sterile water. Sterile water should be used to fill nebulizer reservoirs and to flush naso-gastric tubes. Avoid bathing surgical wounds with tap water. The CDC Guidelines for Environmental Infection Control in Health Care Facilities contains specific recommendations for Legionella surveillance, culturing water systems, elimination of legionella colonization of water systems, and recommended storage temperatures for hot and cold water in facilities.

http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf

Although persons can be exposed to Legionella organisms in a variety of health care and non-healthcare settings, awareness of this organism and the diseases it causes is important for workers in any healthcare facility.
Resources for this article:

APIC Text of Infection Control and Epidemiology, 3rd Edition Chapter 77 Legionella pneumophila

CDC: Guidelines for Environmental Infection Control in Health-care Facilities 2003