

## Legionnaires' disease

A 54-year-old male resident of Cape Town was hospitalised on 23/11/2013 following a four-day history of fever, drenching sweats, confusion and unsteady gait. On admission he was noted to be febrile (temperature of 38.2°C) and tachypnoeic. There was clinical and radiological evidence of pneumonia, and no focal neurological deficit was found on examination. Empiric antimicrobial therapy included ceftriaxone, clarithromycin and oseltamivir. However, his condition deteriorated and he subsequently required ventilatory support in ICU; the pneumonia was also complicated by renal dysfunction.

Amongst the microbiological investigations done, urine was submitted to Groote Schuur NHLS for *Legionella* urinary antigen testing (UAT); the UAT was positive, confirming Legionnaires' disease in this patient. He fortunately responded to antibiotic therapy and supportive care and is recovering. Two suspected epidemiologically-linked cases are under investigation.

*Legionella* spp are increasingly reported as a significant cause of sporadic and epidemic community-acquired and hospital-acquired pneumonia worldwide. The majority of Legionnaires' disease cases are caused by *Legionella pneumophila* serogroup 1, but other serogroups and other species are also pathogenic and able to cause sporadic and epidemic disease.

Infection with *Legionella* spp can present as a spectrum of disease. Many persons exposed to *Legionella* spp will seroconvert but are asymptomatic; symptomatic disease (legionellosis) classically presents as two distinct clinical entities: Legionnaires' disease and Pontiac fever. Pontiac fever is a mild, self-limited influenza-like illness (without pneumonia) whilst Legionnaires' disease is a severe multisystem disease with pneumonia, associated with a high mortality rate (15-25%). *Legionella* spp are ubiquitous in virtually all sources of fresh water, including natural sources as well as man-made water systems. Transmission of *Legionella* occurs via inhalation of aqueous aerosols dispersed by environmental sources. Recognised potential sources of infection include domestic hot- and cold-water systems, cooling towers and evaporative condensers, spa pools (Jacuzzis)/ natural pools/thermal springs, fountains/sprinklers, humidifiers for food display cabinets, car wash water jets, compost/potting soil, and respiratory therapy equipment. Recognised risk factors associated with infection include older age (>50

years), male gender, having a chronic underlying disease with or without an associated immunodeficiency, and being a heavy smoker.

It is not possible to clinically distinguish patients with Legionnaires' disease from patients with other types of pneumonia. Features of Legionnaires' disease include fever, non-productive cough, headache, myalgia, rigors, dyspnoea, diarrhoea and confusion. Hyponatraemia, high CRP levels and renal dysfunction have been noted in some studies to occur more often in patients with Legionnaires' disease than in patients with other types of pneumonia. The diagnosis of Legionnaires' disease depends on a high index of suspicion and special laboratory tests. The definitive diagnosis of legionellosis is based on culture of *Legionella* spp from respiratory tract specimens on appropriate selective media; this remains the gold standard. However, culture is not very sensitive (10-80%), and there is considerable inter-laboratory variation and expertise in performing the specialised culture. At present, the most commonly used and recommended diagnostic test worldwide is the *Legionella* urinary antigen test (UAT). It is a relatively inexpensive rapid test that detects antigens of *L. pneumophila* serogroup 1 in urine, and allows a diagnosis to be made early in the course of illness. The major disadvantage with this test is the inability to reliably detect other serogroups of *L. pneumophila* or other *Legionella* spp. Diagnosis by serology requires a four-fold rise in antibody titres in acute and convalescent sera. A single high titre ( $\geq 1:256$ ) does not discriminate between cases of Legionnaires' disease and other causes of community-acquired pneumonia; in addition, some studies have shown that 5-10% of the general population has titres  $\geq 1:256$ . PCR-based assays for the detection of *Legionella* spp in clinical samples are available in an increasing number of laboratories and show promise in providing a rapid diagnosis. Although PCR has repeatedly shown to have a sensitivity equal to or higher than culture, the occurrence of false-positive results is problematic and more experience is needed to guide the clinical use of PCR.

Azithromycin or the fluoroquinolones levofloxacin/moxifloxacin are recommended for treating Legionnaires' disease.

Legionellosis is a notifiable disease in South Africa. It is likely under-recognised in our country, owing to a lack of awareness and low index of suspicion for disease, as well as the diagnostic vagaries.

*Legionella* spp will not be detected through any of the routine investigations performed on patients with community- or hospital-acquired pneumonia (blood cultures, routine sputum/other respiratory tract sample cultures etc), and unless a health professional submits appropriate specimens specifically for *Legionella* testing (respiratory tract specimens for *Legionella* spp culture or urine for *Legionella* UAT), Legionnaires' disease cases will go unrecognised. Legionella UAT is offered by a few NHLS laboratories, and certain private laboratories also offer the test. Health professionals are urged to

consider Legionnaires' disease in patients with severe pneumonia who have underlying risk factors, and to request the appropriate tests.

**Source:** Division of Public Health Surveillance and Response, NICD-NHLS; Western Cape Province Department of Health; Groote Schuur NHLS