Legionella pneumophila Arthritis: Use of Medium Specific for Mycobacteria for Isolation of L. pneumophila in Culture of Articular Fluid Specimens

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We report the first case, to our knowledge, of acute purulent arthritis due to Legionella pneumophila in an immunosuppressed patient. L. pneumophila was isolated from samples of blood and articular fluid cultured with use of medium specific for mycobacteria (Bectec 13A medium).

Case report. A 51-year-old man presented to the infectious diseases department of the Hôtel-Dieu Hospital (Nantes) in October 2000, reporting a history of pain in his right wrist, right ankle, and both knees for a month. Combination therapy with amoxicillin and clavulanic acid and corticosteroids was administered, but there was no improvement. The year before, in August 1999, the patient had received chemotherapy to treat a recurrence of thymoma that had been diagnosed in 1992. At the time of presentation in October 2000, physical examination revealed a temperature of 39°C and clinical signs of arthritis in the left knee and right wrist but no other signs of systemic involvement. The patient’s WBC count was 20×10^7 cells/L (95% neutrophils), and the C-reactive protein level was 147 mg/L. A chest radiograph showed an opacity in the left lung, but there were no accompanying respiratory symptoms. Aspiration of the left knee yielded a purulent fluid with a WBC count of 40×10^7 cells/L (90% neutrophils). Results of fuchsin Gram staining of the joint fluid specimen were negative.

Samples of blood and articular fluid were inoculated into 6 culture vials containing medium specific for mycobacteria (Bectec TB 13A blood culture vials; Becton Dickinson). Results were positive after 1 month of incubation, with low growth-index values of 100–150. Subcultures on buffered charcoal–yeast extract (BCYE) plates yielded 50–100 cfu of Legionella pneumophila serogroup 1. Cultures of blood and articular fluid specimens in 10 Bactec 9240 aerobic vials (Becton Dickinson Diagnostic Instrument Systems) were sterile after 30 days of incubation. L. pneumophila was isolated from a culture of articular fluid inoculated in a Bactec 13A vial; however, culture of articular fluid samples on blood agar and IsoVitaleX chocolate plates (bioMérieux) remained sterile after 4 days of incubation.

L. pneumophila serogroup 1 urinary antigen was detected by use of immunochromatographic membrane assay (Binax Now Legionella Urinary Antigen Test). In serum, the level of IgM antibodies to L. pneumophila SG1 was 300 U/mL, as determined by use of ELISA, and the IgG level was <50 U/mL. Cultures of 3 sputum samples were negative for L. pneumophila. Culture of respiratory samples, such as bronchial aspirate or bronchoalveolar lavage fluid specimens, was not performed. The patient recovered uneventfully after 3 weeks of treatment with a combination of oloxac (400 mg/day) and rifampin (1.5 g/day).

Discussion. In adults with legionellosis, systemic manifestations with multiple-organ system failure are often reported [1]. In most instances, a presumptive diagnosis of extrapulmonary legionellosis is based on the clinical presentation and is confirmed retrospectively by the results of serologic studies or direct immunofluorescence testing of tissue samples. Acute purulent arthritis due to L. pneumophila has not been reported previously. Legionnaires disease, which is relatively common among immunosuppressed patients, has been described in patients with rheumatoid arthritis or systemic lupus erythematosus [2]. Cyclosporine therapy is considered a predisposing factor [2]. To our knowledge, this is the first report of a case of purulent arthritis due to L. pneumophila in which the microorganism has been isolated from articular fluid.

It was also remarkable that Legionella was isolated with use of medium specific for mycobacteria (i.e., from the Bactec TB 13A medium). Bactec 13A vials inoculated with specimens of blood and articular fluid grew L. pneumophila in 28–30 days, although cultures of these specimens in Bactec 9240 Aerobic/F resin vials remained sterile. In addition, 3 clinical isolates of L. pneumophila were inoculated with or without blood in Bactec
13A and Bactec Aerobic/F resin vials (bacterial inoculum, 10⁶ cfu/mL). Cultures of *L. pneumophila* and blood had positive results in 3 weeks, with growth-index values of <200; subcultures on BCYE plates yielded colonies of *L. pneumophila* serogroup 1. Subcultures on BCYE plates of samples from the vials without blood remained sterile. Although the growth indices for *L. pneumophila* failed to exceed the thresholds for the Bactec 9240 system, as reported elsewhere [3, 4], systematic subcultures on BCYE plates of samples from Aerobic/F vials did yield *L. pneumophila*.

Presence of blood monocytes seems to be a determining factor for growth of *L. pneumophila*, which is a well-known intracellular pathogen. The specimens of purulent articular fluid should have induced the growth of *L. pneumophila*. It is difficult to choose blood culture methods for recovery of *L. pneumophila* from the blood of patients with Legionnaires disease. The Isolator lysis-centrifugation system (Dupont Nemours) has been found to be sensitive [5]. The Bactec 9240 system allows the growth of *L. pneumophila*, provided that specimens from the Aerobic/F resin vials are subcultured on BCYE plates. Bactec TB 13A medium, although nonspecific for *L. pneumophila*, yields growth of *L. pneumophila* from blood and articular fluid samples. If a sample of articular fluid obtained from a patient with arthritis has negative Gram-staining results and is sterile with use of usual culture media, inoculation of articular fluid onto BCYE plates or into 13A blood culture vials will improve the detection of possible *L. pneumophila* infection.

**References**