

Short Research Communication

Unusual Case of Spondylodiscitis due to *Listeria monocytogenes*

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Introduction

The diverse clinical spectrum of *Listeria monocytogenes* infections includes frequent clinical forms, such as meningitis or bacteremia, and uncommon manifestations, such as septic arthritis. Osteoarticular infections due to *L. monocytogenes* remain very rare.

Case report

A 92 year-old man was admitted to the emergency unit at Nantes University hospital for fever and acute low back pain since one week associated with a systemic inflammatory response syndrome and oliguria. His medical history included arterial hypertension, heart failure and arrhythmia, gastric ulcer and hip arthroplasty. He did not recall gastrointestinal symptoms or specific trauma to his skin. On admission, he had a temperature of 38.2°C and normal blood pressure. General examination was normal apart from low back pain and paraspinal muscle spasm. He had no sign of meningoencephalitis. Blood tests showed a total white cell count of 7.47 G.L⁻¹ with normal neutrophil count (82.7%) and lymphopenia (7.6%) and an elevated C-reactive protein level of 190.8 mg.L⁻¹. Three aerobic and anaerobic blood cultures (Bactec FX, Becton, Dickinson, Sparks, MD, USA) were performed on the peripheral site over the course of 24 h. The two first aerobic blood cultures were positive after 22h of incubation and yielded

Gram-positive bacilli. The etiological agent of this bacteremia was identified as *Listeria monocytogenes* only one hour later after the Gram staining thanks to a modified driven hemolysis method using MALDI-TOF mass spectrometry [1]. After 24h of incubation, the bacterial identification was confirmed by using the hemolytic colony on blood agar plate (bioMérieux, Marcy l'Etoile, France). Esculine test was rapidly positive. According to French *Listeria* National center, multiplex PCR showed that this strain belonged to the serotype-associated group 4b complex (serotypes 4b, 4d, and 4e). Despite recommendations in invasive listeriosis, lumbar puncture (to objective paucisymptomatic meningoencephalitis) was not achieved in this case given the patient's age and location of infection [2]. Two days after admission, magnetic resonance imaging of the lumbar spine revealed a multifocal spondylodiscitis with global (L4-L5) and focal (L3-L4 and L5-S1) hyper intensity of the discus in T2 and abnormal hypo-intensity of the adjacent plate of the L3-L4 discus on T1 (Fig. 1). Transthoracic echocardiography did not find any evidence for infective endocarditis. Antibiotic therapy with continuous intravenous amoxicillin (200 mg/kg daily) during six days and gentamicin (5 mg/kg in one daily injection) during four days was started. *In vitro* susceptibility testing was performed using the

disk diffusion method on Mueller-Hinton medium with 5% sheep blood (bioMérieux). This bacterium was susceptible to amoxicillin, levofloxacin, moxifloxacin, aminoglycosides, tetracycline, lincomycin, cotrimoxazole, and rifampin, according to the European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidelines. After six days of intravenous therapy, given a favorable evolution, the treatment was switched to oral cotrimoxazole (30 mg/kg of sulfamethoxazole daily) for three months.

Following blood cultures remained negative after the beginning of antibiotic treatment.

At the three-month clinical assessment, the patient had been recovering slowly and regaining mobility. Investigation performed to identify the source of infection found in the patient's fridge raw milk and raw milk cheese, but cultures of those food items remained negative. No predisposing condition other than his advanced age was evidenced in this patient.

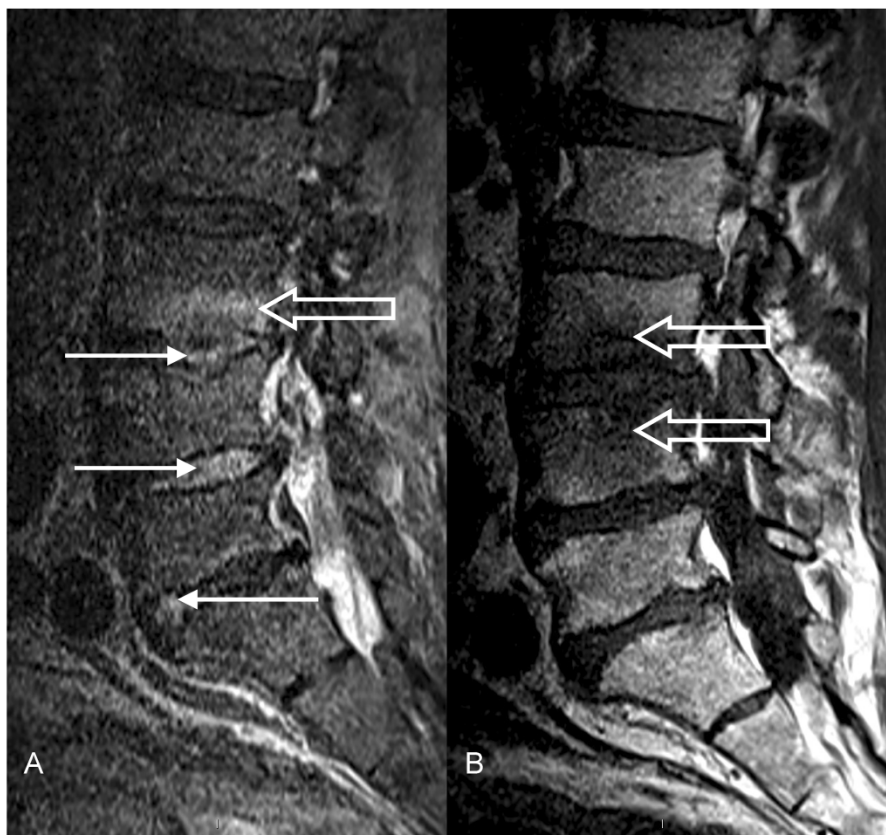


Figure 1: Magnetic resonance imaging of the lumbar spine. A: T2 Fat suppressed - weighted magnetic resonance imaging of the lumbar spine showing global (L4-L5) or focal (L3-L4 and L5-S1) hyper intensity of the discus (little white arrows). Note the hyper intensity corresponding to the edema on the end-plate of the L3 vertebra (empty arrow). B: T1-weighted magnetic resonance showing abnormal hypo-intensity of the adjacent plate of the L3-L4 disc (empty arrows). Gadolinium injection was not performed and imaging procedure has been shortened due to the patient's pain.

Discussion

This case illustrates an unusual spondylodiscitis caused by *L. monocytogenes* in an elderly patient. *L. monocytogenes* is a Gram-positive, facultative intracellular bacillus that can be isolated from a large number of environmental sources such as soil, water, vegetables [3]. Listeriosis constitutes a food borne disease due to poultry, duck, beef or salmon and seafood contamination [3]. *Listeria* infections remain relatively rare, with an estimated 2000 cases per year in the United States and 300 cases per year in France [3]. Even though 13 serotypes have been recognized, most cases of human disease involve strains of three sero-

types, i.e., serotypes 1/2a, 1/2b, and 4b [4]. In France, *L. monocytogenes* serotype-associated group 4b complex is the major complex causing human diseases [4]. In recent years, an increasing number of cases has been reported in Europe, essentially due to emergence of bacteremic listeriosis in immunocompromised individuals, and especially in the elderly [5]. Indeed, listeriosis currently affects debilitated patients such as those with cancer, immunosuppression, such as transplant recipients, and the elderly. Immunocompetent individuals usually present nonspecific flu-like symptoms, lymphadenopathy and gastrointestinal symptoms, whereas immunocompromised individuals may develop meningoencephalitis, bacteremia and

a wide variety of focal infections [5]. Mortality of invasive listeriosis is as high as 15 to 30% [5]. Furthermore, in pregnant women, infection with *L. monocytogenes* may be transmitted to the fetus, leading to bacteremia and fetal loss. The majority of sporadic cases are associated with *Listeria* contamination of unpasteurized dairy products, although other modes of transmission may be involved. Rare epidemic cases of listeriosis have also been traced to exposure to contaminated food [4].

Spondylodiscitis due to *L. monocytogenes* was not already described in patient without immunodeficiency or history of spinal surgical procedure. Del Pozo et al. recently published a literature review on *Listeria* septic arthritis cases in the native joints of immunocompromised patients [6]. The knee was the most frequently affected joint, and two cases involved more than one joint, with no case of spondylodiscitis. Unlike other patients from Del Pozo's study, the patient did not receive any immunosuppressive therapy. As *L. monocytogenes* is a rare causative agent of arthritis [6–8], diagnosis can be difficult, especially when no evident sign of *Listeria* disease exists. Gram positive bacilli in blood culture are often considered as contamination by *Corynebacterium species* from the skin. Herein, bacterial identification was performed the day of blood bottle positivity by MALDI-TOF mass spectrometry. This alternative approach for rapid MALDI-TOF based identification constitutes a new step to reduce the time of identification and therefore to adapt the treatment of clinically relevant and uncommon bacteria. In this case, the antibiotic treatment was adapted 24h after sampling.

Microbiologists and physicians should be aware of *L. monocytogenes* infection, in light of Gram's stain results, especially in elderly and/or immunocompromised patients. The propensity for a commensal bacterium to cause unapparent bloodstream infections with septic metastasis and joint infections is of special concern for this type of patients.

As recommended by guidelines [2], treatment consisted initially in high dose of intravenous amoxicillin and gentamicin. Switch for oral antibiotics was quickly performed due to favorable evolution and difficulty of venous catheterization. Cotrimoxazole, which has good diffusion to bone tissue, has been introduced and allowed to cure the infection.

Conclusion

Antibiotic susceptibility testing, including those with a good bone diffusion remains an important step, especially with the emergence of rifampin-resistant Gram positive bacilli involved in spondylodiscitis such as *L. monocytogenes* or *Propionibacterium acnes* as recently described [9,10].

The clinicians should now consider the risk of invasive listeriosis in the elderly, since the clinical presentation may be atypical in this population.

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Competing Interests

The authors have declared that no competing interest exists.

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