

Short Communication

An Unusual Case of Fatal Pericarditis due to *Listeria monocytogenes*

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SUMMARY: Pericarditis due to *Listeria monocytogenes* is a very uncommon and serious disease. We describe a case of fatal subacute pericarditis that was caused by *L. monocytogenes* in a 61-year-old woman with Hodgkin's disease who was diagnosed in 1975 and considered cured. In addition, we review the literature on this condition.

In Occidental countries, most cases (80–85%) of acute pericarditis are idiopathic. This diagnosis, which is based on non-invasive techniques, is generally presumed to be viral. The 15–20% of non-idiopathic cases includes tuberculosis, neoplasia, and autoimmune pericarditis. Bacterial purulent pericarditis rarely occurs (incidence, < 10%) (1–3), and recent publications have shown a significant decrease in its incidence to around 1% (4). The most frequently isolated bacteria reported in older publications are *Staphylococcus aureus* (22%) (1,5), *Streptococcus pneumoniae* (9–22%) (1,5), *Haemophilus influenzae*, and *Neisseria meningitidis* (3%) (5). The outcome of bacterial purulent pericarditis is life-threatening with 40% mortality (6). We describe here a rare and unexpected discovery of *Listeria monocytogenes* pericarditis, and we review the literature on the subject, showing a rate of mortality up to 62% in case of *L. monocytogenes* pericarditis.

A 61-year-old woman was admitted to the cardiovascular surgery unit of the University Hospital Centre of Lille (France) for dyspnea and leg edema, which was related to pleural effusion. This patient was hospitalized in a Parisian hospital for constrictive pericarditis 12 years previously. A hemodynamic investigation showed anterior predominant constriction and biventricular muscular restriction, which was probably due to the radio-therapy treatment for Hodgkin's disease that was conducted in 1975. At that time, a pericardiectomy was denied. From July 2010 to February 2011, this patient presented with three episodes of respiratory deterioration, consisting of shortness of breath, leg edema, and bilateral pleural effusion. Each time, the pleural liquid was evacuated, and treatment with a diuretic was conducted. The pleural fluid was slightly cloudy, and the cytological analysis evoked an exudate, but no bacteriological analysis was performed. Heart magnetic resonance imaging confirmed chronic pericarditis with upper and lower vena cava enlargement and interventricular and interauricular septa kinetic troubles. There

were no abnormalities of cardiac early or late enhancement. The ventricular ejection fraction was 44%. There was no enlargement or stricture of the cardiac cavities. At the end of May (day 1), she was admitted to our hospital in order to treat an increase of dyspnea and leg edema. Hemodynamic parameters were normal. Clinical signs favored bilateral pleural effusion. Her heart rate was 100 beats/min, and an electrocardiogram showed a sinus rhythm. She was afebrile but presented a leukocyte count of 24.6×10^9 cells/L with 92% polymorphonuclear cells and C-reactive protein (CRP) level of 249 mg/L (normal level, ≤ 6 mg/L). Arterial blood gas parameters were as follows: pH = 7.57, pCO₂ = 44 mmHg, and pO₂ = 50 mmHg. Arterial oxygen saturation was 90% in a rest period and in ambient air. The dyspnea and edema quickly decreased after high doses of intravenous diuretics. Because of the rapid deterioration of the clinical situation, the patient finally agreed to surgical pericardiectomy.

A direct smear examination of the pericardium liquid showed many leucocytes (polymorphonuclear cells) without bacteria and yielded a short Gram-positive rod in pure culture. This non-motile, non-spore forming, β -hemolytic, and facultative aerobic rod was catalase-positive and hydrolyzed esculin in less than 2 h. Matrix-assisted laser desorption and ionization (MALDI) time-of-flight mass spectrometry identification using a thin smear of this strain on a MALDI-plate was performed. Measurements were performed with a Microflex mass spectrometer (Bruker Daltonik S.A., Wissembourg, France) using FlexControl software (version 3.0). The spectrum was imported into the BioTyper software (version 2.0; Bruker Daltonik GmbH, Bremen, Germany). The Biotyper database contains the spectra of approximately 3,847 species and is regularly updated by the Bruker Company. The results of the pattern-matching process were expressed with a score of 2.3, giving *L. monocytogenes* as the first choice (a score > 2.0 was considered as identification at the species level). In vitro antimicrobial susceptibility tests of this strain were obtained by the disk diffusion method on Mueller-Hinton agar plates, as recommended by the Comité de l'Antibiogramme de la Société Française de Microbiologie (CA-SFM) criteria (Comité de l'Antibiogramme de la Société Française de Microbiologie;

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http://www.sfm.asso.fr). The strain was susceptible to penicillin G, ampicillin, piperacillin, imipenem, aminoglycosides, glycopeptides, erythromycin, pristinamycin, doxycycline, tigecycline, trimethoprim-sulfamethoxazole, and levofloxacin and resistant to cefotaxime, ofloxacin, and clindamycin. Blood cultures remained sterile because the bacteriologic phase was resolved when the first blood culture was performed. Intravenous antibiotic therapy with amoxicillin and trimethoprim-sulfamethoxazole was initiated. Anamnesis of the patient did not reveal the consumption of a particular food nor underlying immunocompromised diseases or chronic liver and kidney diseases. In the critical care unit, post-surgical time was complicated by hemodynamic instability requiring prolonged use of vasopressive amines and pacemaker implantation. Respiratory weaning difficulties persisted and were complicated by nosocomial pneumonia due to extended-spectrum β -lactamase (ESBL) *Escherichia coli*, which was treated by imipenem and amikacin (day 10). ESBL *E. coli* bacteremia occurred (day 15), and the patient finally died of fungemia due to *Candida albicans* that was not associated with a catheter at the end of June (day 25). No investigations were performed to rule out lymphoma because the patient died. The family did not grant permission for an autopsy.

In France, 312 cases of listeriosis were declared in 2010. The main infections are bacteremia, meningoen- cephalitis, and neonatal infections with 168, 78, and 43 cases, respectively, in 2010 (7). The lethality of these infections was 20–30%. They preferentially occur in patients presenting with alterations of immunity that are naturally disturbed (newborns and pregnant women) or acquired (AIDS, lymphomas, or corticosteroid therapy). The following rare localizations have been described: endocarditis (8), osteomyelitis (9), and pleuritis (10). *L. monocytogenes* is usually transmitted by a food-borne route with a contaminated aliment. The main virulence factor allowing to avoid from phago-

somes is listeriolysin O. Iron is also an important element for the growth of this organism, explaining the susceptibility of a hemochromatosis patient to this microorganism. The diagnosis of the infection requires the isolation of *L. monocytogenes* from clinical specimens, especially if these sites are normally sterile. This bacterium is not difficult to grow if no effective antimicrobial is prescribed before sampling. In cases of treated meningoencephalitis, specific PCR (11) or serological test positive for listeriolysin O may indicate infection by *L. monocytogenes*, even if the culture of the sample is negative for this bacterium.

A search in Medline from 1970 to the present using the key words *Listeria monocytogenes*, human pericarditis, and pericardial effusion yielded eight English publications (Table 1). As mentioned, all of the patients presented with an alteration of immunity or an iron overload, allowing better growth of *L. monocytogenes*. The outcome of the illness was fatal in 5/8 cases, showing the seriousness of this infection. In our case, there was no neurological failure or cardiac murmur found during clinical examination, but further investigations of these localizations (cerebral magnetic resonance imaging or transesophageal ultrasound scan) were impossible because of the critical situation of the patient. In addition, cerebrospinal fluid was not taken. Anamnesis did not reveal any particular exposure, and the patient had not presented with any digestive symptoms. We suggest that this community pericarditis was due to the bacterial graft that was done in May 2010 when the clinical situation began to get worse along with the increase in the CRP levels. In this patient, the Hodgkin's disease that was diagnosed in 1975 was considered cured. The only factor found in this patient to explain the bacterial graft without general immunocompromised features was the local state of the pericardium. Moreover, recently, Alonzo et al. (12) showed that a subpopulation of *L. monocytogenes* might have an enhanced invasion of cardiac cells. All the other cases de-

Table 1. Cases of *L. monocytogenes* pericarditis in the literature

Reference	Sex	Age	Underlying disease at the time of diagnosis	Type of infection	Clinical presentation	Treatment	Outcome
Khan et al. (13)	M	61	Cirrhosis	Pericarditis Bacteremia	Fever, chills Substernal pain	Penicillin	Alive
Tice et al. (14)	M	52	Cirrhosis	Pericarditis	Fever, Dyspnea	Diuretics Pericardiocentesis Oxacillin, gentamycin	Dead
Holoshitz et al. (15)	F	54	Hemodialysis	Pericarditis Bacteremia	Fever	Cefazolin Erythromycin	Alive
Crellin et al. (16)	F	58	Cervix carcinoma + corticosteroides	Pericarditis	Dyspnea Peripheral edema Weight loss	Diuretics Digoxin	Dead
Ferguson et al. (17)	M	37	HIV	Pericarditis Bacteremia	Fever Chest pain	Ampicillin	Dead
Revathi et al. (18)	F	25	Post-partum	Pericarditis	Fever Respiratory distress	Resuscitation measures	Dead
Manso et al. (19)	M	65	Hemochromatosis	Pericarditis Meningitis Endocarditis	Fever Confusion	Ampicillin, tobramycin	Dead
Dias et al. (20)	M	60	Cirrhosis (Child-Pugh B)	Pericarditis	Asthenia Respiratory distress	Surgical pericardiectomy Ampicillin, gentamycin	Alive
Present case	F	61	None	Pericarditis	Dyspnea Peripheral edema	Pericardiectomy Amoxicillin, trimethoprim-sulfamethoxazole	Dead

scribed in the literature showed a general immunocompromised factor for *L. monocytogenes* pericarditis.

In conclusion, *L. monocytogenes* is a rare cause of pericarditis that needs to be diagnosed and treated early in order to avoid a high rate of mortality, especially because this infection may occur in immunocompromised patients.

Conflict of interest None to declare.

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