

Listeria endocarditis and spondylodiscitis: a case report and review of the literature

Rova Malala Fandresena Randrianarisoa¹, Herveat RAMANANDAFY¹, Alexandre Mania², Assia Benelhadj², Mélissa Clément², Lara Sabbagh², Pierre Vernet², Hélène Monjanel², and Sébastien Trouillier²

¹University of Antananarivo Faculty of Medicine

²Hospital Centre Henri Mondor Aurillac

March 11, 2022

Abstract

A 75-year-old man with an aortic bioprosthesis was admitted with polyarthritits in a non-febrile setting. Blood cultures were positive for *Listeria monocytogenes*. The diagnosis of *Listeria* endocarditis and spondylodiscitis was evoked. These are two unusual forms of listeriosis. The evolution was favourable after antibiotic therapy.

Listeria endocarditis and spondylodiscitis: a case report and review of the literature

Short title: *Listeria* endocarditis and spondylodiscitis

Rova Malala Fandresena Randrianarisoa¹ | Hervéat Ramanandafy¹ | Alexandre Mania² | Assia Djelloul Benelhadj² | Mélissa Clément² | Lara Sabbagh² | Pierre Vernet² | Hélène Monjanel² | Sébastien Trouillier²

¹ Department of Internal Medicine, University Hospital of Joseph Raseta Befelatanana, Antananarivo, Madagascar

² Department of Internal Medicine, Hospital of Henri Mondor, Aurillac, France

Correspondence

Rova Malala Fandresena Randrianarisoa. Department of Internal Medicine. University Hospital of Joseph Raseta Befelatanana. Antananarivo, Madagascar

Email : rrmf7763@gmail.com

ABSTRACT

A 75-year-old man with an aortic bioprosthesis was admitted with polyarthritits in a non-febrile setting. Blood cultures were positive for *Listeria monocytogenes*. The diagnosis of *Listeria* endocarditis and spondylodiscitis was evoked. These are two unusual forms of listeriosis. The evolution was favourable after antibiotic therapy.

KEYWORD

case report, endocarditis, *Listeria monocytogenes*, spondylodiscitis

KEY CLINICAL MESSAGE

Blood cultures should be taken routinely in cases of polyarthritits. In case of *Listeria* bacteremia, endocarditis should be investigated in high-risk patients. Aminopenicillin and aminoglycoside remains the most effective treatment for listeriosis.

INTRODUCTION

Listeria monocytogenes (LM) is a facultative intracellular Gram-positive bacterium that causes listeriosis. Infection usually occurs through ingestion of contaminated food, particularly shellfish, deli meats and dairy products. The disease is relatively rare, with 0.1-10 cases per million people per year depending on the country. Mortality is estimated at 20-30% of infected patients [1].

Listeriosis mainly affects newborns, pregnant women, the elderly, transplant and immunocompromised patients. It classically presents as febrile gastroenteritis leading to bacteremia, which may be responsible for meningoencephalitis or maternal-fetal infection [2]. Endocarditis and spondylodiscitis are rare forms [3,4]. We describe a case of aortic bioprosthesis endocarditis associated with spondylodiscitis due to LM.

OBSERVATION

A 75-year-old man was admitted to the Internal Medicine Department with polyarthrititis of the wrists, elbows, shoulders, hips, knees and ankles for three weeks without fever. He did not have any alteration in his general condition. In the past, he has had two episodes of infective endocarditis, the last one dated two years ago due to *Streptococcus gallolyticus* and complicated by a severe aortic insufficiency requiring replacement with a biological valve prosthesis. He had a pacemaker and was known to have atrial fibrillation and chronic alcoholism.

On admission, the physical examination revealed a right knee effusion, bilateral pain in the first metatarsophalangeal joint, mechanical low back pain and ecchymotic purpura on the dorsal side of feet. Cardiac auscultation revealed no murmurs and the neurological examination was normal.

C-reactive protein was elevated to 78 mg/L. Blood count, serum creatinine, uric acid and calcium levels were normal. The immunological work-up showed normal serum protein electrophoresis, rheumatoid factor at 27.1 IU/mL and negativity of anti-nuclear and anti-CCP antibodies. Serologies for hepatitis B, C, HIV and syphilis carried out as part of the etiological work-up for polyarthrititis were negative. Proteinuria was 0.44 g per 24 hours.

Ultrasound of the joints showed effusion in the right knee, left ankle and subacromial bursa with synovitis of the first metatarsophalangeal joints. The knee joint aspiration revealed sterile inflammatory fluid (3600 leukocytes/mm³) with uric acid crystals.

Two blood cultures 48 hours apart were finally positive for LM serogroup IIa. The urine was sterile.

Transoesophageal echocardiography (TEE) showed 5 mm vegetation on the aortic bioprosthesis and abscess at the aorto-mitral trigone. The fluorine-18 fluorodeoxyglucose positron emission tomography (18F-FDG PET/CT) showed hypermetabolism of the aortic valve and hyperfixation of the L5 vertebral body suggesting spondylodiscitis (Figure 1). Magnetic resonance imaging of the spine confirmed L4-L5 spondylodiscitis without spinal cord compression (Figure 2).

On the 7th day of hospitalisation, a right brachiofacial hemiparesis and dysarthria occurred suddenly. The brain computed tomography showed ischaemic hypodensity in the left superficial sylvian territory with subarachnoid haemorrhage in the frontotemporal region (Figure 3). Cerebrospinal fluid (CSF) examination revealed a clear fluid containing less than one leukocyte per mm³ with normal proteinorachia (0.39 g/L), normal glycorachia (0.54 g/L), negative culture and viral panel.

The diagnosis of LM endocarditis on aortic bioprosthesis associated with L4-L5 spondylodiscitis was made, complicated by an abscess of the aorto-mitral trigone and a cerebral septic embolus. The patient was a regular consumer of unpasteurised milk. The diagnosis of gouty arthropathy was associated.

As soon as the blood cultures were positive, intravenous antibiotic therapy with amoxicillin 150 mg/kg/24hrs for 6 weeks and gentamycin 4 mg/kg/24hrs for 2 weeks was started. Treatment was continued with amoxicillin 75 mg/kg/24hrs orally for a further 6 weeks with the use of a corset for the management of spondylodiscitis. Colchicine was added to the treatment.

The evolution is marked by the regression of the inflammatory syndrome, the disappearance of pain and joint effusions. The TEE performed at the 3rd week of treatment showed complete disappearance of vegetation, absence of valve leakage and stabilisation of the abscess. At the 6th week, transthoracic echocardiography showed that the abscess had disappeared. The neurological evolution consisted of motor recovery and the disappearance of the haemorrhage on the brain scan. At 3 months, X-rays of the lumbosacral spine showed a reconstitution process at the L4-L5 level in favour of a favourable evolution of the spondylodiscitis.

DISCUSSION

The diagnosis of listeriosis is based on the isolation and identification of LM from biological samples, including blood cultures or CSF. Valvular and osteoarticular infections are unusual locations and usually occur in special settings.

LM endocarditis occurs in 8% of patients with listeriosis [3]. It can affect native or prosthetic valves and intracardiac devices. In 2017, 100 cases of LM endocarditis were identified in the MEDLINE database [5]. The clinical manifestations are protean, fever is often absent and vascular phenomena are very frequent. Aortic involvement is most common in native valve endocarditis and mitral involvement in prosthetic valve endocarditis [5]. Although listeriosis usually affects women, evidence shows that men are frequently affected by LM endocarditis [6]. The main predisposing factors are immunodeficiency, valve disease, prosthetic devices, hypertrophic cardiomyopathy and a history of endocarditis. Our patient had an aortic bioprosthesis, a pacemaker and two episodes of infective endocarditis. The context of chronic alcoholism was an important factor. The absence of hypermetabolism on 18F-FDG PET/CT allowed us to rule out a pacemaker infection.

LM is a rare causative agent of osteoarticular infection. The infection usually affects a single joint with a predominance of the knee and hip. It occurs in patients over 50 years of age with underlying diseases and mainly concerns orthopaedic implants [7]. Rheumatoid arthritis, osteoarthritis, liver cirrhosis and diabetes mellitus are the most reported risk factors. Other authors have discussed the correlation of LM osteoarticular infection and surgical interventions [8]. Spinal involvement is less common, resulting in spondylodiscitis. To our knowledge, 7 cases of *Listeria* spondylodiscitis have been described in the literature (Table 1) [4,9,10,11,12,13,14]. In some cases, the diagnosis was confirmed by spinal biopsy. The association of LM spondylodiscitis and endocarditis is reported in one case.

In our case, the neurological deficit was explained by the cerebral septic embolus. During infective endocarditis, whatever the cause, emboli are reported in 15-30% of cases, particularly affecting the central nervous system [15]. In LM bacteremia, any neurological involvement requires CSF analysis which was normal in our patient, excluding meningoencephalitis. The association of LM endocarditis and meningitis is exceptional in the literature [16].

The first-line treatment of listeriosis is based on the combination of aminopenicillin and aminoglycoside which has a rapid synergistic bactericidal activity [16,17]. The combination of ampicillin and gentamycin is the most commonly used in LM endocarditis. The authors suggest a treatment of 6 to 8 weeks for prosthetic valve endocarditis and at least 4 weeks for native valve endocarditis [16,17]. Surgery is often reserved for complicated cases [6]. In contrast, the management of LM osteoarticular infections is still debated due to the paucity of literature. Our patient received a total of 12 weeks of treatment. In a 2012 study, no treatment failure was observed in patients with the osteoarticular form without prosthetic devices treated for a median of 15 weeks [7]. Other authors have shown the effectiveness of rifampicin and cotrimoxazole [4,11]. Long-term treatment with aminopenicillin remains a consensus.

Delayed diagnosis and treatment contribute to the fatal outcome of patients. Valvular disease is one of the severe forms of listeriosis. The mortality rate in LM endocarditis is significantly higher than in other causes of bacterial endocarditis [18]. Prosthetic valve involvement has higher morbidity and mortality rates compared to native valve endocarditis, especially if associated with cardiac and cerebral complications [19].

As initial symptomatology, our patient presented with a non-febrile peripheral joint picture that is more consistent with the immunological manifestation of endocarditis. This picture points in the first instance to

rheumatoid disease, which can delay the diagnosis in the absence of fever. Our case reflects the importance of systematic blood cultures in polyarthritis. The etiological research includes an inflammatory, immunological, infectious (serologies and blood cultures), radiological and joint aspiration work-up.

CONCLUSION

This is a case of LM endocarditis on bioprosthesis associated with spondylodiscitis. The initial presentation is polyarthritis without fever. Blood cultures should be performed routinely in such cases in conjunction with an autoimmune work-up. In case of LM bacteremia, patients at risk should be tested for endocarditis. The combination of aminopenicillin and aminoglycoside is still the most effective treatment for the usual and unusual forms of listeriosis.

ABBREVIATIONS

18F-FDG PET/CT: fluorine-18 fluorodeoxyglucose positron emission tomography

CSF: cerebrospinal fluid

LM: *Listeria monocytogens*

TEE: transesophageal echocardiography

ACKNOWLEDGEMENTS

Thanks to all the staff of the Internal Medicine Department, Hospital of Henri Mondor, Aurillac.

CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTIONS

Rova M.F. Randrianarisoa, Hervéat Ramanandafy, Assia D. Benelhadj, Pierre Vernet, Mélissa Clément, Lara Sabbagh: patient follow-up, collection of clinical information and writing of the report. Alexandre Mania, Hélène Monjanel, Sébastien Trouillier: critical review and validation of the report. All authors read and approved the final manuscript.

CONSENT TO PUBLICATION

The patient has been informed about the aims of the publication, the use of the information for research purposes. The patient gave written consent for the data to be published. The authors have included only the information necessary for scientific understanding.

DATA AVAILABILITY STATEMENT

All data generated are included in the article.

FUNDING

This work was not supported by any specific grant.

REFERENCES

1. World Health Organization. Listeriosis, fact-sheets. WHO 2018. Available on: <https://www.who.int/news-room/fact-sheets/detail/listeriosis>. Accessed 24 October 2021.
2. CDC. National Center for Emerging and Zoonotic Infectious Diseases. National Enteric Disease Surveillance: The Listeria Initiative. 2016. pp. 1-2.
3. Spyrou N, Anderson M, Foale R. Listeria endocarditis: current management and patient outcome-world literature review. *Heart*. 1997;77(4):380-383. <https://doi:10.1136/hrt.77.4.380>
4. Aubin GG, Boutoille D, Bourcier R, et al. Unusual case of spondylodiscitis due to *Listeria monocytogenes*. *J Bone Jt Infect*. 2016;1(1):7-9. <https://doi:10.7150/jbji.13863>

5. Kumaraswamy M, Do C, Sakoulas G, et al. *Listeria monocytogenes* Endocarditis: case report, review of the literature, and laboratory evaluation of potential novel antibiotic synergies. *Int J Antimicrob Agents*. 2018;51(3):468-478. <https://doi.org/10.1016/j.ijantimicag.2017.12.032>
6. Guerrero MLF, Rivas P, Rábago R, Núñez A, de Górgolas M, Martinell J. Prosthetic valve endocarditis due to *Listeria monocytogenes*. Report of two cases and reviews. *Int J Infect Dis*. 2004;8(2):97-102. <https://doi.org/10.1016/j.ijid.2003.06.002>
7. Charlier C, Leclercq A, Cazenave B, et al. *Listeria monocytogenes*-associated joint and bone infections: a study of 43 consecutive cases. *Clin Infect Dis*. 2012;54(2):240-248. <https://doi.org/10.1093/cid/cir803>
8. Wilson APR, Prouse PJ, Gumpel JM. *Listeria monocytogenes* septic arthritis following intra-articular yttrium-90 therapy. *Ann Rheum Dis*. 1984;43(3):518-519. <https://doi.org/10.1136/ard.43.3.518>
9. Chirgwin K, Gleich S. *Listeria monocytogenes* Osteomyelitis. *Arch Intern Med*. 1989;149(4):931-932.
10. Khan KM, Pao W, Kendler J. Epidural abscess and vertebral osteomyelitis caused by *Listeria monocytogenes*: case report and literature review. *Scand J Infect Dis*. 2001;33(9):714-716. <https://doi.org/10.1080/00365540110027033>
11. Hasan T, Chik W, Chen S, Kok J. Successful treatment of *Listeria monocytogenes* prosthetic valve endocarditis using rifampicin and benzylpenicillin in combination with valve replacement. *JMM Case Rep*. 2017;4(2):e005085. <https://doi.org/10.1099/jmmcr.0.005085>
12. Duarte F, Pinto SM, Trigo AC, et al. A rare presentation of *Listeria monocytogenes* infection: perianal abscess associated with lumbar spine osteitis. *IDCases*. 2019;15:e00488. <https://doi.org/10.1016/j.idcr.2019.e00488>
13. Al Ohaly R, Ranganath N, Saffie MG, Shroff A. *Listeria* spondylodiscitis: an uncommon etiology of a common condition; a case report. *BMC Infectious Diseases*. 2020;20:559. <https://doi.org/10.1186/s12879-020-05286-y>
14. Mercurio M, Sanzo V, Rava A, Galasso O, Gasparini G. Spondylodiscitis after endovascular aortic repair due to noninvasive listeriosis: a case report. *JBJS Case Connect*. 2021;11(3):e21.00212. <https://doi.org/10.2106/JBJS.CC.21.00212>
15. Habib G, Lancellotti P, Antunes MJ, et al. 2015 ESC guidelines for the management of infective endocarditis. The task force for the management of infective endocarditis of the European Society of Cardiology. *Eur Heart J*. 2015;36(44):3075-3128. <https://doi.org/10.1093/eurheartj/ehv319>
16. Antolín J, Gutierrez A, Segoviano R, López R, Ciguenza R. Endocarditis due to *Listeria*: description of two cases and review of the literature. *Eur J Intern Med*. 2008;19(4):295-296. <https://doi.org/10.1016/j.ejim.2007.06.020>
17. Miguel-Yanes JM, González-Ramallo VJ, Pastor L. Outcome of *Listeria monocytogenes* prosthetic valve endocarditis: as bad as it looks? *Scand J Infect Dis*. 2004;36(10):709-711. <https://doi.org/10.1080/00365540410021063>
18. Bayer AS, Chow AW, Guze LB. *Listeria monocytogenes* endocarditis: report of a case and review of the literature. *Am J Med Sci*. 1977;273(3):319-323.
19. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: diagnosis, antimicrobial therapy, and management of complications: a scientific statement for healthcare professionals from the American Heart Association. *Circulation*. 2015;132(15):1435-1486. <https://doi.org/10.1161/CIR.0000000000000296>

FIGURE AND TABLE LEGENDS

FIGURE 1 18F-FDG positron emission tomography.

(A) Focal hypermetabolism of the aortic valve prosthesis [VMAX = 5.71]. (B) Hyperfixation of the L5 vertebral body [VMAX = 9.72] extended to the anterior part of the overlying disc and the anterior edge of the L4 lower plate, osteolytic background with infiltration of adjacent soft tissues

FIGURE 2 Magnetic resonance imaging of the spine.

L4-L5 spondylodiscitis without spinal cord compression. T1 sagittal section (A), STIR (B) and T1 after gadolinium injection (C)

FIGURE 3 Non-contrast brain computed tomography.

(A) Ischaemic hypodensity in the left parieto-insular region, superficial sylvian territory. (B) Subarachnoid haemorrhage in the frontotemporal region

TABLE 1 Cases of *Listeria monocytogenes* spondylodiscitis in the literature

TABLE 1 Cases of *Listeria monocytogenes* spondylodiscitis in the literature

	Chirgwin K et al.^a	Khan KM et al.^b	Aubin GG et al.^c	Hasan T et al.^d	Duarte F et al.^e	Al Ohaly R et al.^f	Mercurio M et al.^g	Our case
Gender, age	Man - 57	Man - 69	Man - 92	Man - 63	Man - 65	Man - 79	Man - 83	Man -73
Antecedents	Diabetes Asthma Corticosteroid therapy	Spinal laminectomy	Arterial hy- pertension Heart failure Arrhythmia Gastric ulcer Hip prosthesis	Diabetes Arterial hy- pertension Atrial flutter Aortic bio- prosthesis Coronary surgery	Diabetes Arterial hy- pertension Alcoholic and smoker	Arterial hy- pertension Aneurysm surgery Gout Alcoholic and smoker	Aortic surgery	2 endo- carditis Pacema Aortic b prosthe Atrial fibrillat Alcohol
Spinal injury	Compression T4-T5	Synovial cyst L3-L4 Epidural abscess L5-S1	L4-L5, L3-L4 focus L5-S1	L4-L5	L5 Sacrum	L3-L4	L4	L4-L5
Associated form	-	-	-	Endocarditis on aortic prosthesis Cerebral infarction	Perianal abscess	-	Retroperitoneal abscess	Endocardi on aortic prosthe Cerebra emboli
Antibiotic therapy	Ampicilline + to- bramycine 6 weeks	Ampicilline + gentamycine	Amoxicilline 6 days + gen- tamycine 4 days Relay: cotrimoxa- zole 3 months	Benzylpenicillin 6 weeks + rifampicine 4 weeks Relay: amoxicilline 18 weeks	Ampicilline 2 weeks Relay: amoxicilline 3 months	Ampicilline 6 weeks	Ampicilline + gentamycine	Amoxic 6 weeks gen- tamycin weeks Relay: amoxici 6 weeks
Surgery	Spinal decompression	Drainage of abscess Removal of cyst Laminec- tomy L5-S1	-	Valve replacement	Drainage of abscess	-	Drainage of abscess	-

