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Case Report and Review of the Literature

Listeria Monocytogenes Prosthetic Joint Infection, Case Report and Review of the Literature

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ARTICLE INFO

Article history:

Received: 13 November, 2019

Accepted: 5 December, 2019

Published: 16 December, 2019

Keywords:

Listeria monocytogenes

acute Prosthetic joint infection

sporadic infection

case report

review

hip arthroplasty

ABSTRACT

Background: *Listeria monocytogenes* causes bacteraemia in elderly and immunocompromised patients and rarely also in immunocompetent patients. In sporadic setting it can be challenging to diagnose. We present the first case of *Listeria monocytogenes* infection presenting as an acute infection of a prosthetic joint in an immunocompetent patient.

Case summary: An immunocompetent patient presented with acute onset of right hip pain lasting for 3 days. The day before admission the patient had fever of 38.5°C and chills. The patient admitted having eaten raw meat some days prior to onset of symptoms. He had a prosthetic right hip implanted due to secondary arthritis 9 months prior to onset of hip symptoms. He was treated successfully with removal of mobile parts and appropriate antibiotic treatment.

Conclusion: Sporadic focal infections with *Listeria monocytogenes* occur rarely and are often not diagnosed until the arrival of final culture results. Dietary history is also important when clinical history of patients is taken. Food consumption advice is important in immunocompromised, but also immunocompetent patients can get infected when eating raw food. Accurate diagnosis for orthopaedic samples is crucial. In order to successfully treat patients with a prosthetic joint infection, a tight collaboration between several specialists is needed.

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Introduction

Prosthetic joint infections are often caused by organisms such as staphylococci, streptococci or Gram-negative bacilli. *Listeria* (L.) *monocytogenes* has recently become a topic of interest. It is a food borne pathogen and it predominantly affects people receiving immunosuppressive therapy [1, 2]. In Europe, the overall incidence of listeriosis is estimated to be 4.7 cases per million persons [3]. Immunosuppressive therapy promotes the manifestation of these infections [4, 5]. Fewer than 80 cases of L. *monocytogenes* bone and joint infections are reported in the literature. In the largest series of 43 patients from France, the majority had orthopaedic implant devices (34 patients, 79%) and all patients had risk factors for listeriosis [6]. We present a case of a patient who presented in the office with the symptoms of acute infection (<7 days) and interestingly was without a history of immunosuppressive illness or therapy.

Patient Information

A 50-year-old Caucasian man presented with acute onset of right hip pain for 3 days. The day before admission the patient had fever of 38.5°C and chills. The patient admitted having eaten raw meat some days prior to onset of symptoms. He suffered from a dysplastic hip, had a reconstructive procedure done in childhood and had a prosthetic right hip implanted due to secondary arthritis 9 months prior to onset of hip symptoms. He was satisfied with right hip function and had no pain until the onset of hip symptoms. He had no history of immunosuppressive illness or therapy.

I Physical Exam

On admission he presented with a right hip that was painful on palpation and allowed only for limited motion. He had signs of septic arthritis.

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Table 1: Timeline

14.4.2015	15.4.2015	28.4.2015	1.6.2015	13.7.2015	11.1.2016	12.12.2016
Admittance to Hospital	Operated	Discharge from Hospital	1 st check-up	2 nd check-up. stop of antibiotic treatment	3 rd check-up	Final check-up

II Diagnostic Assessment

A laboratory test of a blood sample showed C-reactive protein (CRP) of 167.8 mg/l. We decided for a surgical revision. A hip aspiration was performed, pus was found, with the laboratory result of 68,000 cells/ μ l, 84% of them neutrophil granulocytes.

III Interventions

The patient was prepared for surgery. The mobile parts were replaced, irrigation and debridement were performed.

Follow-up and Outcomes

From aspiration, 4 tissue samples and sonication, *Listeria monocytogenes* was isolated. On the first post-operative day, he received intravenous amoxicillin/clavulanic acid and garamycin treatment, then 2 days ampicillin and garamycin, and then up to 8th postoperative day only ampicillin 2 g every 6 hours, then up to 13th day ampicillin and rifampicin. Postoperative course was favourable. CRP fell from 167 to 36 mg/l at the end of hospitalization. Pain was described as 4/10 according to VAS scale by the patient, who was fully mobile. He was prescribed with levofloxacin 500 mg and rifampicin 450 mg every 12 hours day. First check-up was performed a month after the discharge. CRP fell to 8.5 mg/l. Intensive rehabilitation was prescribed. Antibiotic treatment was not discontinued. Second check-up was performed 3 months after the procedure. CRP fell to 5.6 mg/l. Antibiotic treatment was discontinued. Third check-up was performed 4 months after the conclusion of antibiotic treatment with the patient showing no signs of a relapse. Fourth check-up was done 20 months after the procedure with the patient presenting no problems with the right hip and with a wish to have the arthroplasty done on the contralateral hip. He now has both arthritic hips replaced and is satisfied with the result of our treatment.

Discussion

Only limited descriptions of prosthetic joint infection with *L. monocytogenes* exist. Besides the 34 patients from the largest series article only a few other case reports can be found [2, 6, 7-23]. Our case is therefore the 54th. With this case, to our knowledge, we reported the ninth case of *L. monocytogenes* infection involving a prosthetic joint in a non-immunocompromised patient and at the same time the first case of that kind with an acute presentation. It was possible to treat our case successfully solely with removal of mobile parts. In all other cases, where the infection is of chronic nature, a one stage or a two-stage revision is necessary. In all cases, proper antibiotic or a combination of them in accordance with antibiogram testing must be provided to the patient. Consumption of raw meat, especially beef in the form of steak tartare, is not uncommon in Slovenian society, but large-scale outbreaks of listeriosis have not been reported yet. Reports of outbreaks exist in other countries exist also in relation with consumption of hard and soft cheeses.

We recommend extending the advice that is provided to pregnant women regarding the dangers of raw and unpasteurized foods and soft cheese to all elderly and immunocompromised patients. Clinicians should be aware of unusual organisms that may cause focal infections. Obtaining a microbiological specimen is crucial for diagnosis as treatment is often prolonged and inappropriate therapy may lead to progression of the infection. As *L. monocytogenes* is an uncommon cause of joint infection, there is a potential for laboratory misidentification. The organism can be incorrectly identified as *Corynebacterium* species (also a Gram positive rod) and definitive identification is sometimes needed using MALDI-TOF mass spectrometry, highlighting the importance of accurate diagnosis for orthopaedic samples. It has been demonstrated that the phenotypic approach may lead to misidentification of *L. monocytogenes* and molecular methods of pathogen detection are useful. Genotypic methods based on 16S rRNA gene sequencing have become useful tools for recovering the infectious agent in culture-negative infection case [19].

Conclusion

L. monocytogenes has previously been infrequently implicated as a pathogen in prosthetic joint infection. However, there are now reports of increasing numbers of cases particularly amongst immunosuppressed individuals. Dietary history is important when clinical history of these patients is taken. Food consumption advice is crucial in immunocompromised patients, but also immunocompetent patients can get infected when eating contaminated food. With an expanding at risk population, the importance of *L. monocytogenes* as a cause of prosthetic joint infection is set to rise in the future. Optimal management has not been well studied. It is likely that the best option combines antimicrobial therapy and prosthetic removal, perhaps only mobile parts if feasible. To successfully treat patients with recurrent prosthetic joint infections, tight collaboration between microbiologists, molecular microbiologists and orthopaedic surgeons is needed.

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