



## Case report

# Persistent bacteremia secondary to delayed identification of *Lactobacillus* in the setting of mitral valve endocarditis



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## A B S T R A C T

**Introduction:** *Lactobacillus* species causing infective endocarditis is rare. Most reported cases arise from the oral ingestion of *Lactobacillus* via dairy or nutritional supplements in patients with congenital valve disease or replacement. We present a case of native valve bacterial endocarditis caused by *Lactobacillus* arising from dental abscesses. Additionally, there was an error in identification of the *Lactobacillus* as *Corynebacterium*, which led to inadequate treatment.

**Presentation of case:** A 51-year-old male presented to an outside clinic with several weeks of subjective fevers and malaise. The provider obtained two sets of blood cultures. Both grew Gram-positive bacilli identified as *Corynebacterium*. Once hospitalized he persistently had positive blood cultures despite treatment with vancomycin and gentamicin. The specimens were sent to a reference lab. The cultures were confirmed to be *Lactobacillus zeae* resistant to vancomycin and gentamicin. Once he was started on appropriate therapy his blood cultures showed no further growth of bacteria. The infected teeth were removed as it was felt they were the source of the bacteremia.

**Discussion:** This case presents two interesting topics in one encounter. First, *Lactobacillus* is not a common culprit in endocarditis. Secondly, the incorrect identification of the gram-positive bacilli bacteria led to prolonged bacteremia in our patient.

**Conclusion:** The patient was evaluated by cardiothoracic surgery at our facility and it was determined that he would likely need a mitral valve replacement versus repair. The decision was made to treat the patient with six weeks Penicillin-VK prior to the operation. He is currently completing his antibiotic therapy.

## Introduction

The diagnosis of bacterial endocarditis in itself is not uncommon in medicine. Most cases are caused by the different species of gram-positive cocci bacteria [7]. A less common cause is infection of the cardiac valves with species classified as gram-positive bacilli [2]. Another group of bacteria associated with cardiac valve infections are the gram-negative bacteria, particularly the HACEK group. Infections with the HACEK group are also less common than endocardial infections with gram-positive cocci bacteria. In addition, most patients that are diagnosed with gram-positive bacilli endocarditis prove to have a pre-existing congenital valve abnormality or valve replacement [7]. These gram-positive bacilli, being a less common cause for infection, may also prove to be more difficult to identify with routine laboratory methods [2]. We wish to present a case of gram-positive bacterial endocarditis arising in the native mitral valve of a patient with oral abscesses. In addition to this, the patient had persistent bacteremia due to initial incorrect identification of the offending bacteria as a *Corynebacterium*

species rather than the actual *Lactobacillus* species.

## Case presentation

Our patient is a 51-year-old gentleman we initially encountered after he presented to the emergency department after receiving a call from his primary care provider (PCP) telling him to go the emergency department because he had positive blood cultures. On further questioning we learned the patient went to his PCP's office with the symptoms of fatigue, malaise, 20 pound weight loss, arthralgias, headaches and decreased exercise capacity. Among other things, the PCP obtained two blood cultures drawn from separate sites and some unknown time apart. When these cultures returned positive for growth, the PCP phoned the patient and asked him to go the emergency department.

When initially evaluated and examined the patient was in no acute distress but did complain of lethargy and fatigue. The patient took no medication or herbal supplements and had no known allergies He had

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never used tobacco and socially drank alcohol but had abstained for the prior 3 months due to feeling ill. He had an unremarkable family history. Physical exam revealed an afebrile healthy appearing middle-aged male with slight tachycardia at 105 beats/min and grade III holosystolic blowing murmur heard best at the apex that radiated medially across the left anterior chest. No cardioembolic or immunologic phenomenon was seen on eye, skin or nail exams. The patient also had a broken tooth that did not appear acutely inflamed or infected. Otherwise, the exam was relatively normal.

Vancomycin monotherapy was begun for the bacteremia, which at this time had been identified as the genus *Corynebacterium*. Species identification was never obtained. Antibiotic sensitivity testing was not performed on the isolate, but given the genus of the offending organism, it was felt vancomycin monotherapy was an adequate antibiotic choice. The patient was admitted to the medicine service to undergo antibiotic therapy and further diagnostic testing.

A transthoracic echocardiogram followed by a transesophageal echocardiogram was obtained which showed vegetations on both mitral leaflets and moderate to severe mitral regurgitation (MR). The patient was seen and evaluated by our cardiothoracic specialists. Their thought at the time was that the patient would likely need valve replacement, but wanted to have clearance of the bacteremia beforehand. This was not deemed emergent, as the only symptom the patient had was dyspnea with vigorous exertion. He did not have heart failure signs or symptoms.

A Panorex showed erosive changes and periapical abscess at tooth #18 with significant caries in #3 and #19. At this time the oral and maxillofacial surgery consultants saw the patient. They recommended outpatient extraction of the three infected teeth seen on dental panoramic radiograph. Blood cultures were obtained daily to show clearance of the offending bacteria. All had returned positive for *Corynebacterium*.

By day 5 of vancomycin therapy the patient was feeling no better and showed no objective improvement. The infectious disease specialists recommended starting gentamicin in addition to the vancomycin therapy and obtain two more blood cultures. These cultures were identified 33 h later as *Corynebacterium* as well. At this time a non-contrasted computed tomography (CT) scan was ordered of the thorax, abdomen, and pelvis to attempt to identify a potential indolent source of the persistent bacteremia. Also on day 5 all the prior blood cultures were sent to a reference lab for more advanced identification methods.

On hospital day 9 we received confirmation from the reference lab that all the prior blood cultures were actually *Lactobacillus zeae* rather than the previously identified *Corynebacterium*. The antibiotic therapy was then changed to piperacillin/tazobactam on day 9. Two blood cultures obtained 24 h after the initiation of piperacillin/tazobactam showed no growth of any bacteria.

On day 10, the oral surgeons reevaluated the patient and decided to remove the offending teeth and abscess while the patient was hospitalized after CT of the chest, abdomen and pelvis returned unremarkable. This was performed without complication and the patient was subsequently discharged from the hospital on Penicillin VK for a total of 6 weeks of therapy. He was discharged with follow-up appointments with both oral and cardiothoracic surgery.

## Discussion

Our patient, having previously had bacterial endocarditis, was at an increased risk of having the condition again when compared to the average population [7]. Given that fact, infection of the cardiac valves with *Lactobacillus* species is still rare. In one study looking at the different anaerobic bacteria causing endocarditis, on 4 out of 204 distinct cases were *Lactobacillus* species [5].

Another aspect of this case is the incorrect antibiotic choice. Generally, we assume that gram-positive bacteria will be susceptible to vancomycin therapy. In the case of *Lactobacillus* genus, the susceptibility is based on specific cell wall make up that differs on a species basis. *Lactobacillus casei* and *Lactobacillus rhamnosus* were found in one study to have minimum inhibitory concentrations (MICs) of over 256 ug/mL to vancomycin, which practically showed resistance to the antibiotic [4]. These MICs are in comparison to that of *L. acidophilus*, which is very sensitive to vancomycin with a MIC of less than or equal to 2 ug/mL. The resistance of the species in question is derived from a change in the peptidoglycan layer of the cell wall. In susceptible species, the layer ends with a D-Alanine -D-Alanine complex, which is the target of vancomycin therapy. In the resistant species have a peptidoglycan layer ending in D-Alanine D-Lactate, rendering vancomycin therapy ineffective [1].

Finally, this case brings to light the issue of incorrect identification of bacteria in hospital microbiology laboratories. *Lactobacillus* is a difficult bacterium to identify. Studies have shown up to half of isolates being incorrectly identified using traditional laboratory techniques [6]. The process at our facility's laboratory for Gram-positive bacilli bacteria is to not run antibiotic susceptibility, as they are mostly contaminants. The bacteria undergo catalase and oxidase testing as well as motility testing. Should the identification remain in question, the samples are sent to a reference laboratory [1] where they undergo matrix-assisted laser desorption/ionization with time-of-flight mass spectrometer (MALDI-TOF) for more precise identification. Another potential area of study that appears helpful in identification of *Lactobacillus* species is sequencing of the 16 s subunit of the ribosomal RNA of the bacteria in question [6].

## Conclusion

In conclusion, this case presents several issues that are both relevant to medical practice. It also raises questions that will require further investigation. For physicians, it shows that Gram-positive bacilli, in the right clinical situations, should warrant more thought than simply passing them off as contaminant. It should also highlight the fact that if you persistently have positive blood cultures while on antibiotic therapy that the bacterium you are treating should be susceptible, then incorrect identification may be to blame. In this situation, we should be vigilant in speaking directly with laboratory personnel to ascertain out the correct diagnosis. This is adamant when preventing morbidity in future patients with similar situations.

## Conflict of interest

None of the authors list any conflicts of interest. There were no outside financial supporters of this manuscript.

The above authors list no conflicts of interests and have nothing to disclose.

## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.idcr.2017.10.002>.

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