**ABSTRACT**

Introduction: Lactobacilli are part of the normal gastrointestinal and genitourinary microbiota. They are generally considered nonpathogenic and rarely cause serious infections. Case Report: We present the case of a 46-year-old woman with poorly controlled diabetes mellitus, who was found to have *Lactobacillus acidophilus* bacteremia and urinary tract infection (UTI). She was treated with penicillin with resolution of her bacteremia and UTI. Conclusion: This case highlights the potential pathogenicity of these organisms in immunocompromised patients. Appropriate treatment is required to avoid potential life-threatening complications.

Keywords: Bacteremia, Diabetes, *Lactobacillus*, Probiotics

**CASE REPORT**

A 46-year-old morbidly obese woman, with poorly controlled type 2 diabetes mellitus (DM), prior history of transient ischemic attacks (TIAs) related to drug use, current smoker, with a history of polysubstance abuse (including alcohol and cocaine), who presented to emergency department with complaints of abdominal pain and vomiting of four days duration. Review of systems was positive for urinary frequency, dysuria, and heartburn. The patient was not complaint with her medications, including her insulin.

On physical examination she was afebrile, with blood pressure of 153/64 mmHg, heart rate of 82 beats/min, and respiratory rate of 22 breaths/min. She appeared dehydrated and lethargic. Her abdominal examination was notable for epigastric tenderness without rigidity or guarding. Laboratory workup demonstrated leukocytosis of 14,200 with 91% neutrophils, blood glucose of 782 mg/dL, HbA1c of 12.2, high anion-gap metabolic acidosis with positive ketones in the urine, and negative human immunodeficiency virus (HIV) serology. The patient was treated for diabetic ketoacidosis (DKA) with intravenous insulin infusion, intravenous fluid, and close monitoring of electrolytes and vitals. The patient was not complaint with her medications, including her insulin.

The Gram stain of positive blood cultures showed gram positive bacilli (Figure 1), and she was started empirically on intravenous ceftazidime...
were negative for malignancy. Fluconazole was added to her medication regimen for treatment of candidal esophagitis. Of note, the patient’s HIV screening was negative. Over the course of hospitalization, the patient remained afebrile, urinary symptoms improved, and leukocytosis resolved. The repeat blood cultures after starting antibiotics showed no growth. The patient was discharged to a short-term rehab facility on oral amoxicillin to complete a total of 10 days of antibiotics.

**DISCUSSION**

Members of the *Lactobacillus* bacteria are normal commensals of the oropharynx, gastrointestinal tract, and the female genital tract. Lactobacilli are often considered commensal or beneficial participants in human microbial ecology, and their use as probiotics is aimed at restoring normal bacterial microflora and to decrease colonization with pathogenic bacteria. Systemic infections with lactobacilli are generally uncommon. However, *Lactobacillus* is becoming a potential emerging pathogen, with multiple reports showing life threatening disease including infective endocarditis [7], liver abscess [8], pulmonary infections [9], pyelonephritis [10], meningitis [11], and necrotizing fasciitis [12].

The reported risk factors are immunocompromised states such as DM, malignancy, organ transplantation, and short gut syndrome [13]. *Lactobacillus* bacteremia might be underdiagnosed because lactobacilli are cumbersome to culture and to identify, and in many cases they have been regarded as contaminants [1] given it ubiquitous presence in normal human flora.

Our patient had a very poorly controlled DM (HbA1c of 12.2) due to noncompliance with her insulin, predisposing her to DKA and to opportunistic infection, including candidal esophagitis and *Lactobacillus* bacteremia. The potential pathogenicity of lactobacilli is likely due to a translocation mechanism by which some strains bind to mucosa with the ability to adhere to extracellular matrix proteins, producing glycosidase and proteases enzymes, which help breakdown the glycoproteins of affected tissues [14–16].

Some strains have shown resistance to intracellular killing by macrophages, and to the bactericidal effects of nitric oxide as well [17]. There are reports of lactobacillus infection after probiotic administration, which is concerning given their wide use [13, 18]. In case reports of bacteremia, several *Lactobacillus* species have been identified, but the two most common species were *Lactobacillus casei* and *Lactobacillus rhamnosus*—both of which are common in probiotic use [19]. A recent systemic review of the safety of probiotics in 2010—including 53 trials—in which 4131 patients received probiotics. Only three trials showed increased complications, which were mostly in transplant patients [20]. In our case the patient denied intake of probiotics in the past.
Transient *Lactobacillus* bacteremia following endoscopy has also been described, mostly with *L. rhamnosus* [21, 22]. However, this patient’s endoscopy was done after the diagnosis of bacteremia. Urinary tract infections is rarely caused by *Lactobacillus* species. In fact, reports have suggested the use of lactobacilli species for prevention of recurrent UTI in women, with *L. rhamnosus* GR1 and *Lactobacillus reuteri* RC14 being the most studied strains [23]. One case of pyelonephritis caused by *Lactobacillus jensenii* in a patient with urolithiasis was noted [10], however, *L. acidophilus* was not encountered. In our patient, the strain of the lactobacilli causing her UTI was not specified, however, blood cultures grew *L. acidophilus*.

Antibiotic susceptibility of *Lactobacillus* species is variable, with studies showing susceptibility of these microbes to ampicillin, clindamycin, erythromycin, and gentamicin, with high resistance to vancomycin, albeit there is paucity of evidence regarding the best antibiotic regimen [2, 24, 25]. Our patient was treated with vancomycin and ceftazidime initially, and later switched to penicillin with resolution of the bacteremia and the urinary symptoms. The studies to demonstrate the preferred choice of antibiotics for lactobacilli infection are lacking due to rarity of clinically significant infection, however, treatment with beta lactams, fluoroquinolones, carbapenems, gentamicin, and clindamycin have been shown to be effective [2].

**CONCLUSION**

In conclusion, this case illustrates that *L. acidophilus* can cause life-threatening disease in an immunocompromised host. A wide array of complications reported in literature include infective endocarditis, bacteremia, liver abscesses, and necrotizing fasciitis. *Lactobacillus* in microbiological cultures should not be ignored as contaminants in this patient population. Patients with risk factors who predispose to opportunistic infections should avoid taking probiotics.

**REFERENCES**


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Author Contributions

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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