

An unknown source of *Micrococcus luteus* bacteremia

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ABSTRACT

Micrococcus luteus is a common organism in the human skin flora. It is an uncommon cause of pathogenic bloodstream infections, which occur mostly in immunocompromised patients. We report the clinical course of an 82-year-old man who underwent complex management of multiple diverticular abscesses and had three serial positive blood cultures for *M. luteus*. Despite treatment with vancomycin, the patient ultimately died due to septicemia secondary to mixed gastrointestinal flora and *M. luteus*. A source this infection was never definitely identified.

Keywords: *Micrococcus luteus*, bacteremia

INTRODUCTION

Micrococcus luteus, from the family *Micrococcus*, is a Gram-positive coccid, oxidase (+), catalase (+), bacterium that is a common organism in the human skin flora.¹ Currently, the pathogenicity of *M. luteus* is poorly understood, and it is considered to be an uncommon cause of pathogenic bloodstream infections. Very few case reports on *M. luteus* exist in the current literature due to a low incidence rate.² There are case reports of *M. luteus* causing infections, such as prosthetic valve endocarditis, bacteremia in immunocompromised patients, brain abscesses in systemic lupus erythematosus patients, and bacteremia leading to septic shock.¹⁻⁵

Here we report a case of an 82-year-old man who underwent complex management of multiple diverticular abscesses and had a series of repeat positive blood cultures for *M. luteus*. The patient ultimately died due to septicemia secondary to mixed gastrointestinal flora and *M. luteus*.

CASE

An 82-year-old man with extensive comorbidities and a complex past medical history, including an

extensive cardiovascular history with an aortic valve prosthesis, abdominal aortic aneurysms, and left lower extremity cellulitis, was hospitalized for acute diverticulitis. On initial presentation, the patient was hemodynamically stable with a white blood count of 11.4 k/ μ L. Diagnostic work up revealed diverticulitis of the sigmoid colon with abscesses. Blood cultures (set #1) were drawn, and fluids, loperamide, piperacillin-tazobactam, and a "GI cocktail" were started.

Blood cultures from admission were positive for *M. luteus* on day 3. Vancomycin was started, and repeat blood cultures (set #2) were drawn, which were again positive for *M. luteus* on day 4. The patient did not improve, and the Interventional Radiology service was consulted for drainage of sigmoid abscesses, which was performed on day 5. Fluid cultures from the abscesses grew 3+ *E. coli*, *Proteus mirabilis*, yeast, and anaerobic mixed flora. Follow-up computed tomography showed no new sigmoid abscesses. No definite source was identified to explain the *M. luteus* bacteremia.

The patient began to deteriorate with changes in his mental and hemodynamic status and required supplemental oxygen. Over the next few days, his white blood cell counts increased to 19.9 k/ μ L. His family was hesitant to allow sigmoidectomy, but due to the patient's deteriorating status, he eventually underwent a sigmoidectomy with creation of an end colostomy on day 11. The patient had a transthoracic echocardiogram as part of cardiac clearance for colostomy. Regurgitation and stenosis were present at most valves, but no

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vegetations were noted. Vancomycin was continued, and blood cultures (set #3) were drawn again.

His clinical course began to improve with a decrease in white blood cell counts and improvement in his vital signs with the exception of a 2 L/minute oxygen requirement. He subsequently developed increasing oxygen requirements to 5 L/minute but remained afebrile and had no tachycardia. However, on post-operative day 4, he began to deteriorate and developed altered mentation; his white blood cell count increased to 19.0 k/ μ L again. He had multiple oxygen desaturation episodes to 89% SpO₂ and was placed on CPAP. On day 15 of admission, the patient declined rapidly and died secondary to septic shock from a gastrointestinal infection. The patient's final blood culture (set #3) was positive for *M. luteus* again.

DISCUSSION

M. luteus is part of the normal skin flora and is a relatively uncommon cause of bloodstream infection due to its low pathogenicity. Due to its rarity as an infectious microorganism, there exists little literature about *M. luteus* bacteremia, its cause, and its treatment. An analysis of 97 cases of *M. luteus* between 2010 and 2017 showed that 40.6% of patients with *M. luteus* bacteremia had a history of invasive surgery or indwelling catheters.² Furthermore, in 77.4% of the cases, patients had underlying disease processes, such as malignancy, infection, or immune disorders.² In this case study, the patient was presumed susceptible to *M. luteus* due to his severe gastrointestinal infection.

The available literature suggests that a common source of *M. luteus* bacteremia may be from prosthetic valve endocarditis.⁴ Statistics demonstrate that this is not an inconsequential correlation.⁴ This patient did have a past medical history of aortic valve replacement and had an echocardiogram prior to colostomy. Although there were no vegetations seen on his transthoracic echocardiogram, this does not preclude the possibility of a vegetative growth on a heart valve. In cases of *M. luteus* bacteremia in patients with prosthetic valves, a concerted effort should be made to

determine whether or not there is any valvular vegetation. In this patient, a repeat TTE or TEE could have been considered.

This patient continued to have positive blood cultures despite treatment with vancomycin. This possibly reflects recurrent bacteremia from either cellulitis or from valvular vegetations. However, this explanation seems somewhat unlikely based on the available clinical information. Another possibility is that vancomycin provided inadequate *M. luteus* coverage and failed to clear the infection. In our hospital, sensitivities are not regularly performed for an *M. luteus* infection. While vancomycin should have offered sufficient coverage, there is a possibility that this strain was not susceptible. One study found that *M. luteus* is usually sensitive to cephalosporins, glycopeptides, and carbapenems *in vivo*, but it is sensitive to vancomycin *in vitro*.²

During this severe gastrointestinal infection, the patient had 3 sets of positive blood cultures for *M. luteus* over a 14-day course despite vancomycin treatment. The origin of this bloodstream infection was never determined with any certainty. Considering the patient's extensive comorbidities and septic shock, the outcome was expected. This case study contributes to the increasing information that *M. luteus*, albeit an unusual source of bacteremia, can cause significant morbidity and mortality in critically ill patients. In cases with severe infections, effort should be made to determine a source of *M. luteus* infection and its antibiotic susceptibilities.

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