



Case report

First case report of infective endocarditis associated with *Microbacterium maritypicum*

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ABSTRACT

Microbacterium species are gram positive coryneforms generally considered as a contaminant when identified in gram stain of blood culture, especially when time-to-positivity is longer than 48 h. We encountered a case of infective endocarditis associated with *Microbacterium maritypicum* bacteremia, which became positive after 48 h of incubation in three out of four bottles. The antimicrobial management is controversial as vancomycin is generally assumed to cover most gram positive bacilli, but our susceptibility result demonstrated minimum inhibitory concentration of 4 µg/mL of vancomycin, indicating non-susceptibility. To the best of our knowledge, this is the first case report of infective endocarditis associated with *Microbacterium maritypicum*.

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Introduction

Historically, gram positive bacilli identified as “diphtheroids” or “coryneforms” on blood culture are generally considered as contaminants because they rarely cause infection (1.9 %–6.7 % of all isolates) [1]. True bloodstream infections are unlikely to happen after 48 h of culture incubation (negative predictive value 99.8 %) [2]. However, increasing amount of literature supports *Microbacterium* species to be opportunistic human pathogens [3]. One report described a case of endocarditis secondary to a *Microbacterium* strain not identified to the species level; the patient survived after administration of ticarcillin/clavulanic acid, tobramycin, vancomycin, and ceftriaxone, and removal of Hickman catheter [4]. Others reported patients with endophthalmitis due to *Microbacterium* infection from hematogenous spread and penetrating ocular injury, and subsequently impaired vision despite antimicrobial therapies [4]. The antimicrobial management is controversial, as a German study of 50 *Microbacterium* strains reported 100 % susceptibility to vancomycin, except *Microbacterium resistens* which is intrinsically resistant to vancomycin [5]; on the contrary, a Canadian study of 69

Microbacterium strains reported only 74 % susceptibility to vancomycin, including strains other than *M. resistens* [3]. To the best of our knowledge, we encountered the first case of infective endocarditis associated with *Microbacterium maritypicum* bacteremia, which became positive after 48 h of culture incubation.

Case report

A 43-year-old female had previous tricuspid valve endocarditis secondary to methicillin-susceptible *Staphylococcus aureus* 5 years ago. She had a follow-up transesophageal echocardiogram, which showed a 13 mm pedunculated mass on mitral valve. She was instructed to go to emergency department, where she presented with fever and cardiac murmur. The first set of her blood culture showed growth in one aerobic bottle in 48 h; the second set showed growth in aerobic and anaerobic bottles in 54 h. The organism appeared like gram positive coryneforms on direct smear (Fig. 1a), and showed pinpoint and yellow colonies after incubation in blood and chocolate agar plates, respectively (Fig. 1b). Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) and 16 s ribosomal RNA testing identified the organism to be *Microbacterium maritypicum*.

Our patient denied exposure to seawater and seafood, relapse of intravenous drug use, and recent insertion of urinary catheter, intravenous lines or prosthetic materials prior to her illness. Source of infection could be her multiple ulcers on legs and ischium.

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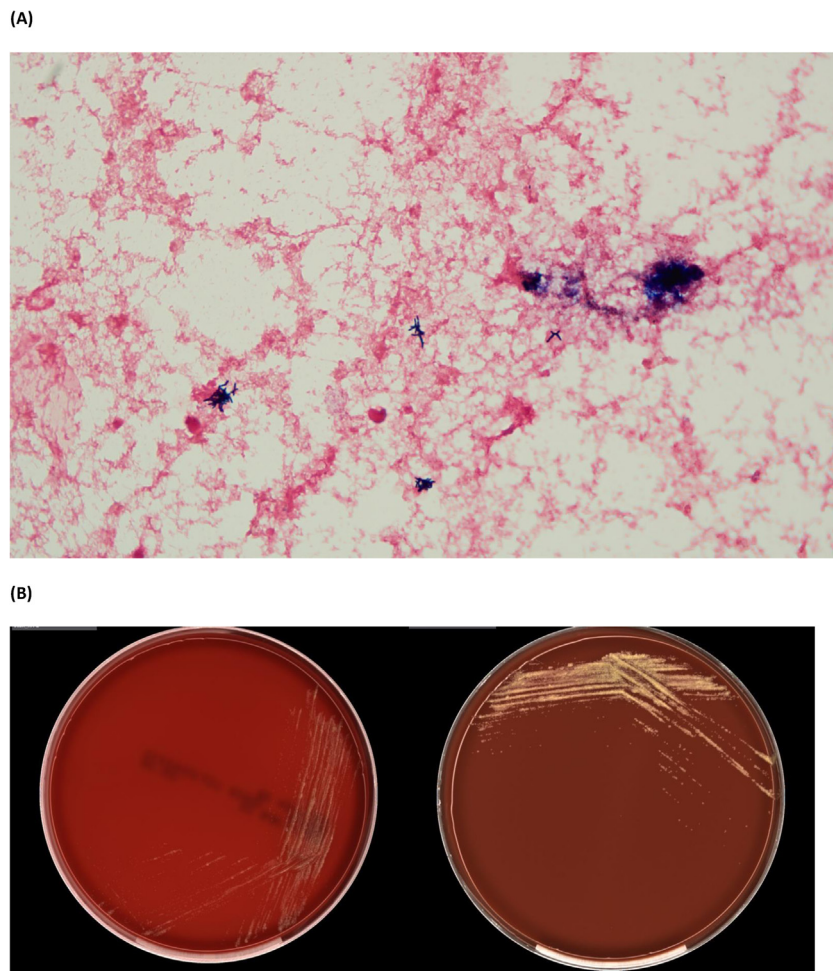


Fig. 1. (A) Direct gram stain of patient's blood culture showed gram positive coryneforms (rodlike or clublike shape). (B) After 48 -h incubation, pinpoint and yellow colonies were seen in blood (left) and chocolate agar (right) plates, respectively.

Intravenous vancomycin 1 g every 12 h and meropenem 500 mg every 8 h were conjointly given soon after blood culture gram stain result. She improved with absence of fever, positive blood culture, and vegetation on repeat echocardiogram in the following 2 weeks. The minimum inhibitory concentrations (MIC) of her *M. maritropicum* isolate were determined by broth microdilution (with Clinical and Laboratory Standards Institute interpretation): penicillin 1 $\mu\text{g}/\text{mL}$ (intermediate); vancomycin 4 $\mu\text{g}/\text{mL}$ (uninterpretable when >2); ciprofloxacin ≤ 1 $\mu\text{g}/\text{mL}$ (sensitive); erythromycin ≤ 0.25 $\mu\text{g}/\text{mL}$ (sensitive); gentamicin ≤ 2 $\mu\text{g}/\text{mL}$ (sensitive); and linezolid ≤ 1 $\mu\text{g}/\text{mL}$ (sensitive). Our patient has been stable since finishing her 6-week course of antibiotic, which included step-down of the intravenous antimicrobials to oral ciprofloxacin 750 mg twice daily starting on day 21 of the therapy.

Discussion

Our patient probably improved with meropenem rather than vancomycin, which was shown to be non-sensitive *in vitro*. It is important to recognize certain gram positive organisms, such as *Leuconostoc*, *Lactobacillus*, *Pediococcus* and *Erysipelothrix*, are intrinsically resistant to vancomycin [6]. It is unknown whether our patient's *M. maritropicum* has acquired or intrinsic resistance to vancomycin. The studies in Germany and Canada did not include *M. maritropicum* isolates in their antimicrobial susceptibility testing [3,5]. Multidrug resistance has been reported in various coryneforms [3]. It is possible that *M. maritropicum*, previously known as

Flavobacterium maritropicum, acts like gram negative organisms with limited penicillin-binding protein sites, rendering vancomycin ineffective. In the future, we may require authoritative guidance on whether we should continue to extrapolate MIC interpretative criteria from coryneforms. These are only our speculations that require further studies to verify.

Author statement

E.Y.H.Y, M.F.C. and R.W.S. made substantial contributions to the conception, design, acquisition, analysis or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Consent

Patient has given consent for images and other clinical information relating to the case to be reported in a peer-reviewed journal.

Declaration of Competing Interest

The authors report no declarations of interest.

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