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Case Report

Early prosthetic valve endocarditis caused *by Corynebacterium amycolatum:* the first case reported in Brazil

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Abstract

Non-diphtheriae *Corynebacterium* species are usually considered as contaminants of clinical specimens due to their widely environmental distribution and colonization of the human skin and mucous membranes. However, these bacteria have been increasingly recognized as agents of life-threatening infections mainly in individuals in immunosuppressive conditions. These organisms have vast variation in morphology and biochemical reaction, characteristics that make the correct identification of *Corynebacterium* at the species level extremely difficult using conventional phenotypic methods. The precise identification of *C. amycolatum* requires approaches rarely available in conventional clinical microbiology laboratories, such as API Coryne system, 16s rRNA and *rpoB* gene sequencing. In this setting, MALDI-TOF, a quick, accurate, and relatively unexpansive molecular technique, arises as a cost-effective alternative for characterizing these agents. Here, a rare and lethal case of endocarditis caused by *C. amycolatum* is presented. This is the first case of infective endocarditis due to *C. amycolatum* reported in Brazil.

Key words: Early prosthetic valve endocarditis; *Corynebacterium amycolatum;* MALDI-TOF.

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Introduction

Non-diphtheriae *Corynebacterium* species are usually considered as contaminants of clinical specimens due to their widely environmental distribution and colonization of the human skin and mucous membranes. However, these bacteria have been increasingly recognized as agents of life-threatening infections mainly in individuals in immunosuppressive conditions. Specially, *Corynebacterium amycolatum* has been described as agent of fatal premature infant sepsis, bloodstream infection among hematopoietic stem cell transplantation recipients, several different types of infection in patients with solid tumors, hospital acquired infective endocarditis (IE) associated with indwelling intravascular devices and IE in elderly patients with chronic comorbidities [1–4]. More than 50 species of *Corynebacterium* have been identified as causative agents of human diseases. These organisms have enormous variation in morphology and biochemical reaction, characteristics that make the correct identification of Corynebacterium at the species level extremely difficult using conventional phenotypic methods. Currently, the precise identification of *C. amycolatum* requires approaches rarely available in conventional clinical microbiology laboratories, such as API Coryne system, 16s rRNA and *rpoB* gene sequencing [5]. In this setting, Matrix Associated Laser Desorption-Ionization – Time of Flight (MALDI-TOF), a quick, accurate, and relative unexpansive molecular technique, arises as a cost-effective alternative for characterizing these agents [6].

In this report, a lethal and rare case of endocarditis caused by *C. amycolatum* is presented. In addition, MALDI-TOF is discussed as microbiological method for early and appropriate diagnosis of infections by "difficult to identify" microorganisms. The data were collected by records review. This case report is part of a research project approved by The Ethics Committee of Hospital Universitário Antonio Pedro of Universidade Federal Fluminense (HUAP), number: 32570 (CAAE 02759912.9.0000.5243).

Case report

A 32 years-old male patient underwent a double valve replacement with metallic prostheses due to severe rheumatic aortic stenosis at HUAP, Rio de

Janeiro, Brazil. Four months later, he returned to HUAP emergency room with fever (axillary temperature: 100.4 °F) and chills lasting for about one month. Hematological parameters revealed normocytic normochromic anemia; physical examination revealed splenomegaly and systolic aortic murmur (3+/6) with irradiation for the entire precordium. At this moment, subacute early prosthetic valve infective endocarditis (IE) was hypothesized. This diagnosis was reinforced by positive blood cultures in three sets of samples collected with at least 24-hours of interval and by the transesophageal echocardiogram suggestive of aortic perivalvular pseudo-aneurysm, with possibly perivalvular dehiscence and abscess with fistula to the left ventricle (LV). Perivalvular pseudo-aneurysm and aortic fistula to the LV were confirmed by thoracic angiotomography. Bacterial isolates were sent to a research reference laboratory. Score values for all the isolates analyzed by MALDI-TOF (Bruker Daltonik GmbH, Bremen, Germany) were 1.95-2.2, confirming the identification of *C. amycolatum*.

Firstly, the patient received empirical therapy with ceftriaxone plus amikacin for five days, followed by vancomycin plus gentamicin guided by microbiologic results. The patient was transferred to a reference cardiology center for cardiovascular surgical treatment and the perivalvular abscess was confirmed during surgery. Unfortunately, he died at the early post-operative time.

Conclusion

In this report, we described a severe case of early prosthetic valve endocarditis caused by a rare and "difficult to identity" microorganism in a patient from Brazil. To the best of our knowledge, only three cases of IE caused by *C. amycolatum* have been described so far [3,4,7], none of them in Brazil.

Considering specifically *Corynebacterium* species, MALDI-TOF has been described as a useful tool for identifying and discriminating at species and strain level [6,8]. Species identification rates of *Corynebacterium* spp. isolates may be similar or higher with MALDI-TOF compared with conventional phenotypic methods. MALDI-TOF analysis is able to correctly identify more than 96% and 92% of *Corynebacterium* isolates to the genus and species level respectively, when compared with *rpoB* and 16s rRNA genes sequencing. However, several less common *Corynebacterium* species and medically relevant coryneform bacteria are not still included in the commercial databases used to compare the protein mass spectra obtained, and not all species are identified. This setting keeps the identification of *Corynebacteria* difficult and limited to the species included into appropriate databases. In addition, misidentification due to matching with closest patterns among the database entries can happen [9].

To the best of our knowledge, this is the first case of IE caused by *C. amycolatum* described in Brazil. Indeed, these infections are extremely rare worldwide. In this setting, an accurate, fast and relative inexpensive microbiological method like MALDI-TOF seems a useful tool to better describe the occurrence and to guide the correct therapy of these infections. Unfortunately, MALDI-TOF is not able to identify all *Corynebacterium* species, yet.

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