Clinically-significant Corynectionerium aurimucosum bacteremia: Is it time for a change of perspective? A first documented case and review of the literature

Evangelia Anna Maria Zioga, Clara Sala Jofre, Raquel Clivillè Abad, Iolanda Calvet Tort, Virginia Isern Fernández, Lourdes Ferrer Rouscalleda

ABSTRACT

Introduction: Most Corynebacteria and other gram positive rods have been classically considered contaminants of microbiological samples, however, advances in microbial identification offer a new insight on their pathological significance. In this report, we present a first case of clinically significant bacteremia of urinary origin caused by Corynebacterium aurimucosum and a brief review of the literature. Case Report: Corynebacterium aurimucosum was isolated in both urinary and blood samples of a 94-year old patient with fever and bacteremia. The isolated pathogenic organism was identified in the samples using mass spectometry (MALDI-TOF), and was treated with amoxicillin/clavulanic with clinical improvement and stability at three weeks follow up. This was the first reported case of clinically significant bacteremia caused by this isolate, although infections at different sites have reported. Conclusions: New techniques of microbial identification show gaining importance of Corynebacterium spp. in clinically-relevant infections, thus modifying progressively the established spectrum of disease caused by GPRs. Detailed reporting of new cases could contribute to a better understanding of the burden of the disease.

Keywords: Aurimucosum, Bacteremia, Corynebacterium, Gram-positive rods

INTRODUCTION

Corynebacteria are an important part of the commensal flora of the skin and mucous membranes [1]. Except for Corynebacterium diphtheriae, they were once considered contaminants of mucosa, but recent publications in medical bacteriology have established the clinical importance of other corynebacteria species in different types of infections. Microbial identification and strain typing using molecular techniques provides a new insight on the clinical significance of various species of coryneform gram positive rods (GPRs) [2].
Corynebacterium aurimucosum was taxonomically first described in 2002 as a new species, and isolated cases of urinary tract infections(UTIs) [3], septic abortion [4] and prosthetic joint infections(PJIs) [5, 6] have been published. However, the spectrum of the disease caused by this pathogen has not been established.

Herein, we report a first documented case of clinically relevant bacteremia secondary to a UTI caused by C.aurimucosum.

CASE REPORT

A 94-year-old man was admitted with a four-day history of malaise. He denied headache, seizure, cough, chest or abdominal pain, diarrhea, dysuria or changes in urinary frequency or urgency. The patient could not recall any recent contact with animals. His past medical history included arterial hypertension, dyslipidemia, ischemic heart disease, prostatic benign hyperplasia, occult hepatitis B infection, a proximal femur fracture treated with osteosynthesis with use of a femoral nail two years before and a giant right inguinal hernia. A contralateral inguinal hernia had been previously surgically treated with introduction of a surgical mesh.

On admission, he presented elevated arterial pressure, normal heart rate and fever of 38.6°C. Physical examination was normal. Laboratory parameters were as follows: leukocyte count 7.7×10^9/L (neutrophils: 66.5%); Hb 14.7 g/dL; platelet count 168×10^9/L; creatinine 1.1 mg/dL; C-reactive protein of 168 mg/L and GFR deterioration up to 40ml/min/1.73m². The microbiology results were interpreted as bacteremia secondary to a urinary infection by C.aurimucosum and linezolid 600mg twice per day was administered during a week. An abdominopelvic CT-scan did not describe abscesses or fistulae. Our patient presented clinical and laboratory improvement, with normalization of inflammatory parameters. Two control sets of blood cultures failed to grow any microorganisms after a 5-day incubation period. After completing antibiotic treatment, our patient presented a deterioration of renal function without other signs of active infection. An emergency abdominal ultrasound was performed showing acute urinary retention and was proceeded to permanent bladder catheterization with normalization of the GFR at discharge. A three-week follow up showed clinical stability.

DISCUSSION

Catalase-positive Gram-positive bacilli, commonly called “diphtheroids” or “coryneform” bacteria were historically nearly always dismissed as contaminants when recovered from patients, but there is growing evidence that many species within this classification are opportunistic pathogens [1].

In the past, only C.diphtheriae was thought to be an infectious agent, but these are now recognized as agents of infection. With diphtheria-like disease being principally caused by C.urogenes and rarely C.pseudotuberculosis. Other established pathogens of the Corynebacteria genus include C.realyticum causing UTIs, C.jekkeum causing systemic infections, and C.kroppenstedtii which has been associated with chronic osteitis [1, 7]. C.striatum is a pathogen at multiple sites [8, 7]. Beyond these examples, potential association between diphtheroids and infections have historically been hindered by the inability to efficiently and accurately identify isolates to the species level, resulting in routine dismissal of results as being of no clinical significance.

However, during the last years, microbial identification and strain typing using molecular techniques has provided
a more thorough insight on the diversity and significance of human microbiome. These techniques have been recognized as a valuable tool for rapid and accurate identification of bacteria in different samples, providing a new insight on the clinical significance of various species of coryneform GPRs. Although the latter has not been clearly established [2], plenty of species previously identified as contaminants have been gaining attention in cases of clinically relevant identification. Correct identification of Corynebacterium spp. and other GPR species is a very challenging task because it will help to identify the real source of infection and install the appropriate treatment [9].

In 2002, C. aurimucosum was taxonomically described as new species within the genus Corynebacterium, with C. minutissimum as the nearest phylogenetic neighbour [10]. The spectrum of the disease caused by this pathogen has not been established, and reports of isolates of clinical significance from different samples is necessary so as to define the breadth of possible infection.

This strain has been isolated in several clinical samples; it can cause a skin affection or erythrasma [11] and an association with spontaneous abortions has been postulated, as secondary to colonization of the vaginal tract [1, 4]. Prosthetic joint infections caused by C. aurimucosum have been having importance, especially after implementation of molecular methods that permits more accurate characterization [5, 6].

Some cases of isolation from urogenital sites have been described, but none with associated bacteremia. A case report of urinary tract infection by C. aurimucosum secondary to urethroplasty stricture of the urethra was described in 2012 [3]. A retrospective review of gram positive rods isolated in different sample, showed 3 clinically relevant isolation of C. aurimucosum in urine samples, two of which presented in elderly individuals with a history of recurrent culture-proven UTIs, and none of these individuals had been catheterized. The 3 blood samples where C. aurimucosum was identified, were considered as contaminants with no clinical significance [7]. Another recent retrospective study evaluated the clinical significance of gram-positive rods isolated in blood samples. In this study, 246 blood samples were analyzed, and C. aurimucosum from 4 of them; however, none of them was treated [2]. In the same study, an association on a multivariate analysis was reported between the assessed significance of the isolate and the number of positive blood culture sets, time to positivity of culture and infectious diseases consultation. In our case, the blood culture sets were positive on the first day on cultivation. Other clinical studies, failed to identify bacteremia by C. aurimucosum when reviewing blood samples with Corynebacterium spp. identification [12].

This clinical case describes a rare urinary tract infection caused by Corynebacterium aurimucosum; only four cases of urinary infection by this pathogen had been previously described. However, this is the first report of a clinically significant bacteremia caused by this species.

While the decision as to whether or not treat individual species is certainly influenced by other patient characteristics, the particular species of Corynebacterium identified in different infections may impact treatment decisions made by the healthcare team. Since the burden of the disease has not been yet clearly established, detailed clinical reporting of bacterial identification in different samples and its interpretation could contribute to clinical uncertainty, in this changing era of microbial identification.

CONCLUSION

This case report and review of cases underlines the gaining importance of Corynebacterium species that were previously thought as purely contaminant non-pathogens in clinical practice, especially after the development of molecular techniques for microbial and strain identification, thus modifying progressively the established spectrum of disease caused by GPRs.

REFERENCES


Author Contributions
Evangelia Anna Maria Zioga – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Clara Sala Jofre – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Raquel Clivillè Abad – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Iolanda Calvet Tort – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Virginia Isern Fernández – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Lourdes Ferrer Rouscallada – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission
The corresponding author is the guarantor of submission.

Source of Support
None.

Consent Statement
Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest
Authors declare no conflict of interest.

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

Copyright
© 2018 Evangelia Anna Maria Zioga et al. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited. Please see the copyright policy on the journal website for more information.
Submit your manuscripts at
www.edoriumjournals.com