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Short communication

Candidemia in the intensive care unit: A 12-year retrospective cohort study in Reunion Island

Candidémies en service de réanimation : étude de cohorte rétrospective sur 12 ans à l'Île de la Réunion

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Abstract

Objectives. – We aimed to describe the epidemiology of *Candida* bloodstream infection in an intensive care unit (ICU) in Reunion Island.

Methods. – We performed a retrospective cohort study and evaluated 63 candidemia episodes, which occurred between January 2004 and December 2015 in the ICU of a University Hospital in St-Pierre.

Results. – The incidence rate of candidemia in the ICU was estimated at 7.6%. *Candida albicans* was the most common yeast pathogen species recovered (54%), followed by *Candida glabrata* (17%), *Candida tropicalis* (12%) and *Candida parapsilosis* (10%). Between 2012 and 2015, we also observed a modification of antifungal use.

Conclusion. – The epidemiology of candidemia in Reunion Island is characterized by the predominance of *Candida albicans* and by the relative importance of *Candida tropicalis*. This pattern corresponds to a model of epidemiological transition between the one usually observed in tropical areas and the one observed in temperate countries.

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Keywords: Reunion Island; Intensive care unit; Candidemia

Résumé

Objectifs. – Nous avons cherché à décrire l'épidémiologie des candidémies dans un service de réanimation à l'Île de la Réunion.

Méthodes. – Dans une cohorte rétrospective, nous avons étudié 63 épisodes de candidémie survenus entre janvier 2004 et décembre 2015 dans le service de réanimation du CHU Réunion, Saint-Pierre.

Résultats. – En réanimation, l'incidence des candidémies était de 7,6 %. *Candida albicans* était l'espèce la plus isolée (54 %), suivie de *Candida glabrata* (17 %), *Candida tropicalis* (12 %) et *Candida parapsilosis* (10 %). De 2012 à 2015, des modifications ont été observées dans la prescription antifongique.

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Conclusion. – À l'Île de la Réunion, l'épidémiologie des candidémies en réanimation est caractérisée par la prédominance des infections à *Candida albicans* et l'importance relative de *Candida tropicalis*. Ce schéma correspond à un modèle de transition épidémiologique situé entre le modèle des régions tropicales et celui des pays tempérés.

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Mots clés : Île de la Réunion ; Réanimation ; Candidémie

1. Introduction

Candidemia is recognized as the sixth most common cause of sepsis in European countries [1]. Invasive candidiasis (IC) including bloodstream *Candida* infections is usually reported as a life-threatening condition, particularly in the intensive care unit (ICU), where its attributable mortality has been reported as high as 50% [2]. The predisposing factors for IC have been well described and are common in the ICU: abdominal surgery, acute pancreatitis, malignancies, solid organ transplantation, broad-spectrum antibiotics, central catheter, hemofiltration and steroid use [3].

Accordingly, intensivists usually harness local epidemiology to properly treat candidemia episodes in critically ill patients. However, the epidemiology of *Candida* species is known to differ worldwide and to change according to antifungal recommendations [3]. Thus, in recent years, a pattern exhibiting *Candida albicans* as the most common pathogen of fungal sepsis, was shifted towards the predominance of non-albicans *Candida* species, showing *C. glabrata* and *C. parapsilosis* as the main pathogens [4]. To the best of our knowledge, the epidemiology of fungal bloodstream infection in Reunion Island, a French overseas department located in the southwestern Indian Ocean, has not been studied so far.

We aimed to describe the incidence and the outcome of *Candida* bloodstream infections in a 12-year retrospective cohort study in an intensive care unit.

2. Patients and methods

2.1. Data collection

After oral consent, as required for routine care surveillance in the intensive care unit, we retrospectively retrieved all candidemia episodes (at least one positive blood culture) reported between January 2004 and December 2015 from the Crossway database of the University Hospital of Saint-Pierre, Reunion Island. This is a 1100-bed facility, including a 15-bed polyvalent ICU, supporting medical and surgical pathologies.

For each candidemia episode treated in the ICU, we collected clinical features including gender, age, predisposing factors of invasive candidiasis, treatment and outcome (alive or dead). The screening of *Candida* multiple-site colonization was not routinely performed in our center.

2.2. Mycological identification

Incubation of blood cultures was first performed with the automated BacT/ALERT system (bioMérieux; 2004–2013) and then with the Bactec Fx system (Beckton-Dickinson). The identification of *Candida* species from subcultures was performed with an auxanogram (API ID 32C, bioMérieux, Marcy l'Étoile, France; 2004–2013) and then with the MALDI Biotyper system (Bruker Daltonics, Inc., Bremen, Germany).

Antifungal susceptibility testing was not available in our center; candidemia episodes were thus treated empirically according to the putative intrinsic resistance of the isolates [5]. Physicians initially managed candidemia cases as per the 2004 French consensus [6] and then according to the 2009 IDSA [5] and 2012 ESCMID guidelines [7].

2.3. Pharmacoeconomic evaluation

Surveillance of antifungal drug consumption was implemented in 2012 in our facility. Antifungal use was therefore evaluated in the ICU over a 4-year period, between 2012 and 2015. Antifungal drugs included fluconazole, voriconazole, posaconazole, caspofungin and liposomal amphotericin B. The consumption was expressed in defined daily doses (DDD) for 1000 patient days (PD).

2.4. Statistical analysis

Incidence rates and incidence density rates of candidemia in the ICU were measured using the annual hospital activity data.

Characteristics of ICU-associated candidemia episodes were compared with those treated in other units, using the Chi-square test or Fisher's exact test, or Student *t* test or Mann–Whitney test as appropriate, with the Stata software (v13.0, StataCorp., College Station, TX). Evolution of the incidence rates and distribution of *Candida* species in the ICU were compared between 2004–2009 and 2010–2015 to account for local implementation of the IDSA recommendations to assess the robustness of observation over the 12-year study period. A *P* value < 5% was considered significant.

3. Results

Over the 12-year study period, 171 patients presented with candidemia including 63 episodes treated in the ICU (37%) and 108 (63%) episodes managed in other units. Between 2004 and 2015, the overall annual cumulative incidence rate of candidemia in critically ill patients was estimated at 7.6% of ICU admissions

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