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Risk factors for candidemia in non-neutropenic critical patients in Colombia☆

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KEYWORDS
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Abstract
Objectives: Due to the increase in isolation of *Candida* spp. in critically ill patients, and the high mortality and economic costs which this infection entails, a study was made of the risk factors associated to candidemia in critically ill patients from 7 intensive care units in Colombia.
Materials and methods: A multicenter matched case–control study was conducted in 7 intensive care units of 3 university hospitals. Data on overall length of hospital stay (including both general wards and the intensive care unit) were recorded.
Results: A total of 243 subjects (81 cases and 162 controls) between January 2008 and December 2012 were included. In order of frequency, *Candida albicans*, *Candida tropicalis* and *Candida parapsilosis* were isolated. The main identified risk factors were: overall length of hospital stay >25 days (OR 5.33, 95%CI 2.6–10.9), use of meropenem (OR 3.75, 95%CI 1.86–7.5), abdominal surgery (OR 2.9, 95%CI 1.39–6.06) and hemodialysis (OR 3.35, 95%CI 1.5–7.7). No differences in mortality between patients with candidemia and controls were found (39.5 versus 36.5%, respectively; $p = 0.66$).
Conclusions: In Colombia, a long hospital stay, abdominal surgery, the use of meropenem and hemodialysis were identified as risk factors for candidemia.

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PALABRAS CLAVE
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Factores de riesgo asociados a candidemia en pacientes críticos no neutropénicos en Colombia

Resumen
Objetivos: Determinar los factores de riesgo asociados a candidemia en pacientes críticos de 7 unidades de cuidados intensivos de Colombia.
Materiales y métodos: Estudio de casos y controles pareado, multicéntrico, retrospectivo, en 7 unidades de cuidados intensivos de 3 hospitales universitarios. Se tomaron datos de duración de la estancia hospitalaria global (incluyendo salas generales) y en la unidad de cuidados intensivos.
Resultados: Se incluyeron 243 participantes (81 casos y 162 controles) entre enero de 2008 y diciembre de 2012. Se aislaron en orden de frecuencia *C. albicans*, *C. tropicalis* y *C. parapsilosis*. Los principales factores de riesgo identificados fueron: tiempo de estancia hospitalaria global > 25 días (OR 5,33; IC 95% 2,6-10,9), uso de meropenem (OR 3,75; IC 95% 1,86-7,5), cirugía abdominal (OR 2,9; IC 95% 1,39-6,06) y hemodiálisis (OR 3,35; IC 95% 1,5-7,7). No se encontraron diferencias en mortalidad entre los grupos de pacientes con candidemia y el grupo control (39,5 frente a 36,5%; p = 0,66).
Conclusiones: Se identificaron como factores de riesgo para candidemia en Colombia la larga estancia hospitalaria, la cirugía abdominal, el uso de meropenem y la hemodiálisis.

Introduction

Among the infections acquired in the Intensive Care unit (ICU), the isolation of *Candida* spp. in blood cultures is characterized by high morbidity–mortality.[1,2] A retrospective analysis of the study on the prevalence of infections in intensive care in Europe (EPIC II) found *Candida* spp. infection in blood to be associated to high mortality rates and an important use of intensive care resources.[3,4] In Colombia, the genus *Candida* accounts for 99% of all fungal species and 5.2% of the total microorganisms isolated in blood.[5] Gudlaugsson et al.[6] reported an attributable 30-day mortality rate of 38% and an overall mortality rate of 49% in patients with nosocomial candidemia.

Candidemia has increased in recent years in critically ill patients, due to expansion of the risk population and increased patient survival, exposure to a greater number of invasive procedures, immunosuppression, the use of broad-spectrum antibiotics, alteration of the host innate or acquired immune mechanisms, or mucosal barrier alterations associated to the use of central catheters, renal failure subjected to hemodialysis, abdominal surgery, or neutropenia, among other factors.[7–12]

Different clinical predictive algorithms have been developed and validated,[4,13] involving both colonization indices and risk factors, and which in combination with clinical judgment facilitate the diagnosis and opportune and adequate treatment of disorders of this kind.[14–17]

We consider that in Colombia, the risk factors for candidemia in critical patients may be different from those found in regions of Europe and North America, since epidemiological differences are found in the Colombian population, in the same way as in other countries in Latin America: non-*Candida albicans* species cause over 50% of the episodes of candidemia – the most prevalent being *Candida parapsilosis and Candida tropicalis*.[3,6,15] In view of these possible circumstances, we must establish our own approach to the diagnosis and management of such disorders.

The aim of the present study was to determine the risk factors associated to the isolation of *Candida* spp. in the blood cultures of patients admitted to 7 ICUs of three university hospitals in Colombia; establish the frequency of the different species of *Candida* that cause candidemia in the ICU; and describe the epidemiological and clinical characteristics of the patients who suffer candidemia, as well as the mortality rate in the studied population.

Material and methods

An analytical, paired case–control multicenter observational study was carried out.

We collected the microbiological and clinical data related to the isolation of *Candida* spp. in the blood cultures of patients admitted to hospital between the years 2008 and 2012 in a high-complexity private center with two ICUs–one polyvalent and the other cardiovascular (23 ICU beds)–in the city of Bogota, and in a hospital of similar characteristics in the city of Neiva, with two polyvalent ICUs and a total of 21 ICU beds. All three centers shared common characteristics as regard the treated populations, with an important representation of patients with complex medical, cardiovascular and traumatic diseases. The blood cultures were processed in the Microbiology Laboratory of each of the institutions using the automated systems MicroScan® (Siemens) or Vitek® (Biomerieux).

Cases were defined as patients with the isolation of *Candida* spp. in the blood cultures performed in the ICU after 48 h of stay in the Unit, between the years 2008 and 2012. For each case we selected two controls over 18 years