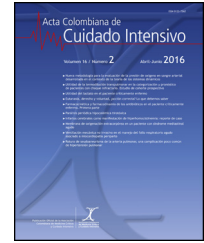




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ORIGINAL ARTICLE

Risk factors for carbapenem-resistant bacterial infection or colonization: A case control study

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KEYWORDS

Risk factors;
Carbapenem
antibiotic resistance;
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Abstract

Introduction: Worldwide, there has been a documented increase in carbapenemase-producing bacteria, and the high incidence in Latin America has led to different research groups to focus on the phenotypic and genotypic characterization of these microorganisms. The aim of this study was to determine the risk factors for colonization or infection with carbapenem-resistant bacteria in a third level Hospital in Chía, Colombia.

Methodology: Patients hospitalized in Clínica Universidad de La Sabana from January 2010 until September 2013 were identified retrospectively according to culture results from any biological sample as being colonized or infected by a carbapenem-resistant microorganism. Twenty-four variables were analyzed.

Results: Eighty-five patients met the inclusion criteria in the study (44 cases, 41 controls). However, since three osteomyelitis cases by *Pseudomonas aeruginosa* did not have controls, only eighty-two cases were analyzed. Twenty-four variables were included as possible risk factors, of which five were statistically significant: use of carbapenem, beta-lactamase inhibitor and first generation cephalosporin antibiotics (OR 10.5, Mc Nemar 15.7; OR 4.8, Mc Nemar 9.8 and OR 3, Mc Nemar 5 respectively), previous hospitalizations (ICU or general ward) within a three-month period (OR 7.5, Mc Nemar 9.9), and use of a central catheter of peripheral insertion (Mc Nemar 11).

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PALABRAS CLAVE

Factores de riesgo;
Resistencia a
carbapenémicos;
Infección;
Colonización

Conclusions: This is the first Colombian study to determine the risk factors associated with colonization or infection by carbapenem-resistant bacteria. Five risk factors were identified and the main one was previous antibiotic use during a patient's hospitalization period.

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Factores de riesgo para la infección o colonización por gérmenes resistentes a los carbapenémicos: estudio de casos y controles

Resumen

Introducción: A nivel mundial, se ha documentado un aumento en la producción de carbapenemasas y en Latinoamérica su alta incidencia ha conducido a que diferentes grupos de investigación centren su interés en la caracterización fenotípica y genotípica de estos microorganismos. Se desea determinar los factores de riesgo para colonización o infección por gérmenes resistentes a antibióticos carbapenémicos en una clínica de tercer nivel en Chía, Colombia.

Metodología: Pacientes hospitalizados en la Clínica Universidad de La Sabana desde enero del 2010 hasta septiembre del 2013, identificados retrospectivamente según los resultados de los cultivos de cualquier muestra biológica con colonización o infección por un germen resistente a los carbapenémicos. Se analizaron 24 variables.

Resultados: Ochenta y cinco pacientes cumplían los criterios de inclusión del estudio (casos: 44, controles: 41); sin embargo, para 3 casos de osteomielitis por *Pseudomonas aeruginosa* no se encontró control, para un total de 82 pacientes analizados. Se incluyeron 24 variables como posibles factores de riesgo, 5 fueron estadísticamente significativas: El uso de antibióticos carbapenémicos (OR 10,5; Mc Nemar 15,7), inhibidores de betalactamasas (OR 4,8; Mc Nemar 9,8), cefalosporinas de 1.ª generación (OR 3; Mc Nemar 5), hospitalización previa en los últimos 3 meses (OR 7,5; Mc Nemar 9,9) y el uso de catéter central de inserción periférica (Mc Nemar 11).

Conclusiones: Es el primer estudio realizado en Colombia en determinar los factores de riesgo asociados a la colonización o infección por gérmenes resistentes a los carbapenémicos. Se identificaron 5 factores de riesgo asociados y el principal fue el uso previo de antibióticos durante la hospitalización.

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Introduction

Traditionally, carbapenem antibiotics have been considered first-line therapy against Gram negative, multiresistant microorganisms such as extended spectrum beta lactamase producing bacteria or AmpC beta-lactamases.^{1,2} However, the carbapenemases generation represents a major threat since it depletes a last line of antibiotic defense.¹ Worldwide, there has been a documented increase in carbapenemase-producing bacteria, and the high incidence in Latin America has led to different research groups to focus on the phenotypic and genotypic characterization of these microorganisms.¹ The determination of the risk factors for the infection or colonization by carbapenem-resistant bacteria allows the establishment of protocols to minimize their dissemination in the hospital environment and the optimization of resource utilization. The objective of this study is to determine through a case-control study the risk factors associated with either colonization or infection by carbapenem-resistant microorganisms.

Materials and methods

Design and population

A retrospective case-control study was undertaken analyzing patients hospitalized from January 2010 until September 2013 in a third-level university hospital in Chía, Colombia. This hospital holds 110 beds, of which 22 belong to the Intensive Care Unit, and it is a regional reference center for trauma and rehabilitation.

Cases were defined as hospitalized patients in whom a carbapenem-resistant microorganism was isolated in cultures from any biological sample. Isolation of such microorganisms was confirmed using Hodge Test. In the case of *Pseudomonas aeruginosa*, patients with reported resistance to any carbapenem antibiotic were included. The control population was selected from patients with infection by carbapenem-sensitive bacteria. The sample was taken by convenience. Inclusion criteria were: hospitalization during the period between the years 2010 and 2013 in ICU or general

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