Trends in Resistant Enterobacteriaceae (ENT), Acinetobacter baumannii (ACB) and Extended Spectrum Beta-Lactamase (ESBL) Organisms in Hospitalized Patients in the US: 2011-2016

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Abstract

Background: Gram-negative resistant organisms are problematic and there are limited data on changes in rates for recent time periods. We evaluated the overall rates and rate changes for common resistant pathogens by clinical setting and by pathogen over a 6.5-year period from 2011–June 2017.

Methodology: The data source was the BD Insights Research Database (Becton, Dickinson & Company) from 192 US hospitals (2011–June 2017). Non-duplicate isolates (first isolate of a species per 30 day period) from hospitalized patients from respiratory, blood, urine, skin, intraabdominal, and other sources were evaluated as admittance (AD) or hospital-onset (HO) for 4 groups of organisms: (1) ESBL, defined as if confirmed as ESBL-positive per commercial panels or intermediate or resistant (IR) to either ceftriaxone, ceftazidime or ceftepime; (2) MDR ENT, identified using NHSN definition as IR to imipenem (IPM), meropenem (MEM), doripenem or to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, and piperacillin or piperacillin/tazobactam; (3) MDR ACB, defined as intermediate or resistant to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, and piperacillin or piperacillin/tazobactam; and (4) Carb NS ENT/ACB defined as IR to imipenem, meropenem, doripenem or to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, piperacillin or piperacillin/tazobactam, and aminoglycosides.

Conclusions: Overall GN resistant rates remained the highest for ESBL followed by MDR ENT, Carb NS ENT/ACB and MDR ACB pathogens. The annual combined HO and AD rates of ESBL pathogens increased whereas the annual rates for the other 3 pathogen groups showed a decreasing trend.

Introduction

According to the Antibiotic Resistance Threats in the United States, 2013 report from the CDC, it is estimated that overall approximately 2.2 million people in the US become infected with antibiotic-resistant bacteria and at least 23,000 die annually.1 Among all of the bacterial resistance problems, the World Health Organization (WHO) has deemed Enterobacteriaceae and Acinetobacter baumannii as 3 priority pathogens for R&D of new antibiotics as they pose a serious threat to patients in hospitals.2 The purpose of this study was to evaluate the overall rates and rate changes for common resistant pathogens by clinical setting and by pathogen over a 6.5-year period from 2011 - June 2017 based on a large database from Becton, Dickinson & Company (BD Insights Research Database).

Methodology

The data source was the BD Insights Research Database (Becton, Dickinson & Company) from 192 US hospitals (2011–June 2017). Non-duplicate isolates (first isolate of a species per 30 day period) from hospitalized patients from respiratory, blood, urine, skin, intraabdominal, and other sources were evaluated as admittance (AD) or hospital-onset (HO) for 4 groups of organisms: (1) ESBL, defined as if confirmed as ESBL-positive per commercial panels or intermediate or resistant (IR) to either ceftriaxone, ceftazidime or ceftepime; (2) MDR ENT, identified using NHSN definition as IR to imipenem (IPM), meropenem (MEM), doripenem or to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, and piperacillin or piperacillin/tazobactam; (3) MDR ACB, defined as intermediate or resistant to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, and piperacillin or piperacillin/tazobactam; and (4) Carb NS ENT/ACB defined as IR to imipenem, meropenem, doripenem or to at least 1 drug in 3 of the following classes: extended-spectrum cephalosporins, carbapenems, piperacillin or piperacillin/tazobactam, and aminoglycosides.

Conclusion: Overall GN resistant rates remained the highest for ESBL followed by MDR ENT, Carb NS ENT/ACB and MDR ACB pathogens. The annual combined HO and AD rates of ESBL pathogens increased whereas the annual rates for the other 3 pathogen groups showed a decreasing trend.

References


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