Impact Assessment of Revised CLSI Cephalosporin Breakpoints (M100-S20, 2010) Using 27,415 Enterobacteriaceae Isolates Tested in the SENTRY Antimicrobial Surveillance Program

PR RHOMEGER, GJ MOET, HS SADER, DJ FARRELL, RN JONES
JMI Laboratories, North Liberty, Iowa, USA

Background

Reviewing functional of PK/PD properties and clinical data, CLSI modified interpretive breakpoints for susceptibility and resistance to cephalosporins (excluding ceftazidime and cefepime) (CRO and ATM) when testing Enterobacteriaceae (ENT). These revised breakpoints were based on ceftriaxone (CRO) MIC data generated by the SENTRY Program was used to assess the breakpoints and rate of these breakpoints. The subcommittee decided to revise (2010) the interpretive breakpoints for susceptibility and resistance for cefazolin, cephalothin, cefazolin, causeofloxacin, and cefuroxim. This study was performed to evaluate the impact of the modified cephalosporin and monobactam breakpoints against Enterobacteriaceae as published by the CLSI in the M10-S20 document. Previous studies have now closely harmonized with those utilized worldwide.

Methods

Organism Collection: 27,415 Enterobacteriaceae isolates were collected from urine, skin and soft tissues, and bloodstream infections were collected from patients in Asia-Pacific, Europe, North America and Latin American medical centers between 2007 and 2009. Rank order of pathogen frequency was Escherichia coli (12,031), Klebsiella spp. (9,033), Enterobacter spp. (3,707), Serratia spp. (1,608), Proteus mirabilis (1,350), Citrobacter spp. (678), Indole positive Proteus spp. (557), Salmonella spp. (324), and other Enterobacteriaceae (229).

Susceptibility Testing: The isolates were tested for susceptibility to ceftriaxone-adjusted Mueller-Hinton broth against 30 antimicrobial agents including several cephalosporins by reference broth microdilution methods as described by the CLSI M07-A8 (2009). Susceptibility and interpretative breakpoints were calculated based on the old CLSI M100-S19 breakpoints, the recently adjusted breakpoints in the M100-S20 document and the current EUCAST breakpoints (Table 1). The subcommittee decided to revise (2010) the interpretive breakpoints for susceptibility and resistance for cefazolin, cephalothin, cefazolin, causeofloxacin, and cefuroxim. This study was performed to evaluate the impact of the modified cephalosporin and monobactam breakpoints against Enterobacteriaceae as published by the CLSI in the M10-S20 document. Previous studies have now closely harmonized with those utilized worldwide.

Results

The revised CLSI breakpoints for Enterobacteriaceae published in the M100-S20 document changed most for ceftriaxone, ceftazidime, cefepime, and doripenem using recently approved breakpoint criteria (27,415 strains; 2007-2009). The overall susceptibility rates among the 27,415 Enterobacteriaceae strains were only slightly decreased for ceftriaxone (-3.2%), aztreonam (-2.2%) and ceftazidime (-2.0%) when comparing the revised M100-S20 document to the old CLSI M100-S19 document and the current EUCAST (2010) breakpoints for comparison.

Conclusions

The revised cephalosporin and monobactam breakpoints found in the CLSI M100-S20 document produced only minor (3.2%) decreases in susceptibility rates among the large collection of Enterobacteriaceae strains. The revised CLSI M100-S20 breakpoints allow greater harmonization with the current EUCAST breakpoints for susceptibility and resistance rates; and have the advantage of elimination of necessary follow-up testing of ESBL-phenotype strains (MIC, ≥2 μg/ml) for definitive detection of ESBL-producing strains.