INTRODUCTION

Antimicrobial resistance surveillance programs provide useful information regarding trends in microbial pathogen distribution and antimicrobial resistance patterns in nosocomial and community-acquired infections.1 Such information has the potential to help in the development of empiric treatment protocols and may have a value in the prevention of infection due to resistant organisms.2

MYSTIC is a global resistance surveillance program that compares the in-vitro activity of meropenem over time with the other anti-infective classes in medical centers that are actively participating in meropenem resistance surveillance (MRS). Results from the first 2 years of the MYSTIC Program (1999 and 2000) in the USA are described here. Resistant pathogens clustered in time and locations are characterized by molecular epidemiologic typing methods, and patterns of antimicrobial usage in selected medical centers, are also examined.

METHODS

• Each center submitted up to 100 aerobic Gram-negative and 100 Gram-positive isolates (Table 1). The few organisms known to be inherently resistant to carbapenems (inoculisin-resistant staphylococci, Enterococcus faecalis, and Stenotrophomonas maltophilia) were excluded.

• MICs for MEM, imipenem (IPM), cefoxitin (CTX), cefotaxime (CAZ), ceftepime (CPE), piperacillin/tazobactam (TAZ), cefepime (CEP), gentamicin (GM), and tobramycin (TM) were determined using the NCCLS broth microdilution method3 and susceptibilities were determined using NCCLS interpretive criteria4

• Clusters of resistant organisms usually represented clonal spread within institutions with high antimicrobial usage (Table 1). MEM was high even in the absence of carbapenem usage but was seen to have low MICs than IPM for E. coli and Klebsiella spp. (Table 2).

• A great decrease in the activity of CPE versus Citrobacter spp. was noted: 85% susceptibility in 1999 and 75% in 2000. The activity of CTX against Acinetobacter spp. was already low in 1999 (34% susceptibility) and this declined even more (25% in 2000). The greatest decline in the activity of CIP was observed with Acinetobacter spp. (72-63%) and P. aeruginosa (61-49%).

• Some differences in activity were seen between the carbapenems (Table 2). MEM was seen to have lower MICs than CAZ and decreased activity of CPE, 3rd-generation cephalosporins, aminoglycosides and fluoroquinolones in specific, high use institutions.

• With the exception of the Enterococcus spp., the greatest decline in activity of the carbapenems was with E. coli: from 99% in 1999 to 95% in 2000.

• The activity of CTX against Acinetobacter spp. was already low in 1999 (34% susceptibility) and this declined even further in 2000 to 25% susceptibility.

• The activity of TAZ against Acinetobacter spp. declined significantly between 1999 (72%) and 2000 (59%), as did its activity against Citrobacter spp. (88% in 1999 and 80% in 2000).

• Genomic-positive clusters (data not shown).

• MEM was highly active against staphylococci (100%) and Streptococcus pneumoniae (95%)

• None of the agents tested was particularly active against the enterococci as defined by NCCLS breakpoint criteria

RESULTS

• 4,408 significant isolates (Table 2), were obtained in 1999 (1,808 isolates; 10 centers) and 2000 (2,586 isolates, 12 centers) from study sites in the USA.

• 100% of isolates were identified as the following:

  - Genus
  - Species
  - Antimicrobial resistance

• Results for 1999 and 2000 from the MYSTIC USA surveillance program show a pattern of sustained potency and spectrum for the carbapenems and decreased activity of CPE, 3rd-generation cephalosporins, aminoglycosides and fluoroquinolones in specific, high antimicrobial use institutions.

• Antimicrobial resistance among the Gram-negative pathogens was largely confined to institutions with clinical outbreaks.

• These observations stress the need for both formulary control and good infection control practices.

• MEM retained the widest spectrum of activity among the β-lactams against Gram-negative and Gram-positive pathogens.

CONCLUSIONS

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REFERENCES


