Impact of new CLSI piperacillin/tazobactam breakpoints on reported susceptibility of Pseudomonas aeruginosa in North America - TEST 2009-2011

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Background: The Clinical and Laboratory Standards Institute (CLSI) has the authority to establish reference levels for antimicrobial susceptibility breakpoints (BP) for Pseudomonas aeruginosa. This report summarizes the impact of the BP changes on reported susceptibility levels for P. aeruginosa collected from 2009 to 2011 in North America. Methods: Between 2009 and 2011, 186 isolates participated in TEST in North America. Susceptibility was determined by the CLSI Document M02-A9. Results: Interlaboratory and interlaboratory results from each participating country were identified to the species level and MICs determined at each participating laboratory in the United States (n=748), Canada (n=219) and Brazil (n=24). MICs were performed as specified by CLSI at each site using parent broth microdilution dilutions and broth microdilution panels. Sources of infection included respiratory, skin/soft tissue/abscess (S/T/A), genitourinary (G/U) and all other (O). Only one isolate per patient was accepted into the study. Conclusions: Reduced susceptibility was most profound in respiratory infections compared with other sources of infection and as a consequence the effect of the old and new breakpoints are given in Table 2. The effect of the new breakpoint is clearly shown by a reduction in percentage of isolates in the susceptible category and an increase in isolates considered of intermediate susceptibility. This reduction in susceptibility was seen to a greater extent in isolates from Canada compared with the USA. Altogether, overall, P. aeruginosa from blood infections were the least affected and respiratory sources the most.

Materials and Methods

Between 2009 and 2011, 186 isolates participated in the TEST program in North America and provided P. aeruginosa isolates. The CLSI Document M02-A9 was used to establish reference levels for antimicrobial susceptibility breakpoints (BP) for Pseudomonas aeruginosa. The report summarized the impact of the BP changes on reported susceptibility levels for P. aeruginosa collected from 2009 to 2011 in North America. Methods: Between 2009 and 2011, 186 isolates participated in TEST in North America. Susceptibility was determined by the CLSI Document M02-A9. MICs were performed as specified by CLSI at each site using parent broth microdilution dilutions and broth microdilution panels. Sources of infection included respiratory, skin/soft tissue/abscess (S/T/A), genitourinary (G/U) and all other (O). Only one isolate per patient was accepted into the study. Results: Reduced susceptibility was most profound in respiratory infections compared with other sources of infection and as a consequence the effect of the old and new breakpoints are given in Table 2. The effect of the new breakpoint is clearly shown by a reduction in percentage of isolates in the susceptible category and an increase in isolates considered of intermediate susceptibility. This reduction in susceptibility was seen to a greater extent in isolates from Canada compared with the USA. Altogether, overall, P. aeruginosa from blood infections were the least affected and respiratory sources the most.

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The Cumulative Microdilution Breakdown of piperacillin-tazobactam against P. aeruginosa by species from 2009 to 2011 is shown in Figure 1. The MIC interpretive criteria followed published guidelines of CLSI published in 2011 and 2012 [1, 2]. Table 2 shows the effect of the new breakpoints [1] and the 2011 (old) breakpoints [2] were evaluated for significance using Fisher’s exact test. A two-tailed p-value <0.05 was considered statistically significant. The cumulative MIC distributions for piperacillin-tazobactam against P. aeruginosa by species for blood isolates were statistically similar to each other.

The new breakpoints for piperacillin-tazobactam against P. aeruginosa are now more in line with other international breakpoints, eg. EUCAST [6].

Conclusions

• The change of CLSI breakpoints has a statistically significant effect on P. aeruginosa susceptibility to piperacillin-tazobactam, reducing overall susceptibility from 85.6% to 74.3% for all North American isolates combined.

• Reduced susceptibility was most profound in P. aeruginosa from respiratory sources (82.5% to 69.7%, p=0.0001).

• Piperacillin-tazobactam susceptibility was higher in blood infections compared with other sources of infections and as a consequence the effect of the new breakpoints was less in the blood isolates (87.3% to 80.9%, p=0.0436).

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