Increasing Prevalence of Antimicrobial Resistant P. aeruginosa isolates in Latin American Medical Centers: 5-Year Report of the SENTRY Antimicrobial Surveillance Program

Soraya Andrade-Baiocchi, Ronald N. Jones, Rodrigo E. Mendes, Helio S. Sader, The SENTRY Participant Group-Latin America
Universidade Federal do Sao Paulo, Brazil; The Jones Group; JMI Laboratories, North Liberty, IA, USA; JMI labs.com

ABSTRACT

Background: Pseudomonas aeruginosa (PsA) is leading pathogen of hospital acquired infections. Resistance to antimicrobial agents has become an increasing concern. Materials and Methods: A total of 1,894 PsA clinical isolates were collected from medical centers located in Brazil (48.3%), Argentina (41.3%), Uruguay (14.5%) and Mexico (4.9%) in the period 1997-2001. The isolates were identified by the routine methodology in use at each participating institution. A total of 1,660 non-duplicate clinical isolates were tested against 10 antimicrobials. The MICs were defined as the lowest antibiotic concentration that inhibited growth of the test organism. Species identification was confirmed with the Vitek system or by conventional methods, as required. The susceptibilities of the isolates were evaluated against the following antibiotics: Amikacin, Amoxicillin, Aztreonam, Ciprofloxacin, Gentamicin, Imipenem, Meropenem, Piperacillin/Tazobactam (P/T), Polymyxin B (P/B), and Vancomycin. Results: In 2001, the susceptibility rates according to the year of isolation in Latin America (SENTRY Antimicrobial Surveillance Program, 1997-2001) were: Amikacin 65.4%, Amoxicillin 63.0%, Aztreonam 55.9%, Ciprofloxacin 56.7%, Gentamicin 62.4%, Imipenem 76.6%, Meropenem 83.9%, Piperacillin/Tazobactam 77.1%, Polymyxin B 81.6%, and Vancomycin < 0.5%. The most active compounds in the last year of this study period (2001) were polymyxin B (96.3% susceptibility) > meropenem (83.9%) = imipenem (83.0%) = piperacillin/tazobactam (83.0%) = polymyxin B (81.6%) susceptibility. The fluoroquinolones evaluated (gatifloxaclin, levofloxaclin, and ciprofloxacin) demonstrated similar in vivo activity against PsA aeruginosa strains (44.4% to 58.6% susceptibility, p < 0.05). Conclusions: Comprehensive longitudinal surveillance programs such as the SENTRY Antimicrobial Surveillance Program provide valuable insights on monitoring antimicrobial resistance patterns and can guide empiric treatments.

RESULTS

Table 1. Distribution of PsA aeruginosa clinical isolates according the source and year of isolation Source of isolation Country 1997 1998 1999 2000 2001 Total No. % No. % No. % No. % No. % Asia 118 42 48 62 56 8 27 329 15.9 South America 96 91 171 126 119 176 6 17 31 114 12.0 Total 214 133 219 188 175 220 33 42 63 393 17.4

Table 2. In vitro activity of selected antimicrobials against 198 PsA aeruginosa clinical isolates from Latin America (SENTRY Antimicrobial Surveillance Program, 1997-2001) Antimicrobial susceptibility 50% 90% 99% PsA aeruginosa No. susceptible % No. susceptible % No. susceptible % Amikacin 109 58.2 62.8 90.9 97.1 99.5 Amoxicillin 134 67.3 73.2 85.2 90.9 99.5 Aztreonam 106 58.2 62.8 90.9 97.1 99.5 Ciprofloxacin 111 56.3 62.8 85.2 90.9 99.5 Gentamicin 125 63.4 69.8 85.2 97.1 99.5 Imipenem 136 70.7 76.6 85.2 97.1 99.5 Meropenem 147 76.6 82.2 92.9 97.1 99.5 Piperacillin/Tazobactam 147 76.6 82.2 92.9 97.1 99.5 Polymyxin B 144 81.6 87.4 95.8 97.1 99.5 Vancomycin 9 47.3 53.8 60.4 67.9 75.4

CONCLUSIONS

The most active compounds in the last year of this study period (2001) were polymyxin B (96.3% susceptibility) = meropenem (83.9%) > imipenem (83.0%) = piperacillin/tazobactam (83.0%) = polymyxin B (81.6%) susceptibility. The fluoroquinolones evaluated (gatifloxaclin, levofloxaclin, and ciprofloxacin) demonstrated similar in vivo activity against PsA aeruginosa strains (44.4% to 58.6% susceptibility, p < 0.05). Susceptibility rates decreased significantly for all anti-pseudomonal drugs evaluated (Table 3).

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SENTRY Program Participant Group (Latin America)
• Argentina
• José M. Casellas (1997-2001) - Centro de Estudios en Antimicrobianos, Sanatorio Jorgelina Baradelli (1997-2001); Microbiology Laboratory, C.A.S. S.A.C., Buenos Aires
• Brazil
• Helio S. Saad (Latin American Coordinator, 1997-2001) – Universidade Federal do Sao Paulo
• Chile
• Manuel Gúzman Blanco (1998-2001) – Centro Medico de Caracas
• Colombia
• Jose M. Casellas (1997-2001) – Laboratorio de Microbiología, Caracas
• • Venezuela
• Jorgelina Smayevsky (1997-2001) - Microbiology Laboratory C.E.M.I.C., Buenos Aires
• • Mexico
• Luis E. Sánchez-Carrillo (1997-2001) – Instituto Nacional de la Nutricion, Ciudad del Mexico
• • Peru
• Julival Ribeiro (2001) – Hospital de Base, Brasilia
• • Uruguay
• Helio S. Saad (Latin American Coordinator, 1997-2001) – Hospital de Clínicas, Montevideo
• • Venezuela
• Mario Gómez Vivas (1997-2001) – Hospital de Clínicas, Caracas
• • Venezuela
• Luis E. Sánchez-Carrillo (1997-2001) – Instituto Nacional de la Nutricion, Ciudad del Mexico
• • Venezuela
• Manuel Gómez Vivas (1997-2001) – Instituto de Microbiología, Caracas

MATERIALS AND METHODS

Study Design: The SENTRY Antimicrobial Surveillance Program’s antibacterial resistance patterns occur as a result of the multidisciplinary and community engaged approach throughout selected hospitals worldwide. In Latin America, the SENTRY Project included hospitals located in Argentina, Brazil, Chile, Colombia, Mexico, and Uruguay. In 1994, the country located in Montevideo was replaced by Lima, and in 2001 the laboratory located in Lima was replaced by Caracas. The hospitals included, events included bloodstream infection, pneumonia, surgical infection and urinary tract infection. PsA aeruginosa clinical isolates (54.4% to 56.8% susceptibility; p > 0.05). The recent increase in adherence to good laboratory practices and the continuous rise in resistance jeopardizes adequate antimicrobial treatment of PsA aeruginosa infections in the region. The adherence to good laboratory practices and the continuous rise in resistance jeopardizes adequate antimicrobial treatment of PsA infections in the region. Comprehensive longitudinal surveillance programs such as the SENTRY Antimicrobial Surveillance Program provide valuable insights on monitoring antimicrobial resistance patterns and can guide empiric treatments.

SUSCEPTIBILITY TESTING

The susceptibility testing was performed according to the references listed in the Methods section. Minimum inhibitory concentrations (MICs) were determined by the broth microdilution technique that was used in the SENTRY Antimicrobial Surveillance Program laboratories. The MICs were defined as the lowest antibiotic concentration that inhibited the growth of PsA aeruginosa. The MICs were determined by the broth microdilution technique at the SENTRY Antimicrobial Surveillance Program laboratories. The MICs were determined by the broth microdilution technique at the SENTRY Antimicrobial Surveillance Program laboratories.