Abstract: P790

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In vitro activity of meropenem, imipenem, piperacillin/tazobactam, ciprofloxacin, amikacin, and cefepime against *P. aeruginosa* and *A. baumannii* isolated from Brazilian intensive care units - MYSTIC Study Group (Brazil 2001)

C. Mendes, C. Kiffer, C. Oplustil, S. Sinto, P. Turner, R. Jones, A. Hsiung

*On behalf of the MYSTIC Study Group*

The selection of multiresistant bacteria has increased subsequent to the introduction of a large number of antibiotics with various mechanisms of action. The scale of this problem is best exemplified by the fact that most nosocomial infection, mainly in ICUs, involve multiresistant bacteria producing several types of enzymes such as extended spectrum β-lactamases, depression of chromosomal *ampC* β-lactamases, plasmid-coded *ampC* β-lactamases in members of Enterobacteriaceae, and multiresistant *Pseudomonas aeruginosa* and *Acinetobacter baumannii*. In this study, the in vitro activities of meropenem (MEM), imipenem (IMP), piperacillin/tazobactam (PIP/TAZ), ciprofloxacin (CIP), amikacin (AMI), and cefepime (CPM) were monitored and compared against 135 ICU isolates of *Pseudomonas aeruginosa* (*n* = 90) and *Acinetobacter baumannii* (*n* = 45). Minimal Inhibitory Concentrations (MICs) were determined by E-test methodology, using standardized and controlled procedures. Overall susceptibility results, MIC50 and MIC90 values are shown in the table below. A high rate of resistance was noticed among the tested strains. Meropenem was the most active agent against both species evaluated. Additionally, the MICs for *P. aeruginosa* were steadily lower when compared to imipenem. Towards *Acinetobacter baumannii*, performances of meropenem and imipenem were similar, showing much superior efficacy comparing to other class of agents. Currently, as we can see, there are few alternative therapies for infections caused by these two species. Infection control measures, rational antibiotic policies and rapid laboratory detection of resistance are the key measures in preventing the spread of these strains.

<table>
<thead>
<tr>
<th></th>
<th><em>P. aeruginosa</em> (<em>n</em> = 90)</th>
<th><em>A. baumannii</em> (<em>n</em> = 45)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%S</td>
<td>%I</td>
</tr>
<tr>
<td>MEM</td>
<td>72.2</td>
<td>7.8</td>
</tr>
<tr>
<td>IMP</td>
<td>66.7</td>
<td>3.3</td>
</tr>
<tr>
<td>PIP/TAZ</td>
<td>76.7</td>
<td>23.3</td>
</tr>
<tr>
<td>CIP</td>
<td>53.3</td>
<td>2.2</td>
</tr>
<tr>
<td>AMI</td>
<td>60</td>
<td>4.4</td>
</tr>
<tr>
<td>CPM</td>
<td>71.1</td>
<td>11.1</td>
</tr>
</tbody>
</table>
**SUMMARY**

The selection of multi-resistant bacteria has increased substantially with the introduction of a large number of antibiotics with various mechanisms of action. The scale of this problem is best exemplified by the fact that most nosocomial infections involve multi-resistant bacteria. These produce several types of enzymes such as extended spectrum β-lactamases, derepression of chromosomal ISOLATED FROM BRAZILIAN in MEM, TAZ and CPE were relatively more (n=45) Acinetobacter baumannii (n=90) -lactamases

1Fleury Medical Diagnostic Center, São Paulo, Brazil; 2Department of Infectious Diseases, School of Medicine University of São Paulo, São Paulo, Brazil; 3Infection Therapy Area Team, AstraZeneca, Cheshire, UK; and 4The Jones Group/JMI Laboratories, North Liberty, Iowa, USA

**INTRODUCTION**

Much has been written in recent years about the ever-increasing problem of the numbers of clinically important bacteria that have developed resistance to a wide range of antibacterial agents. The establishment of several surveillance programmes has provided important information about changes in the spectrum of microbial pathogens and antimicrobial resistance patterns in nosocomial and community-acquired infections. This information has proved useful in the development of empirical approaches for the treatment of serious infections, and may be of use in the prevention and control of infections caused by multi-resistant organisms. Furthermore, surveillance has provided evidence of important differences in antimicrobial resistance patterns that may occur in various geographical regions. Additionally, surveillance efforts stimulate epidemiological research, leading to improved control and prevention strategies.

**METHODS**

**Strains**

- One hundred and thirty-five Gram-negative bacilli (90 P. aeruginosa and 45 A. baumannii) were selected randomly for inclusion in this study.
- All isolates were collected consecutively from patients hospitalised in ICUs of several Brazilian hospitals during 2000-2001. Multiple isolates of the same species with single origin (same patients) were excluded.
- Identification of species was performed by each participating laboratory (Fleury – Medical Diagnostic Center) using conventional biochemical methodology or automated systems.

**Antimicrobial agents and susceptibility testing**

- Isolates were submitted to susceptibility testing for MEM, IPM, TAZ, CIP, AMK, and CPE.
- MICs were determined using the Etest methodology (AB Biodisk - Prova, Brazil) on Mueller Hinton agar, and interpreted according to the criteria of the National Committee for Clinical Laboratory Standards.2
- Control strains of Escherichia coli (ATCC 25922), and P. aeruginosa (ATCC 27853) were run with each set of MIC determinations.

**RESULTS**

**P. aeruginosa**

- High rates of resistance were observed (Table 1), TAZ presented the best performance against P. aeruginosa followed by MEM, CPE, IPM, AMK and CIP (Table 1).
- MEM and CIP presented the lowest MIC50 (Table 1, Figure 1).

**Acinetobacter baumannii**

- There were alarming non-susceptibility rates towards CIP (48.7%) and AMK (40%).
- Four isolates presented significantly lower MICs to MEM than IPM.
- A small increase in resistance of P. aeruginosa to the carbapenems was observed when year 2001 data was compared with 2000 data (Figure 2). MICs will continue to be monitored to determine whether this is a trend or not.

**CONCLUSIONS**

- There were alarming non-susceptibility rates towards CIP (48.7%) and AMK (40%).
- Four isolates presented significantly lower MICs to MEM than IPM.
- A small increase in resistance of P. aeruginosa to the carbapenems was observed when year 2001 data was compared with 2000 data (Figure 2). MICs will continue to be monitored to determine whether this is a trend or not.

**REFERENCE**