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susceptible to all antimicrobials tested. These results suggest that the majority of viridans group streptococci isolated from dental infections remain susceptible to many antimicrobial agents. The absence of adequate surveillance data makes it difficult to monitor trends in antimicrobial susceptibility for viridans streptococci.

References


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Spread of low-level carbapenem-resistant *Acinetobacter baumannii* clones in a tertiary care Greek hospital

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Sir,

*Acinetobacter* spp. are opportunistic pathogens with increasing relevance in nosocomial infections, especially among immunocompromised patients. Extensive use of antimicrobial chemotherapy for these infections has contributed to the emergence and increase of multidrug-resistant *Acinetobacter* spp., such as *Acinetobacter baumannii* strains, in various hospitals. Such strains frequently exhibit resistance to β-lactams, aminoglycosides and fluoroquinolones. Carbapenems usually retain good potency, with imipenem being the most active against *A. baumannii*. However, in the last few years, carbapenem-resistant *A. baumannii* isolates have also been reported. Such strains exhibit various levels of susceptibility and owe their resistance either to target inaccessibility or to drug inactivation by β-lactamases. We report the spread of low-level carbapenem-resistant *A. baumannii* clones in a tertiary care university Greek hospital.

During the study period (November 2000–November 2001), 107 *A. baumannii* isolates were recovered consecutively from clinical infections of 107 different patients hospitalized at Hippokration University Hospital, Thessaloniki, Greece, the largest hospital in northern Greece. Isolates were recovered from blood, urine samples, bronchial secretions and wound exudates. Following the instructions of the API 20NE system (bioMérieux API, Marcy l’Étoile, France), the isolates were identified provisionally to genus species. The classification of *A. baumannii* was performed by a simplified identification scheme. For determination of MICs by the agar dilution method, imipenem and meropenem solutions and MIC plates were prepared freshly on the day of testing. The agar dilution technique was performed by inoculating 10⁵ cfu/spot onto cation-supplemented Mueller–Hinton agar plates (BBL, Cockeysville, MD, USA) containing antibiotic dilutions in the range 0.06–64 mg/L. MIC was recorded as the lowest drug concentration at which no growth occurred. *Pseudomonas aeruginosa* (ATCC 27853) was used as a control and was consistently characterized as having MIC ≤ 2 mg/L for imipenem and ≤ 0.5 mg/L for meropenem.

The majority of the clinical isolates examined exhibited low-level resistance to either imipenem (55 of 107 isolates, 51.4%) or meropenem (93 of 107 isolates, 86.9%), with the MICs in the range 2–8 mg/L, compared with MICs of 0.12–0.25 mg/L for 15 historical isolates from our hospital and relative to an MIC breakpoint of 4 mg/L. In particular, imipenem and meropenem MICs of 8 mg/L were detected for 15 and three isolates, of 2 mg/L for 29 and 62 isolates, respectively (Table 1). Among all these isolates, cross-resistance to penicillins, penicillins with β-lactamase; the test was negative in all isolates have also been reported.2 Such strains exhibit various levels of susceptibility and owe their resistance either to target inaccessibility or to drug inactivation by β-lactamases. We report the spread of low-level carbapenem-resistant *A. baumannii* clones in a tertiary care university Greek hospital.

PCR testing of the 93 low-level imipenem- or meropenem-resistant isolates for carbapenemase genes (*blaTEM*, *blaOXA-24-like* and *blaOXA-23-like*) was carried out using specific primers. The genes were not detected in any isolate. The isolates were also tested phenotypically, by Etest MBL (AB Biodisk, Solna, Sweden), for the possible production of a metallo-β-lactamase; the test was negative in all isolates.

Table 1. Cumulative percentages of *A. baumannii* isolates (n = 107) inhibited by imipenem and meropenem at the Hippokration University Hospital

<table>
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<tr>
<th>Antibiotic</th>
<th>Concentration of antibiotic (mg/L)</th>
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<tbody>
<tr>
<td></td>
<td>≤0.06</td>
</tr>
<tr>
<td>Imipenem</td>
<td>5</td>
</tr>
<tr>
<td>Meropenem</td>
<td>1</td>
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cases. Pulsed-field gel electrophoresis of Apol-digested genomic DNA was performed and banding patterns were compared visually. Nine distinct clones were defined, each containing 3–31 isolates. It is of interest that all but three of the 15 isolates that exhibited an MIC of imipenem of 8 mg/L were indistinguishable, indicating a clonal spread of these acinetobacters. This particular clone was not defined among the remaining low-level carbapenem-resistant isolates or among those that were fully susceptible.

Carbapenem-resistant acinetobacters have been reported sporadically from clinical infections after prolonged exposure to carba- penems. In addition, a USA-wide electronic surveillance network has recorded a yearly increase in A. baumannii strains with reduced susceptibility to imipenem. In a UK burns unit, acinetobacters that exhibit MICs of 2 and 0.5 mg/L of meropenem and imipenem, respectively, have been reported. In addition, a USA electronic surveillance programme has recorded a yearly increase in A. baumannii strains with reduced susceptibility to imipenem. In our region, acinetobacters are one of the most frequent nosocomial pathogens, and the majority of them are multidrug-resistant, leading to an extensive use of carbapenems. The detection in one of the largest Greek hospitals that the vast majority of A. baumannii exhibit low-level resistance to carbapenems is a novel observation, suggesting a potential for wider dissemination. Since the disc diffusion method is not always sensitive in the detection of strains with low-level resistance to carbapenems, it is important that our diagnostic laboratories use a reference susceptibility method to screen periodically for the presence of such acinetobacters. The continuing spread of low-level carbapenem-resistant A. baumannii clones in our hospital demands more prudent use of antimicrobials and more strict infection control measures. Further studies, to determine if similar clones exist in other hospitals, are important in continuing to monitor this situation.

References