Multiple colonization with highly resistant bacteria: carbapenemase-producing Enterobacteriaceae, carbapenemase-producing *Pseudomonas aeruginosa*, carbapenemase-producing *Acinetobacter baumannii*, and glycopeptide-resistant *Enterococcus faecium*

To the Editors,

The dissemination of carbapenemase-producing bacteria worldwide is an important source of concern because carbapenemase producers are multidrug resistant (Nordmann and Poirel, 2014). National guidelines increasingly recommend a systematic screening of at least carbapenemase-producing Enterobacteriaceae (CPE) and glycopeptide-resistant enterococci (GRE) in patients admitted to hospitals who have been hospitalized aboard during the preceding 12 months (Lepelletier et al., 2011). We have investigated the occurrence of colonization and infection with multiple highly resistant bacteria of more than 4 different genus in 2 patients directly transferred from a foreign country.

In June 2014, a 33-year-old French man (patient A) was admitted for a suicide attempt in a Vietnamese hospital where he was treated during 10 days for pneumonia with piperacillin + tazobactam before his transfer to Necker-Enfants Malades University Hospital in Paris, France. At the day of his hospitalization in France, distal protected pulmonary samples were collected, and imipenem was administered subsequently to a persistent fever. In addition, systematic screening to detect carbapenemase-producing Enterobacteriaceae and GRE was also performed. Screening identified also that the patient was colonized with a KPC-2-producing *Klebsiella pneumoniae*, a CTX-M-15–producing *K. pneumoniae*, and a VanA-positive glycopeptide-resistant *Enterococcus faecium* (Table 1).

Patient A was a 33-year-old French man who was admitted to the French hospital. At the admission, the systematic screening of CPE using rectal swab samples revealed the presence of an OXA-48–producing *Acinetobacter baumannii* isolate and an IMP-1–producing *Pseudomonas aeruginosa* (Table 1). Screening identified also that the patient was colonized with a KPC-2–producing *Klebsiella pneumoniae*, a CTX-M-15–producing *K. pneumoniae*, and a VanA-positive glycopeptide-resistant *Enterococcus faecium* (Table 1).

Seven days after her admission, she developed a ventilation-associated pulmonary infection due to a multidrug-resistant *P. aeruginosa* that was treated with imipenem, colistin, metronidazole, and fluconazole for 14 days. Twenty-one days after the admission, the patient developed another pulmonary infection due to a multidrug-resistant *A. baumannii* only susceptible to colistin, resulting in her transfer to the French hospital. At the admission, the systematic screening of CPE using rectal swab samples revealed the presence of an OXA-48–producing *K. pneumoniae* (Table 1). After 24 hours, the patient developed a pyelonephritis due to a VIM-4–producing *P. aeruginosa* and a bronchitis due to an OXA-23–producing *A. baumannii* (Table 1), which were treated with amikacin, fosfomycin, and colistin. Although apyrexia was

Table 1
Clinical data on the 2 patients hospitalized in France after hospitalization in another country and were carrying multidrug-resistant bacteria.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Country of initial hospitalization</th>
<th>Species</th>
<th>Clinical sample</th>
<th>β-Lactamase content</th>
<th>Non-β-lactam resistance determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Vietnam</td>
<td>A. baumannii</td>
<td>Rectal swab</td>
<td>OXA-23</td>
<td>ArmA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>P. aeruginosa</em></td>
<td>Rectal swab</td>
<td>KPC-2, CTX-M-15, TEM-1, SHV-1, OXA-1</td>
<td>IMP-1, AAC6'-ib-cr, QnrB</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>K. pneumoniae</em></td>
<td>Rectal swab</td>
<td>CTX-M-15, TEM-1, SHV-1, OXA-1</td>
<td>AAC6'-ib-cr, QnrB</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>E. faecium</em></td>
<td>Rectal swab</td>
<td>IMP-1</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>Morocco</td>
<td>A. baumannii</td>
<td>Rectal swab</td>
<td>OXA-23</td>
<td>VanA</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>P. aeruginosa</em></td>
<td>Urine and blood culture</td>
<td>VIM-4</td>
<td>AAC6'-ib-cr, QnrB</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>P. rettgeri</em></td>
<td>Urine</td>
<td>NOM-1, CTX-M-15, SHV-12, TEM-1, KPC-2</td>
<td>AAC6'-ib-cr, QnrB</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>K. pneumoniae</em></td>
<td>Rectal swab</td>
<td>OXA-48, CTX-M-15, OXA-9</td>
<td>AAC6'-ib-cr, QnrB</td>
</tr>
</tbody>
</table>

PDP = distal protected pulmonary sample.

* Carbenapenemase are in boldface; ESBL are underlined.
obtained in 3 days, fever reappeared under colistin treatment. A naturally colistin-resistant Providencia rettgeri isolate producing the NDM-1 carbapenemase was isolated from 3 successive urine samples recovered by urinary catheter (Table 1). The urinary catheter was removed, and the patient received 2 doses of amikacin, leading to a rapid apyrexia.

Co-occurrence of multiple resistance determinants in the same species has become a common feature among carbapenemase producers (Compain et al., 2014). Nevertheless, co-occurrence in the same patient of at least 4 different highly resistant bacterial species is worrisome because it might potentially lead to a real therapeutic deadlock.

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References


