Outbreak of multi-resistant *Corynebacterium striatum* infection in an Italian general intensive care unit

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**Article Outline**

- Conflict of interest statement
- Funding sources
- References

Intensive care units (ICUs) are a focus for the emergence and dissemination of multi-resistant bacteria, mainly because the most severely ill patients can be found in the ICU and almost all of these patients will have been exposed to intense antibiotic pressure and exogenous bacterial colonisation.

*Corynebacterium* spp. are widely disseminated in the environment and constitute part of the normal skin and mucous membrane flora. Although both *C. amycolatum* and *C. jeikeium* are currently recognized as important pathogens, the significance and prevalence of *C. striatum* as a causative agent of disease are not well understood.\(^1\)
In first months of 2006, 13 strains, which were identified as *Kocuria kristinae* by an automated system, were isolated from eight patients admitted into ICU. Considering that in our laboratory *K. kristinae* had never been isolated before and that using standard biochemical analysis misidentification of coagulase-negative staphylococci as *Kocuria* spp. had been reported, a genotypic assay was performed.\(^2\) Surprisingly, all the strains tested were identified as *C. striatum*.\(^3\)

Our strains were isolated from clinical specimens using routine diagnostic cultures. The identification had been performed and repeated three times using bioMérieux vitek 2 system GP card. The isolates were identified as *K. kristinae* with a probability of identification of 99.9%. Analysis of the 16S rRNA sequences was performed as described previously by Wauters *et al.*, and showed that all the strains tested were *C. striatum*.\(^3\)

All the isolates exhibited the same pattern of antibiotic susceptibility, being resistant to penicillin, amoxicillin, cefalotin, cefoperazon, cefazolin, ceftriaxone, ceftazidime aztreonam, doxycycline, erythromycin, clindamycin, trimethoprim/sulphamethoxazole, levofloxacin and sensitive to vancomycin, teicoplanin and linezolid.

Overall, *C. striatum* was isolated from seven bronchial aspirates (five patients), from a central venous catheter tip in one patient and from five blood culture sets in two patients. The demographic and clinical data of the patients are reported in Table I. Patient no. 4 had three positive blood cultures, was clinically septic and died even though he was treated with appropriate antibiotic therapy. In none of the patients, in whom *C. striatum* was isolated from a bronchial aspirate, was a diagnosis of ventilator-associated pneumonia made.

### Table I.

Demographic and clinical data of the patients with *Corynebacterium striatum* infection

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Hospital stay</th>
<th>Age (years)/sex</th>
<th>Underlying illness</th>
<th>Clinical specimens</th>
<th>Days in ICU</th>
<th>Therapy</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31 Jan–6 Apr</td>
<td>73/M</td>
<td>Cranial trauma</td>
<td>(N = 3) bronchial aspirates</td>
<td>7</td>
<td>Teicoplanin</td>
<td>Died</td>
</tr>
<tr>
<td>2</td>
<td>31 Jan–18 Feb</td>
<td>16/M</td>
<td>Multiple trauma</td>
<td>CVC tip</td>
<td>9</td>
<td>Ceftazidime</td>
<td>Recovered</td>
</tr>
<tr>
<td>3</td>
<td>3 Feb–16</td>
<td>59/M</td>
<td>Stroke</td>
<td>Bronchial</td>
<td>19</td>
<td>Teicoplanin</td>
<td>Recovered</td>
</tr>
<tr>
<td>Patient no.</td>
<td>Hospital stay</td>
<td>Age (years)/sex</td>
<td>Underlying illness</td>
<td>Clinical specimens</td>
<td>Days in ICU</td>
<td>Therapy</td>
<td>Outcome</td>
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<tr>
<td>4</td>
<td>8 Apr–19 Apr</td>
<td>16/F</td>
<td>Multiple trauma</td>
<td>$N = 3$ sets of blood cultures</td>
<td>5</td>
<td>Teicoplanin</td>
<td>Died</td>
</tr>
<tr>
<td>5</td>
<td>14 Apr–19 Apr</td>
<td>33/M</td>
<td>Multiple trauma</td>
<td>Bronchial aspirate</td>
<td>9</td>
<td>Teicoplanin</td>
<td>Recovered</td>
</tr>
<tr>
<td>6</td>
<td>19 Apr–6 May</td>
<td>80/F</td>
<td>Stroke</td>
<td>$N = 2$ sets of blood cultures</td>
<td>60</td>
<td>Piperacillin</td>
<td>Recovered</td>
</tr>
<tr>
<td>7</td>
<td>5 May–22 May</td>
<td>69/M</td>
<td>Stroke</td>
<td>Bronchial aspirate</td>
<td>5</td>
<td>Linezolid</td>
<td>Recovered</td>
</tr>
<tr>
<td>8</td>
<td>10 May–14 May</td>
<td>55/F</td>
<td>Cerebral metastasis</td>
<td>Bronchial aspirate</td>
<td>24</td>
<td>Teicoplanin</td>
<td>Died</td>
</tr>
</tbody>
</table>

ICU, intensive care unit; CVC, central venous catheter.

The temporal distribution of the cases and the fact that all the isolates exhibited the same pattern of antibiotic susceptibility suggest that a single strain selected in the ICU was transferred from one patient to another.

From the analysis of our cases the clinical significance of *C. striatum* cannot be fully established. In fact, it is hard to assess how many of the symptoms in each patient could be accounted for by infection or by the underlying conditions.

*C. striatum* may cause endocarditis, pneumonia, empyema, lung abscess, conjunctivitis, endometritis, keratitis, peritonitis, soft tissue infections, meningitis, septic arthritis, osteomyelitis, pancreatic abscess, bacteraemia, and catheter exit site infections especially in patients with underlying diseases. In the literature, four nosocomial outbreaks of *C. striatum* infection have been reported. Two of these have been in ICU, where person-to-person spread was also
documented.\textsuperscript{[5]} and \textsuperscript{[6]} Even though a clear pathogenic role was demonstrated only in a few of the above cases, we think that \textit{C. striatum} cannot be simply dismissed as a contaminant when recovered from clinical specimens and, on the base of our experience, empirical treatment should always include a glycopeptide.

Our outbreak highlights both the growing importance of \textit{C. striatum} as an emergent multidrug-resistant nosocomial pathogen and the difficulty microbiology laboratories may encounter when trying to identify this species. The possible misidentification of \textit{C. striatum} as \textit{K. kristinae} using the bioMérieux Vitek 2 GP card is evidenced. The utilization of a genotypic assay such as 16S rRNA is recommended to confirm species identity for unusual clinical scenarios.

References


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**Conflict of interest statement**

None declared.

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