Microbiological investigation and clinical significance of *Alloscardovia omnicolens* in human samples

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**Abstract**

**Objectives:** The genus *Alloscardovia* comprises catalase-negative, facultatively anaerobic, Gram-positive rod that belong to the *Bifidobacteriaceae* family. To date, only one species, *Alloscardovia omnicolens*, has been described in 2007 [1]. Likely commensal of the human urogenital tract, *A. omnicolens* has recently been associated with urinary tract infections (UTIs), especially since the introduction of MALDI-TOF technology in clinical microbiology. Because this emerging uropathogen has been poorly studied, the aim of the study was to determine clinical significance, methods of identification and antimicrobial susceptibility of *A. omnicolens* clinical isolates.

**Methods:** A total of 16 clinical isolates of *A. omnicolens* collected from two different institutions (1 in France and 1 in Switzerland) were included. Clinical data were obtained for each patient (age, gender, predisposing conditions, site of isolation and clinical presentation).

**Identification:** Identification was carried out by biochemical testing. MALDI-TOF mass spectrometry and confirmed by sequencing of the 16S rRNA gene. MICs of 16 antibiotics were determined using E-test strips method on Mueller-Hinton agar plate supplemented with lysed horse blood (5%) and 5% NAD (20 mg/L) according to the EUCAST recommendations. Following clinical data were obtained: age, gender, site of isolation, underlying pathologies and clinical presentation for each patient.

**Results:** Strains were isolated from significant levels from urine (n = 13). BAL (n = 2) and seminai fluid (n = 1). The mean age of patients was 63 years (range, 32-94 years), with a sex ratio M:F of 0.9. Different underlying comorbidities were noted, such as nephropathy (n = 5) or advanced age (>65 years-old) (n = 8). The most frequent type of clinical presentation was UTIs: cystitis (n = 10) and pyelonephritis (n = 2). Biochemical tests did not provide reliable identification whereas both MALDI-TOF and 16S rRNA sequencing accurately identified all isolates to the species level. All isolates were susceptible to beta-lactams, glycopeptides and antimicrobials commonly used for the treatment of UTIs (Table 1). Some strains presented acquired resistance to nitrofurantoin (n = 5) and one isolate presented an acquired MLS resistance due to a single mutation (A2058G) in 23S rRNA gene. Finally, strains appeared to be intrinsically resistant to mercurials.

**Conclusions:** This is the first study on clinical significance and microbiological investigation of *A. omnicolens* isolates, which provides important data for the management of infections caused by this emerging uropathogen.

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**Materials and methods**

**Bacterial strains, antimicrobial susceptibility and clinical data**

A total of 16 clinical isolates of *A. omnicolens* collected from two different institutions in 2007 (1 in France and 1 in Switzerland) were included. MICs of 16 antibiotics were determined using E-test strips method on Mueller-Hinton agar plate supplemented with lysed horse blood (5%) and 5% NAD (20 mg/L) according to the EUCAST recommendations (Table 1).

**Identification assays**

Identification was performed by conventional biochemical tests (API 32 A, bioMérieux), MALDI-TOF mass spectrometry technology (MicroFlex, Bruker Daltonics) according to manufacturer’s recommendations and confirmed by sequencing of the 16S rRNA gene.

**PCR assay and DNA sequencing**

Bacterial genomic DNA was extracted using the easyMAG® NucliSens extractor (bioMérieux) according to manufacturer’s recommendations and confirmed by sequencing of the 16S rRNA gene.

**Results**

**Clinical data**

A total of 16 clinical isolates were isolated from different clinical specimens: urine (n=13), BAL (n=2) and seminal fluid (n=1). Main clinical characteristics were:

- **Mean age:** 63 years (range, 32-94 years)
- **Sex ratio:** M:F 0.9
- **Underlying comorbidities:**
  - elderly age (>65 years old) (n=8/16)
  - prevalent nephropathy (n=5/16)
- **Clinical presentation:**
  - cystitis (n = 10/16)
  - pyelonephritis (n = 2/16)

**Materials and methods**

**Bacterial identification**

As previously described [3], biochemical tests did not provide reliable identification of the species, but all the bacterial strains were identified by MALDI-TOF (Table 1).

**Table 1: Results of MALDI-TOF identification**

<table>
<thead>
<tr>
<th><em>Alloscardovia omnicolens</em></th>
<th>score ≥ 2</th>
<th>n = 21</th>
<th>32%</th>
<th>species identification</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alloscardovia sp.</em></td>
<td>score 1.7</td>
<td>≤ 0.5</td>
<td>≥ 10</td>
<td>32%</td>
</tr>
</tbody>
</table>

**Conclusions**

We report herein the first study on clinical significance, bacterial identification and antimicrobial susceptibility of *A. omnicolens*, a recently-described human uropathogen.

These data may be useful for clinical microbiologists and physicians for the diagnosis and the treatment of UTIs in order to determine the potential of emergence of this Gram-positive rod.