Carbapenemase-producing Enterobacteraeae (CPE) represent a growing health concern worldwide. In this context, their timely and accurate detection constitute one of the priority core action. With Coris Bioconcept, we recently developed and evaluated an immunochromatographic assay (ICAs, OXA-48 K-SeT® Coris Bioconcept, Gembloux, Belgium) for direct and rapid detection of OXA-48-like-producing Enterobacteraeae from culture (1). Chromosome-encoded beta-lactamases of Shewanella spp have been recognized as progenitors of blOXA-48-like genes and some of these species may transiently colonize the intestinal tract, and occasionally also be responsible of infections in humans (2). We therefore aimed to challenge the specificity of the OXA-48 K-SeT against Shewanella spp isolates.

Methods

Culture: 15 environmental and clinical isolates of Shewanella spp (S. algae [n=6], S. putrefaciens [n=6], S. xianemensis [n=1], S. oinodensis, [n=1] and Alishewanella feta lis [n=1]) were grown on TSA sheep blood agar for 24 hours at 35°C. Antibigrams: The antimicrobial susceptibility testing was performed by disc diffusion method on Mueller Hinton agar. Molecular testing: The presence of blOXA-48 was detected according to in house ISO15189 end-point PCR, eazyplex SuperBug Basic and followed by PCR sequencing.

Immunochromatographic assays: All isolates were tested with the OXA-48 K-SeT® according to the manufacturer’s protocol.

Figure 1. Disc diffusion antibiogram of OXA-48 positive Shewanella spp.

- S. putrefaciens COL20140174
- S. putrefaciens COL20140178
- S. putrefaciens COL20140186
- S. putrefaciens COL20140189
- S. xiamenensis COL2015001

Figure 2. Example of molecular testing of some Shewanella spp.

A. Result of end-point PCR for 4 strains:
- a. S. algae (171); b. S. putrefaciens (186);
- c. S. oinodensis (188); d. S. putrefaciens (189)

B. Result of eazyplex SuperBug Basic (Amplex) for the strain S. xiamenensis (COL2015001), OXA-48 positive

Figure 3. Immunochromatographic assays for the detection of OXA-48-like

- 1 S. xiamenensis and 4 S. putrefaciens out of the 15 strains yielded a positive OXA-48 results by PCR and OXA-48K-SeT® (red square) (Figure 1, 2, 3)
- Sequencing revealed 4 OXA-48 S. putrefaciens and 1 OXA-181 S. xiamenensis
- The 10 other strains were negative by OXA-48 K-SeT and end-point PCR

For some Shewanella spp. isolates a concordance is found between presence of OXA-48/OXA-181 coding genes by PCR and detection of the OXA-48 like protein by the ICA even though these strains mostly remain fully susceptible to penicillins (including temocillin) and to carbapenems.