Impact of the isolation medium for the detection of OXA-48 and KPC-producing Gram negative bacteria by immunochromatographic assays

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Introduction and Purpose
The development of new rapid diagnostic tests for the detection of multidrug-resistant Gram-negative bacteria is a priority in the current context of antimicrobial resistance. We recently developed two lateral flow immunochromatographic assays (ICAs) for OXA-48-like and KPC-like carbapenemase-producing Enterobacteriaceae (OXA-48-like, one of each KPC-1, KPC-2, NDM-1, IMP-1, etc.) and non-carbapenem-non-susceptible, non-carbapenemase-producing E. coli were tested. For KPC K-Set, 10 carbapenemase-producing strains (7 KPC, one of each OXA-48, IMP, NDM) and one carbapenem-non-susceptible, non-carbapenemase-producing E. coli were tested. If suspicious colonies were observed, the test was reinterpreted after an additional 16 min as per manufacturers’ instructions.

Methods

Immunochromatographic assays (ICAs):
For OXA-48-like, 22 carbapenemase-producing Enterobacteriaceae (18 OXA-48-like, one of each KPC-1, KPC-2, NDM-1, IMP-1, etc.) and one carbapenem-non-susceptible, non-carbapenemase-producing E. coli were tested.

Culture techniques:
All strains were grown at 37°C for 24 h prior to testing on the following media:
- Non-selective and non-selective media (TSA blood agar, Mueller-Hinton, differential media [McConkey, Drigalski], chromogenic non-selective media [Enterocolitica, ChromID agar orientation medium] and chromogenic-selective media [Luria-Bertani agar, MacConkey agar]).

Aged cultures:
OXA-48 and OXA-181-positive bacteria were grown on three different media: TSA, chromID B/E and chromID OXA-48 at 37°C for 24 h. The plates were then left at room temperature for 7 days and 7 additional days at 4°C. Colonies of the same type were then aged one day during 16 h to evaluate the performance of the test on aged cultures.

Results

Table 1: Detection of OXA-48-like carbapenemases producers from strains grown on 18 media using the ICA OXA-48/K-Set.

Conclusions
OXA-48 and KPC K-Set assays are very useful assays. Various isolation media are compatible with these tests (including Drigalski and McConkey). Colonies should not need to be freshly cultured. Simple and easy to implement as first-line testing for rapid confirmation OXA-48 and KPC.

References

All culture media tested (including Drigalski and McConkey) are compatible with the use of OXA-48 and KPC-K-Set (specificity and sensitivity of 100%).