Evaluation of chromID® OXA-48 for the recovery of carbapenemase-producing Enterobacteriaceae from rectal swabs from hospitalized patients in Ankara, Turkey

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Objectives:
To critically assess three culture methods for screening hospitalized patients in Ankara, Turkey, for potential gut colonization with carbapenemase-producing Enterobacteriaceae (CPE).

Methods:
Direct inoculation of two commercially available chromogenic media (chromID® OXA-48 and chromID® CARRB) was compared with the routinely-used CDC method that entails overnight enrichment in a carbapenem-supplemented broth followed by culture of the broth onto MacConkey agar. Rectal swabs were taken from 302 distinct patients for screening for CPE. The material on each rectal swab was dispersed in 0.5 ml of 0.85% saline to generate a homogenous suspension of faecal material. Aliquots of this suspension (50 µl) were used to inoculate chromID® OXA-48 and 5 ml TSB containing a 10 µg ertapenem disc. All media were incubated at 37°C for 18-20 h. After incubation, the broth was mixed and a 10 µl aliquot was inoculated onto MacConkey agar which was then incubated overnight at 37°C. Any suspect isolates of Enterobacteriaceae isolated on any of the three media were screened for possible carbapenemase production according to UK national guidelines using the KPC, MBL and OXA48 confirm kit (Rosco Diagnostics). Any isolates showing phenotypic evidence of carbapenemase production were investigated using PCR for the five most common carbapenemase genes (OXA-48, KPC, VIM, IMP and NDM-1).

Results:
A total of 33 patients (11%) were found to be colonized with CPE and 34 isolates of CPE were recovered in total with one additional patient (sensitivity: 93.9%). The OXA-48 offers a superior sensitivity to the routinely used CDC method as per each manufacturer’s instructions. The need for follow-up MALDI-TOF testing such as repeat testing, formic acid or alcohol extraction and the selection of different databases was determined on a sample-by-sample basis according to the manufacturer’s guidelines. Identification results were compared for each sample tested and their concordance assessed at the genus and species levels, based on the numerical scoring systems employed by each system. Discordant results were resolved by biochemical and/or molecular testing.

Conclusion:
In an area where OXA-48 is the dominant carbapenemase type, chromID® OXA-48 is also highly specific and only two false positive isolates were recovered from 352 patients. Sensitivity may be improved by combining the use of this medium with other chromID® CARRB or the CDC-recommended method.

Comparison of two commercially available MALDI-TOF systems for bacterial and yeast identification in a clinical diagnostic laboratory

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Objectives:
Matrix assisted laser desorption-ionisation time of flight (MALDI-TOF) mass spectrometry has become a well-established and increasingly common technique for microorganism identification. Here we report our evaluation of two commercially available MALDI-TOF systems, the VITEK® MS (bioMérieux) and the MALDI Biotyper (Bruker Daltonics), for their ability to identify bacteria and yeasts in a clinical diagnostic laboratory.

Results:
A total of 1,309 bacterial and yeast isolates were processed on both systems. The VITEK® MS identified 1270 (97.0 %) of samples tested to the genus level and 1162 (88.8 %) to the species level, based on the confidence values of the identifications. The MALDI Biotyper identified 1251 (95.5 %) of samples to the genus level (score ≥ 1.7) and 1001 (75.5 %) of samples to the species level (score ≥ 2.0).

Conclusions:
Both systems demonstrated the ability to identify isolates with a high level of accuracy. The Biotyper manufacturer’s recommendation of a score of 2.0 is probably too stringent and could be safely reduced to 1.9 or 1.8 to give a higher percentage of correct species identifications. This study confirmed well-known limitations of both systems, such as the inability to distinguish Escherichia coli from Shigella spp. and differentiation amongst Acinetobacter spp. within the brounie complex. One major advantage of the VITEK® MS system was its ability to reliably differentiate Streptococcus pneumoniae and other closely related streptococci such as S. oralis and S. mitis.