EV0534
ePoster Viewing
Diagnostic bacteriology – non-culture based, including molecular and MALDI-TOF

Transition from microbiological culture to Cepheid Carba-R nucleic acid amplification technique for the detection of carbapenemase producing Enterobacteriaceae in screening samples in a high-incidence setting

Rob Shorten*[1], Ashley Mcewan[2], Zoie Aiken[1], Andrew Dodgson[3]

[1]*Public Health Laboratory, Manchester, United Kingdom*

[2]*Central Manchester NHS Foundation Trust, Manchester, United Kingdom*

[3]*Central Manchester University Hospitals NHS Foundation Trust, Manchester, United Kingdom*

Background: Carbapenemase Producing Enterobacteriaceae (CPE) are a significant healthcare threat. Infections caused by them are more problematic to manage due to reduced antimicrobial choice and are associated with poorer outcomes. As they as transmissible between individuals, their rapid detection in colonised patients is vital in containing their spread and starting appropriate empirical antimicrobials when required. Here we describe the transition from a culture-based to genotypic screening technique in a high-incidence CPE setting and present the largest data set of samples screened by this particular molecular assay.

Material/methods: Rectal swabs and stool samples were obtained to routinely screen for CPE carriage. During the period of December 2012 to March 2014, a culture-based method for the detection of CPE was used, whilst the Cepheid Carba-R nucleic acid amplification test was used from April 2014 to January 2015. Samples were processed in batches with both methods.

Results: Between December 2012 and March 2014, 19453 samples were screened using the culture-based method and 780 (4.01%) of these samples were found to be positive for a CPE. Carba-R was used to screen 7337 samples from April 2014 to January 2015 and 247 (3.37%) of these were positive. Mean turnaround time for culture was in excess of two days for provisional results and in excess of three days for final results. The mean turnaround time for Carba-R was less than one day. Approximately two thirds of suspected CPE colonies cultured in the laboratory were subsequently confirmed not to be CPE. False positive results were generated using the Carba-R assay due to laboratory contamination during batch processing of samples, necessary as over 140 tests were performed daily.

Conclusions: The implementation of the molecular assay undoubtedly reduced the turnaround time for the detection of CPE in screening samples, which allowed faster isolation of colonised patients. Notable issues were highlighted in both methods. Bacterial culture took considerably longer and resulted in the unnecessary characterisation of non-CPE isolates. A substantial number of false positive results were generated when individual runs of the Carba-R molecular assay were contaminated. Both methods had negative downstream effects on clinical management; either delayed isolation of CPE colonised patients due to the turnaround time of the culture-based technique or inappropriate isolation of un-colonised patients or delays in reopening outbreak wards due to false positive results. The Carba-R molecular assay provided rapid, sensitive results for CPE screening that allowed rapid isolation of colonised individuals. However, consideration is required regarding whether

a costly test is appropriate in every setting. Additionally, microbiology departments wishing to initiate molecular testing should consider the potential for laboratory cross-contamination when processing large numbers of samples.