2071. Evaluation of BD Phoenix™ CPO Detect Assay for Detection of Carbapenemase Producing Organisms in Clinical Samples in Singapore
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Background. Rapid and accurate detection of CPO is crucial to a targeted infection control strategy, as in Tan Tock Seng Hospital (TTSH), a large tertiary hospital in Singapore, where cohorting of CPO colonized patients is driven by PCR-based genotypic identification. A newly released panel for the BD Phoenix system, the CPO Detect panel, includes CPO detection with Amber Class identification, alongside standard Phoenix antibiotic susceptibility testing. We evaluated this system in the context of the TTSH CPO control strategy.
Methods. A total of 201 isolates from CHROMID™ positive rectal swabs taken as part of inpatient screening, and from clinical samples with confirmed carbapenem resistance, were assayed prospectively between January and April 2018. Ninety-five samples were sampled retrospectively from 2017. CPO genotype was determined using PCR targeting NDM, KPC, oxa-48-like, IMF and IMP carbapenemases. Isolates were analysed on the CPO Detect assay in parallel.
Results. A broad range of CPO genotypes was achieved and results were comparable in both prospective and retrospective samples. Overall, a concordance of 76% was found between CPO Detect determination of CPO status (both positive and negative) and PCR (238/313 isolates). PCR genotype was in agreement with the Amber class found by CPO Detect in 151/200 positives (75.5%), 27 samples were not assigned an Amber class and Amber class was mismatched in 8 samples. Partial agreement was noted in 17 samples in which CPO Detect indicated a single Amber class, but PCR identified two carbapenemase genes. CPO Detect outright failed to detect 14/200 PCR positive samples (7%) of which 10 were IMF. CPO Detect did however identify a CPO in a further 54 samples which were PCR negative.
Conclusion. Compared with PCR, CPO Detect had a sensitivity of 93% in CPO detection and agreement of 75.5% with respect to Amber class specificity. False negatives were overwhelmingly the IMF genotype. We are continuing to characterise these by further molecular means, as well as the 54 samples found by CPO Detect but PCR negative.

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2072. Multicenter Evaluation of the Etest vs. Agar Dilution for Susceptibility Testing of Helicobacter pylori
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Background. Helicobacter pylori is associated with peptic ulcer disease and gastric malignancy. Antimicrobial susceptibility testing (AST) is often requested for patients who fail eradication therapy. The CLSI reference method, agar dilution (AD), is not a method for H. pylori AST in comparison to AD.
Methods. Frozen stocks of 82 H. pylori isolates with AD results previously reported by Mayo Clinic were prepared from the same plate for distribution to participating laboratories. Etest was performed at ARUP Laboratories and Cleveland Clinic (CC). For Etest, isolates were incubated for 72 hours in a microaerobic atmosphere. Aged Mueller–Hinton agar with 5% sheep blood plates were inoculated with a three McFarland suspension prepared in brain heart infusion broth. Etest strips were applied and MICs read after 72 hours of microaerobic incubation. Results were interpreted by applying CLSI and EUCAST breakpoints. Categorical agreement (CA), very major, major and minor errors (VME, ME, and mE) were determined for Etest using AD as the reference method. Isolates with errors were repeat tested in duplicate by Etest to determine the final results summarized below.
Results. For clarithromycin, 65% of isolates were resistant (R) by AD; Etest results at each laboratory showed 97.5% CA (1 me and 1 ME). For tetracycline, only 2.5% of isolates were R by AD; a single VME occurred at both ARUP and CC (98.8% CA) with the same isolate. The AD dilutions tested for amoxicillin prevented interpretation with EUCAST breakpoints. With one exception, amoxicillin Etest results were susceptible (S, 0.125 mg/L) at both laboratories (98.8% of MICs ≤ one dilution). Applying levofloxacin EUCAST breakpoints (S, ≤ 1 mg/L) to interpret ciprofloxacin results, 57.8% of isolates were R by AD. ARUP CA was 97.5% (1 ME, 1 VME) and CC CA was 96.3% (1 ME, 2 VMEs).
Conclusion. Clarithromycin, tetracycline, and ciprofloxacin Etest results for H. pylori showed acceptable CA (≥95%) at both testing sites compared with the AD reference method. The comparative ease of performance and reproducibility of the Etest may help standardize it as an AST method for H. pylori.

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2073. Positive Clinical Impact of MALDI-TOF for the Management of Inpatient Pneumonia Without Additional Antimicrobial Stewardship (AS) Support
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Background. Matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) mass spectrometry decreases time to identification (ID) and has been shown to improve antibiotic utilization when combined with real-time AS intervention. We assessed the impact of MALDI-TOF without additional AS support in patients with inpatient pneumonia.
Methods. This was a single-center quasi-experimental study of adult patients with a pneumonia who had a positive respiratory culture with bacteria that were identified by MALDI-TOF from August 2016–February 2017 (Pre-MALDI-TOF) and August–February 2018 (Post-MALDI-TOF). The primary endpoint was the time to initiation of optimal therapy before and after MALDI-TOF. The secondary endpoints included: clinical cure at 7 days; inpatient antibiotic duration; infection-related length of stay (LOS); overall LOS; excess antibiotic days; and costs.
Table 2: Outcomes

| Pre-MALDI-TOF | Post-MALDI-TOF | P-value |
|---------------|---------------|---------|
| In-hospital mortality | 7 (4) | 8 (4) | 0.79 |
| In-hospital mortality | 7 (5–10) | 7 (5–9) | 1.0 |
| Infection related LOS, days, median, IQR | 7 (5–11) | 7 (5–9) | 0.09 |
| Overall hospital LOS, days, median, IQR | 14.5 (7–22) | 13 (6–29) | 0.26 |
| Clinical cure | 145 (81) | 150 (83) | 0.49 |

Conclusion. The implementation of MALDI-TOF without AS support for pneumonia patients reduced the time to ID and optimal therapy but there were no significant differences in clinical outcomes. It did not positively impact excess antibiotic doses or costs.

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The objective of this study was to assess the hypothetical impact of ACC on TTAT and TTOT. The Accelerate Pheno™ system (ACC) can provide ID and AST results within 7 hours. Testing (AST) can improve time to adequate therapy (TTAT) and optimal (TTOT).

2074. Performance and Impact Evaluation of Direct Rapid Antibiotic Susceptibility Testing on Antibiotic Treatment Accuracy in Clinical Setting

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Background. Timely and effective antibiotics treatment is crucial in early period of bacteremia. Antibiotic susceptibility testing (AST) is essential for choosing an optimal antibiotics treatment, but conventional AST requires 2 days from confirmation of blood culture positivity. Direct rapid antibiotic susceptibility testing (dRAST) based on microfluidic agarose cassette chip technology determines antibiotic susceptibility by time lapse imaging in 6 hours. We evaluated the performance of dRAST to improve selection of adequate antibiotic in clinical practice settings.

Methods. Two hundred eighty-three patients with positive blood culture (BC) bottles were included for analysis. BC bottles from these patients were processed by current microbiology analyzer: Microscan for Gram positive strains and VITEK2 for Gram-negative strains. At the same time, AST was performed using dRAST. The susceptibility results were reported to infectious diseases specialists who determine optimal antibiotics based on AST results. We compared the time differences and accuracy of dRAST with those of conventional method.

Results. Of 283 patients, 117 (41.5%) patients were infected with Gram positive bacteria, 163 (57.4%) patients were infected with Gram negative bacteria and 3 (1.1%) patients were infected with Gram-positive and negative bacteria. The total turnaround time for conventional method and dRAST from blood culture collection was 78.3 ± 27.0 and 55.9 ± 18.9 hours, respectively. Seventy-seven of 95 (81.1%) patients who received ineffective or suboptimal antibiotic treatment after confirming the results of Gram stain and 81 of 86 (94.2%) patients who received unnecessary broad-spectrum antibiotic treatment could have received adjusted optimal treatment based on dRAST.

Conclusion. The use of dRAST system would accelerate earlier effective antibiotic administration and reduce the antibiotic selective pressure in patients with bacteremia.

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2075. The Hypothetical Impact of Accelerate Pheno on Time to Appropriate Therapy (TTAT) and Time to Optimal Therapy (TTOT) in an Institution with an Established Antimicrobial Stewardship Program and Rapid Genotypic Organism/Resistance Marker Identification

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Background. Rapid organism identification (ID) and antimicrobial susceptibility testing (AST) can improve time to adequate therapy (TTAT) and optimal (TTOT). The Accelerate Pheno™ system (ACC) can provide ID and AST results within 7 hours. The objective of this study was to assess the hypothetical impact of ACC on TTAT and TTOT in a hospital with an established antimicrobial stewardship program and rapid genotypic organism and resistance marker ID.

Methods. Patients with positive blood cultures, at the Detroit Medical Center, from March 29, 2016–June 14, 2016, were retrospectively reviewed. ACC was run on unique blood cultures as part of the laboratory validation of the system. ACC results were not made available to clinicians. These results were utilized to determine the hypothetical impact of ACC on TTAT and TTOT in a hospital with an established antimicrobial stewardship program. ACC results would have had a real-time. This assessment was performed based on how clinicians modified antimicrobial therapy with regards to antibiotic choice and timing, once ID or AST were known. The assumption was that the same decisions that were made at the time of traditional AST would have been made when ACC information would have been available. In addition, the impact of ACC on total antimicrobial usage was assessed.

Results. The analysis included 148 patients. The median actual TTAT was 2.2 hours [interquartile range (IQR) 0.5–12.5 hours]. If ACC results were available, TTAT could have been improved in 11 patients (7%), with a median potential decrease in the TTAT of 2.3 hours [IQR, 0.8–20.7]. The median actual TTOT was 40.7 hours [IQR, 21.3–74.1]. If ACC results were available, improved TTOT could have been achieved in 59 patients (40%), with a median potential decrease in TTOT of 24.0 hours [IQR 15.3–34.9]. The TTOT would have been achieved by earlier de-escalation in 53/59 (89.8%) patients. ACC implementation could have led to decreases in antibiotic usage for cephalin (17% reduction of actual use), amoxicillin (23%), piperacillin/ tazobactam (8%), and vancomycin (5%).

Conclusion. Given the aggressive nature of empiric therapy and the availability of other rapid diagnostic tests at our center, ACC would have had a minimal impact TTAT. However, largely due to the ability to more rapidly de-escalate, ACC could have led to a more rapid TTOT in 40% of patients, and significantly reduced the use of broad-spectrum antimicrobials.

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