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

Jeong-Han Kim, MD[1]; Taek Soo Kim, MD[2]; Sang Hoon Song, MD, PhD[2]; Jungil Choi, PhD[3]; Sangkwon Han, PhD[3]; Dong Young Kim, PhD[3]; Sunghoon Kwon, PhD[3]; Chang Kyung Kang, MD[4]; Kyoung-Ho Song, MD, PhD[5]; Pyeong Gyun Choe, MD[1]; Ji Hwan Bang, MD[1]; Eu Suk Kim, MD, PhD[5]; Sang Won Park, MD, PhD[1]; Hong Bin Kim, MD, PhD[5]; Nam Joong Kim, MD, PhD[1]; Myoung-Don Oh, MD, PhD[1] and Wan Beom Park, MD, PhD[1]; [1]Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea, Republic of (South), [2]Department of Laboratory Medicine, Seoul National University College of Medicine, Seoul, Korea, Republic of (South), [3]QuantaMatrix Inc., Seoul, Korea, Republic of (South), [4]Seoul National University College of Medicine, Seoul, Korea, Republic of (South), [5]Department of Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea, Republic of (South)

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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 cannel 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.

Disclosures. **J. Choi**, QuantaMatrix Inc.: Employee, equity interest. **S. Han**, QuantaMatrix Inc.: Employee, equity interest. **D. Y. Kim**, QuantaMatrix Inc.: Board Member, equity interest. **S. Kwon**, QuantaMatrix Inc.: Board Member, equity interest.

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

Christopher Cooper, MD[1]; Oryan Henig, MD[2]; Keith Kaye, MD, MPH[2]; Noman Hussain, MD[3]; Zara Hussain, MBBS[4]; Kathryn Deeds, BS[5]; Hossein Salimnia, PhD[4,5]; Paul Lephart, PhD[2]; Umar Hayat, MD[4] and Jinit Patel, MD[4] and Jason M. Pogue, PharmD, BCPS-AQ ID[4,5]; [1]Michigan State University, East Lansing, Michigan, [2]University of Michigan Medical School, Ann Arbor, Michigan, [3]Henry Ford Health System, Detroit, Michigan, [4]Detroit Medical Center, Detroit, Michigan, [5]Wayne State University, Detroit, Michigan

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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 on TTAT and TTOT that the ACC results would have had in 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 had been 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 24.2 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 cefepime (17% reduction of actual use), aminoglycosides (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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2076. Expanded Antibiotic Menu Demonstration for Novel Rapid Phenotypic Antimicrobial Susceptibility Testing Platform

Eric Stern, PhD[1]; Aleksandar Vacic, PhD[1]; Kelly Flentie, PhD[1]; Benjamin Spears, PhD[1]; Nathan Purmort, MSEE[1]; Felicia Giok, MS[1]; Kayla DaPonte, BS[1]; Sarah Scott, BS[1]; Derek Puff, PhD[1]; Frederick Floyd Jr., BS[1]; Zhi Zhang, MS[1]; Patrick Reilly, High School[1]; Jamie Liu, High School[1]; Emma Viveiros, High School[1]; Nicholas Phelan, High School[1]; Cicely Krebill, High School[1]; Alec Flyer, PhD[1]; David Smalley, PhD[2]; David C. Hooper, MD[3] and Mary Jane Ferraro, PhD, FIDSA[4]; [1]SeLux Diagnostics, Charlestown, Massachusetts, [2]American Esoteric Laboratories, Memphis, Tennessee, [3]Division of Infectious Diseases, Massachusetts General Hospital, Boston, Massachusetts, [4]Massachusetts General Hospital, Boston, Massachusetts

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Background. Fast transitions to targeted therapies for infectious disease patients are paramount for optimal patient care and antibiotic stewardship. A next-generation phenotypic antimicrobial susceptibility test (AST) system that provides rapid results for broad menus of >30 antibiotics per patient sample is required. SeLux has developed a rapid, phenotypic AST platform that utilizes standard 384-well microplates. These consumables provide sufficient wells for simultaneous testing of newly approved antibiotics and broad selections of conventional antibiotics. Here, we demonstrate the platform's ability to produce fast, accurate results with newly approved and not-yet-approved antibiotics.

Methods. The core of SeLux's technology is a novel assay for bacterial surface area, which enables delineation of truly resistant bacteria from organisms that filament or swell in antibiotic concentrations above the MIC. AST was performed with the SeLux platform and compared with the CLSI broth microdilution reference method. Testing of 20 representative conventional antibiotics was performed on 1,191 isolates, including 323 FDA-CDC "challenge" strains and comprising 20 species of nonfastidious bacteria. Testing of newly developed antibiotics, generous gifts from the manufacturers, was performed with ~20 to 50 isolates with representative MICs throughout the dilution series and encompassing the breakpoint region.

Results. Testing of conventional antibiotics showed essential agreements (EA) and categorical agreements (CA) ≥90% with the CLSI reference method for all combinations tested (Figures 1 and 2). The platform returned results within 6.5 hours for >98% of the isolates tested to date. The SeLux platform's EA was ≥90% for all newly developed antibiotics tested to date (Figure 3). For newly approved antibiotics, CAs were similarly ≥90% with no very major errors (Vmj).

Conclusion. The SeLux platform's compatibility with 384-well microplates should transform the rate with which newly approved antibiotics gain use. By speeding the reporting of AST results, SeLux's platform will further enable hospitals to simultaneously improve patient care, decrease lengths-of-stay, and meet antibiotic stewardship goals.

Figure 1