

PharmD, BCPS¹; ¹Department of Pharmacy Services, University of Toledo Medical Center, Toledo, Ohio, ²Department of Pathology, University of Toledo Medical Center, Toledo, Ohio, ³Department of Medicine, Division of Infectious Diseases, University of Toledo College of Medicine, Toledo, Ohio

Session: 240. Stewardship: Impact of Diagnostics
Saturday, October 7, 2017: 12:30 PM

Background. Rapid diagnostic tests (RDTs), such as Matrix-Assisted Laser Desorption/Ionization Time-of-Flight (MALDI-TOF), have been shown to improve time to effective therapy and positively impact patient outcomes when used along with antimicrobial stewardship team (AST) intervention in treating bloodstream infections (BSIs). The purpose of this study was to assess the impact of MALDI-TOF (implemented May 25, 2016) and AST intervention on management of BSIs at a smaller, resource-limited institution.

Methods. IRB-approved, single-center, pre-post quasi-experiment including all patients treated for BSI at the University of Toledo Medical Center from November 1, 2015–November 30, 2016. Patients transferred with documented BSI, expired prior to organism identification, or had blood culture positive for *Mycobacterium*, *Nocardia*, anaerobes, or molds were excluded. Primary endpoint: time to effective therapy. Secondary endpoints: time to optimal therapy, hospital length of stay (LOS), recurrent bacteremia, and 30-day readmission and all-cause mortality.

Results. 593 blood cultures screened, 261 included; 131 pre- and 130 post-MALDI-TOF implementation. Baseline characteristics similar between groups. Median (IQR) time to effective therapy was 6.1 h (2.3–20.0) pre-MALDI-TOF and 6.4 hours (2.2–23.7) post-MALDI-TOF, $P = 0.609$. Median (IQR) time to optimal therapy was 67.3 (48.6–93.2) pre-MALDI-TOF and 67.2 (44.3–94.0) post-MALDI-TOF, $P = 0.520$. Secondary endpoints shown in Table 1. In a subset of cultures defined as contaminants, reduction was seen in time to discontinuation of therapy, however not statistically significant (93.8 hours (61.8–131.4) vs. 71.1 hours (57.5–106.3); $P = 0.180$).

Conclusion. Implementation of MALDI-TOF and AST intervention did not significantly improve an already prompt time to effective therapy in patients with BSIs at our institution. Time to optimal therapy was also similar, highlighting the need for more rapid susceptibility tests in order to support earlier de-escalation of therapy.

Table 1. Clinically Evaluable Endpoints

| | Pre-MALDI-TOF (n = 108) | Post-MALDI-TOF (n = 104) | P-value |
|-----------------------------|----------------------------|-----------------------------|---------|
| Hospital LOS (days) | 9.1 (6.2–15.6) | 10.0 (6.3–15.7) | 0.823 |
| Recurrent bacteremia | 6 (5.6) | 4 (3.8) | 0.748 |
| 30-day readmission | 24 (22.2) | 18 (17.3) | 0.369 |
| 30-day, all-cause mortality | 16 (14.8) | 19 (18.3) | 0.498 |

Values reported as median (IQR) or n(%).

Disclosures. All authors: No reported disclosures.

2124. Impact of Verigene Multiplex PCR for Positive Blood Cultures and Gram-negative Bacteremia

Matthew Adams, DO¹; David Nix, PharmD²; Kathryn Matthias, PharmD³; Abdulhmid Althaghfi, PharmD³; Mimi Bach, MD¹ and Mayar Al Mohajer, MD, MBA, CAQ, FACP⁴; ¹Internal Medicine, University of Arizona, Tucson, Arizona, ²Department of Pharmacy Practice and Science, University of Arizona College of Pharmacy, Tucson, Arizona, ³University of Arizona - College of Pharmacy, Tucson, Arizona, ⁴Department of Medicine, Division of Infectious Diseases, Baylor College of Medicine, Houston, Texas

Session: 240. Stewardship: Impact of Diagnostics
Saturday, October 7, 2017: 12:30 PM

Background. Many patients with bacteremia due to Gram-negative organisms are not treated appropriately. This has been linked to high rates of multi-drug resistant organisms, hospital costs, length of stay, and mortality. The purpose of this study was to assess the effect of implementation of Verigene multiplex PCR on appropriate use of antibiotics, and the time to streamlining of therapy in this population.

Methods. This study included hospitalized patients with Gram-negative organisms isolated from blood cultures both six months before, and six months after the implementation of Verigene at a tertiary care academic medical center. An institutional review board approved this study. We excluded patients that had organisms isolated from autopsy sample and patients under the age of 18. Appropriate therapy was defined as any antibiotic therapy to which the organism was reported as being susceptible once susceptibility results were available. Streamlined therapy was defined as the narrowest antibiotic selection based off organism susceptibility. The primary outcome measure was the time to streamlining of therapy (before culture and susceptibility date were available). Data was compared by group (before and after Verigene implementation) using multiple logistic regression model in SAS.

Results. A total of 287 patients were included. 140 of the subjects were male (48.8%). Mean age in the pre-verigene group was 61.5 years (SD 17.1) and the mean age in the post-verigene group was 59.7 (SD 18.2). In 93 patients, cultures were collected in

the ICU setting (32.4%). In nine post-verigene patients, ESBL with the CTX-M resistance marker was isolated. Six of these patients were switched from inappropriate therapy to a carbapenem. The time to appropriate antibiotics in the pre-verigene group was 0.4 days (SD 0.8) and in the post-verigene group 0.4 days (SD 1.0 $P = 0.57$). The time to streamlining of antibiotics following culture was improved in the post-verigene group (1.9 days, SD 1.3) compared with the pre-verigene group (2.6 days, SD 1.4 $P = 0.01$).

Conclusion. The use of Verigene multiplex PCR was associated with improved time to streamlining of antibiotic therapy in patients with Gram-negative bacteremia.

Disclosures. All authors: No reported disclosures.

2125. Costs of Blood Culture Contamination: Justification for Rapid Diagnostics in a Community Hospital

Zahra Kassamali, PharmD^{1,2}; Amy Jones, MT(ASCP)¹ and Mike Hori, MD¹; ¹UW Medicine, Valley Medical Center, Renton, Washington, ²University of Washington School of Pharmacy, Seattle, Washington

Session: 240. Stewardship: Impact of Diagnostics
Saturday, October 7, 2017: 12:30 PM

Background. We evaluated the cost impact of blood cultures contaminated with coagulase negative *Staphylococci* species (CoNS) at a community hospital in the Seattle metropolitan area. Data were used to justify acquisition of the rapid diagnostics system, Verigene.

Methods. All blood isolates of CoNS from January 2017 were included. Data were evaluated by patient. The cost analysis included length of hospital stay, days of vancomycin therapy, vancomycin drug concentrations, and pharmacist time spent on vancomycin drug monitoring. Documented adverse drug effects and renal dysfunction were recorded. Based on preliminary data using Verigene, we estimated a 1-day time to organism identification and antibiotic de-escalation following culture draw.

Results. 72 blood cultures with CoNS were identified among 51 patients. Physician-documented CoNS infection was present in 5 patients (10%). Of 46 patients with CoNS contamination, 26 (57%) were initially treated with vancomycin, 14 (30%) had therapeutic drug monitoring of vancomycin. One patient was hospitalized 4 additional days due to delay in implanting a cardiac pacing device while infection was ruled out. Four patients were monitored for infection which contributed to hospital stay; each had comorbidities also requiring ongoing hospitalization. Excess care included 20 drug concentrations, 39 days of vancomycin, and 4 additional days of hospitalization. This contributed to a cost/month of \$12,992 which annualized to \$187,104. One patient with documented CoNS infection had *C. difficile* infection while on vancomycin; 16 patients had baseline renal impairment either acutely on admission or due to chronic kidney disease.

Conclusion. Reducing time to identification of blood culture contamination represents an opportunity to improve patient care by minimizing unnecessary antibiotic therapy, drug monitoring, and reducing hospital length of stay. Our institution anticipates an annual cost savings of \$143,504 based on rapid identification of CoNS in blood. This justifies the acquisition and operation of a rapid diagnostics system.

Disclosures. All authors: No reported disclosures.

2126. Impact of a Rapid Diagnostic for Bloodstream Infections with Antimicrobial Stewardship Intervention at a Comprehensive Cancer Center

Brian Buss, PharmD¹; Timothy Baures, MD²; Minkyung Yoo, PhD³; Kim Hanson, MD, MHS⁴; Donald Alexander, PharmD^{1,5}; Russell Benefield, PharmD, BCPS (AQ-ID)^{6,7} and Emily Spivak, MD, MHS^{1,8}; ¹University of Utah Health, Salt Lake City, UT, ²Medical College of Wisconsin, Milwaukee, Wisconsin, ³University of Utah Center for Clinical and Translational Science, Salt Lake City, Utah, ⁴ARUP Laboratories, Salt Lake City, Utah, ⁵University of Utah College of Pharmacy, Salt Lake City, Utah, ⁶Pharmacotherapy, University of Utah College of Pharmacy, Salt Lake City, Utah, ⁷Pharmacy, University of Utah Health, Salt Lake City, Utah, ⁸George E. Wahlen Department of Veterans Affairs Medical Center, Salt Lake City, Utah

Session: 240. Stewardship: Impact of Diagnostics
Saturday, October 7, 2017: 12:30 PM

Background. Molecular based assays reduce time to organism identification for bloodstream infections (BSI) but have limited impact without Antimicrobial Stewardship (AS) intervention. The benefit of pairing molecular based assays with AS in immunocompromised hosts is unknown. Immunocompromised patients present unique challenges to AS efforts and evaluations of traditional AS interventions are needed in this patient population. The purpose of this analysis was to evaluate the utility of a molecular based assay for BSI with and without AS intervention at a cancer hospital.

Methods. A retrospective quasi-experimental pre-post study was performed to evaluate the impact of the FilmArray[®] Blood Culture Identification (BCID) panel with and without AS intervention on time to appropriate antimicrobial therapy defined as de-escalation to the narrowest spectrum agent taking into account need to cover concomitant infections and antibiotic allergies or intolerances. We included inpatients with positive blood cultures between 2014 and 2016 in three separate 100-day cohorts: prior to BCID implementation (pre); after BCID implementation without AS intervention (post); after BCID implementation with AS intervention (ASP) involving blood culture review and antimicrobial treatment recommendations.

Results. 130 of 155 subjects with a BSI during the study period were included. The pre ($n = 52$), post ($n = 43$), and ASP ($n = 35$) cohorts were balanced with the exception of more immunocompromised patients in the ASP compared with pre (91% vs 65%; $P < 0.01$) and post cohorts (91% vs 72%; $P = 0.04$). Time to appropriate antimicrobial therapy, although not statistically different, was shorter in the post and ASP groups

as compared with the pre-BCID group [40.2 hours (pre) vs 24.6 hours (post) vs 25.9 hours (ASP); $P = 0.46$].

Conclusion. Implementation of the BCID in a cancer hospital was associated with reduced time to appropriate antimicrobial therapy; however, additional reductions were not seen when coupled with AS intervention. Further large-scale evaluation is warranted due to unbalanced study groups and small study size to understand the role of rapid diagnostics and AS interventions for BSIs in immunocompromised populations.

Disclosures. R. Benefield, Merck: Grant Investigator, Research grant

2127. Impact of Multiplex Polymerase Chain Reaction Technology with Antimicrobial Stewardship Interventions in the Management of Patients with Positive Blood Cultures

Jenny Gibson, PharmD and Linda Johnson, PharmD; CHI Memorial, Chattanooga, Tennessee

Session: 240. Stewardship: Impact of Diagnostics

Saturday, October 7, 2017: 12:30 PM

Background. Traditional blood culture identification methods often lead to delayed time to optimal antimicrobial agents. This delay may increase morbidity and mortality. Rapid diagnostic tests decrease time to organism identification. The BioFire FilmArray[®], a multiplex Polymerase Chain Reaction (mPCR) technology, was implemented at CHI Memorial in October 2016. We aimed to evaluate the tool's blood culture identification panel in conjunction with antimicrobial stewardship (AS) on improving the management of patients with blood stream infections.

Methods. During the post-mPCR period, the AS team received real-time notifications of blood culture results via a pager system, reviewed available patient data, and made recommendations to the primary service as necessary. A retrospective chart review was conducted in adult inpatients with positive blood cultures from November 1, 2015 to December 31, 2015 (pre-mPCR period) and November 1, 2016 to January 31, 2017 (post-mPCR period). The primary endpoint was the time to effective and de-escalated antimicrobial therapy in the pre- and post-mPCR periods. Secondary endpoints included differences in pre- and post-mPCR periods in the time to pathogen identification, adverse drug reactions, *Clostridium difficile* infections, length of stay, in-hospital mortality, 30-day readmission and antimicrobial costs.

Results. A total of 149 patients were included; 77 in the pre-mPCR and 72 in the post-mPCR period. The median age was 70 years, 30% of patients were admitted to ICU, most common source of infection was urinary tract and most common organisms were *Escherichia coli* and *Staphylococcus aureus*. There were more patients with sepsis in the post-mPCR group. Time to pathogen identification was significantly reduced from 68.7 to 34.1 hours ($P < 0.01$). Median times to effective and de-escalated therapy were also significantly reduced from 5.8 to 3.8 hours ($P = 0.04$) and 73.6 to 36.3 hours ($P < 0.01$), respectively. No significant differences in secondary outcomes were noted between groups.

Conclusion. mPCR blood culture identification tool combined with antimicrobial stewardship leads to faster time to effective and de-escalated antimicrobial therapy.

Disclosures. All authors: No reported disclosures.

2128. Direct Disk Diffusion Susceptibility Testing for *Staphylococcus aureus* from Blood Cultures: Diagnostic Accuracy and Impact on Antimicrobial Stewardship

Michael Payne, MD, FRCPC^{1,2}; Christopher F. Lowe, MD, FRCPC^{1,2,3}; Victor Leung, MD, FRCPC^{2,3,4}; Marc G. Romney, MD, FRCPC^{1,2} and Sylvie Champagne, MD, FRCPC^{1,2}; ¹Pathology and Laboratory Medicine, Providence Health Care, Vancouver, BC, Canada, ²Pathology and Laboratory Medicine, University of British Columbia, Vancouver, BC, Canada, ³Infection Prevention and Control, Providence Health Care, Vancouver, BC, Canada, ⁴Infectious Diseases, Providence Health Care, Vancouver, BC, Canada

Session: 240. Stewardship: Impact of Diagnostics

Saturday, October 7, 2017: 12:30 PM

Background. In order to detect multidrug resistant strains of bacteria, our laboratory routinely performs direct susceptibility (DS), in addition to standardized susceptibilities (SS), testing from positive blood cultures. We conducted a prospective study to determine the accuracy, reporting time (RT), and antimicrobial stewardship impact of DS testing for *Staphylococcus aureus* positive blood cultures.

Methods. From March–December 2016, first time positive blood cultures for *S. aureus* were included. Broth from positive blood culture bottles was inoculated to standard media, as well as to Mueller–Hinton agar with a cefoxitin disk. CLSI breakpoints for *S. aureus* were used to guide interpretation. If DS results were to be reported to clinicians, a penicillin-binding protein 2a (PBP2a) Alere[™] test was performed. When the PBP2a result was concordant with the CLSI interpretation, the isolate was reported as either Methicillin-susceptible *S. aureus* (MSSA) or Methicillin-resistant *S. aureus* (MRSA). Antibiotic therapy changes made based on reporting of DS results were recorded. In order to determine RT, the following time points were recorded: blood culture positivity, reading of DS, and reporting of SS

Results. Of the 100 patients with *S. aureus* bacteremia, 97 showed pure growth of MSSA or MRSA; 3 patients had mixed infections, all of which were only detected using the DS plates. Average RT was 23 hours and 36h for DS and SS, respectively. There were 32 MRSA isolates, with a cefoxitin zone size range of 6–15 mm (median = 8 mm). PBP2a was performed on 11 isolates; all were positive. Of the 69 MSSA isolates, the cefoxitin range was 22 to 32 mm (median = 27 mm). PBP2a was performed on 26 isolates; all were negative. Direct susceptibility results were reported on 31 patients. Of the

21 patients with MSSA bacteremia, 15 changed therapy from vancomycin/daptomycin to cloxacillin/cefazolin. These results were reported an average of 23 hours prior to SS.

Conclusion. DS testing is an accurate and rapid method to determine whether isolates are MSSA or MRSA. We had no major or minor errors. PBP2a testing was concordant for all isolates tested. DS also has the added benefit of detecting mixed *S. aureus* infections. Clinicians acted on the reported results of DS testing, with 15/21 (71%) of our patients narrowed to a cloxacillin/cefazolin 23 hours before the availability of SS.

Disclosures. All authors: No reported disclosures.

2129. MALDI-TOF MS in Adult Inpatients with Bloodstream Infections: Pre- and Post-intervention Study

Salman Khan, MD¹; Dallas Dunn, MD²; Gargi Patel, PharmD³; Patricia Saunders-Hao, PharmD, BCPS³; Meenakshi Rana, MD²; Gopi Patel, MD, MS³ and Camille Hamula, PhD³; ¹Icahn School of Medicine at Mount Sinai, New York, New York, ²Infectious Disease, Icahn School of Medicine at Mount Sinai, New York, New York, ³Mount Sinai Hospital, New York, New York

Session: 240. Stewardship: Impact of Diagnostics

Saturday, October 7, 2017: 12:30 PM

Background. Delays in diagnosis of bloodstream infections (BSI) can lead to adverse outcomes. Matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) can rapidly identify bacteria directly from blood culture bottles. We describe our experience in patients with BSI before and after implementation of MALDI-TOF MS.

Methods. Patients: adult inpatients with BSI. Design: pre-intervention group (August–November 2015); bacterial identification and susceptibility testing performed by Vitek[®]2. Post-intervention group (August–November 2016); bacterial identification on liquid blood culture broth by MALDI-TOF MS; susceptibility testing performed by Vitek[®]2. Both groups received baseline antimicrobial stewardship program (ASP) intervention. Outcomes: times to bacterial identification, susceptibilities, effective and optimal antibiotics, length of stay (LOS), 30-day readmission and 30-day all-cause mortality. Statistical analysis: univariable analysis performed; continuous variables analyzed using a two-tailed t-test; discrete variables analyzed using a chi-square test or Fisher exact test.

Results. 267 cases of BSI occurring in 256 patients were analyzed (137 pre-intervention, 130 post-intervention). Time to bacterial identification was significantly shorter in the MALDI-TOF MS group (40 vs. 63 hours, $P < 0.001$). Times to susceptibilities, effective, and optimal antibiotic therapy did not differ between the two groups. There was no significant difference in LOS or 30-day readmission rates. 30-day mortality was significantly higher in the pre-intervention group (25 vs. 13 percent, $P = 0.026$). The pre-intervention group had significantly more BSI due to multidrug-resistant (MDR) Gram-negative bacteria and vancomycin-resistant enterococci (VRE).

Conclusion. MALDI-TOF MS significantly shortened time to bacterial identification in patients with BSI. Differences in times to effective and optimal antibiotic therapy were not observed. This may be due to high rates of early appropriate empiric antibiotic use at our institution and limited real-time MALDI-TOF MS and ASP interventions. Higher mortality in the pre-intervention group may be due to higher prevalence of multidrug-resistant bacteria.

Disclosures. All authors: No reported disclosures.

2130. Outcomes of Rapid Identification of Multi-Drug Resistant Gram-Negative Organisms Causing Bacteremia in Combination with Antimicrobial Stewardship in a Community Health System.

Sarah Ross, Doctor of Pharmacy; Scripps Mercy Hospital, San Diego, California and Scripps Antimicrobial Stewardship Program

Session: 240. Stewardship: Impact of Diagnostics

Saturday, October 7, 2017: 12:30 PM

Background. Rapid initiation of effective antibiotic therapy has been strongly associated with a decrease in mortality in gram-negative (GN) bacteremia. In an effort to improve time to effective antibiotic therapy in the treatment of multi-drug resistant (MDR) GN bacteremia, we implemented Verigene GN Blood Culture (BC-GN) assay, which can rapidly identify GN bacteria at the genus/species level and specific resistance markers from blood cultures within 2 hours of positivity.

Methods. The objective of this multi-center, pre-post quasi-experimental study was to assess outcomes of Verigene BC-GN in combination with antibiotic stewardship in treatment of MDR GN bacteremia. A retrospective chart review was performed one year prior and four months post-implementation of Verigene BC-GN. Patients > 18 years old with MDR GN bacteremia identified by Verigene BC-GN within 5 days of admission were included. The primary endpoint was time to effective antibiotic therapy for MDR GN bacteremia. Secondary outcomes included overall and ICU length of stay (LOS) and 30-day mortality. Education regarding interpretation of resistance markers and selection of optimal antibiotic therapy was provided to pharmacists and physicians prior to implementation.

Results. A total of 110 patients were included, 86 in the pre-intervention group and 24 in the post-intervention group. Mean time to effective antibiotic therapy decreased significantly from 47.6 ± 23.1 vs. 18.8 ± 9.1 hours, respectively ($P < 0.0001$). Median overall LOS was 6.0 vs 5.5 days ($P = 0.88$), ICU LOS was 3.0 vs 4.0 days ($P = 0.57$), and 30-day mortality was 4.7% vs 4.2% ($P = 1$) pre and post-implementation, respectively.