1804. Impact of Susceptibility Testing Method on Antibiotic Selection for Methicillin-Resistant Staphylococcus Aureus (MRSA) Bacteremia

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Background. The selection of intravenous (IV) antibiotics for methicillin-resistant Staphylococcus aureus (MRSA) bacteremia can be influenced by the vancomycin minimum inhibition concentration (MIC). This study explores the changes in antibiotic use and inpatient mortality for patients with MRSA bacteremia after switching the MIC testing methods.

Methods. At University of Kentucky Medical Center, Etest was implemented in November 2013 for all Staphylococcus aureus blood isolates. In April 2016, this was changed to Phoenix automated system. Data regarding antibiotic usage for patients with MRSA bacteremia were collected from July 2014 to December 2015 (Etest) and September 2016 to March 2017 (Phoenix). Only patients started on IV vancomycin were included. Daptomycin and ceftaroline use was monitored by the antimicrobial stewardship team with focus on guideline adherence.

Results. A total of 119 and 62 patients were identified before and after switching to Phoenix. MICs of 2 µg/mL were significantly decreased (P = 0.001) after changing to Phoenix (Table 1). Daptomycin use (alone or in combination) decreased from 37% (44/119) to 21% (13/62) (P = 0.013). Ceftaroline use (alone or in combination) decreased from 32% (38/119) to 19% (12/62) (P = 0.034). The reason for escalation in 13 of 44 (30%) patients with daptomycin and 6 of 38 (16%) patients with ceftaroline was an MIC of 2 µg/mL. Overall, IV vancomycin use (alone or in combination) increased from 50% (60/119) to 69% (43/62) (P = 0.007). All-cause inpatient mortality was 16% (19/119) before and 10% (6/62) (P = 0.24) after switching to Phoenix.

Conclusion. A switch in vancomycin susceptibility testing from Etest to Phoenix automated system was associated with a significant decrease in daptomycin and ceftaroline use and an increase in IV vancomycin use without any change in all-cause inpatient mortality.

Table 1: Difference in MIC Data and Antibiotic Utilization

| Parameters                      | Etest™ (n = 119) | Phoenix™ (n = 62) | P-Value |
|---------------------------------|------------------|------------------|---------|
| MIC = 2 µg/mL                   | 56 (47)          | 0 (0)            | <0.001  |
| MIC = 1.5 µg/mL                 | 37 (31)          | N/A              | N/A     |
| MIC ≤ 1 µg/mL                   | 26 (22)          | 60 (97)          | <0.001  |
| IV vancomycin                   | 60 (50)          | 43 (69)          | 0.007   |
| Daptomycin                      | 44 (37)          | 13 (21)          | 0.013   |
| Ceftaroline                     | 38 (32)          | 12 (19)          | 0.036   |
| Other antibiotics               | 4 (3)            | 4 (6)            | 0.27    |
| All-cause inpatient mortality   | 19 (16)          | 6 (10)           | 0.24    |

*Include linezolid and trimethoprim/sulfamethoxazole.

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1805. Impact of Antimicrobial Stewardship Interventions Using Rapid Molecular Testing on the Appropriate Use of Antimicrobial Therapy and Reduction of Unnecessary Antibiotic Therapy for Patients Admitted With Acute Influenza

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Background. Rapid molecular tests combined with Antimicrobial Stewardship Program (ASP) interventions have provided opportunities to optimize patient outcomes and reduce unnecessary antimicrobial use. Our institution currently uses an FDA approved influenza/respiratory syncytial virus polymerase chain reaction (PCR) assay. We aimed to implement a multiplex respiratory panel. In addition, our institution commonly utilizes procalcitonin (PCT) levels. The ASP at Summa Health System – Akron Campus (SHS-AC) routinely recommends use of these rapid diagnostic tests to assist with antimicrobial and antiviral usage, including the discontinuation of antibiotics in influenza positive patients in the absence of a concurrent bacterial infection.

Methods. A retrospective review of all ASP interventions on influenza positive patients at SHS-AC was performed from December 2017 to March 2018. The ASP reviewed all patients on broad-spectrum antibiotics >48 hours and all influenza positive patients without Infectious Disease consultation. The appropriateness of antimicrobial and antiviral therapy was assessed, including assessment of culture and PCR results, PCT levels, indication of therapy, and renal function. For patients with a positive influenza PCR and low PCT without evidence of bacterial infection, the recommendation was to discontinue antibacterial use. Data collected included: intervention type, acceptance rate, PCT levels, and influenza subtype.

Results. Two hundred thirty-three total recommendations were made by the ASP on influenza positive patients, with a 96.6% acceptance rate. Interventions included the following: obtain PCT level (54/233), de-escalate or stop antibiotics based on culture, PCR, and PCT results (116/233), obtain influenza or respiratory PCR (8/233), initiate oseltamivir (37/233), and other (18/233).

Conclusion. ASP interventions combined with PCT levels and PCR results contributed to the reduction of unnecessary antibiotic use, and the initiation of oseltamivir therapy in influenza-positive patients.

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1806. Implementation of Rapid Diagnostic Testing Without Active Stewardship Intervention for Gram-Positive Blood Cultures in a Community Teaching Hospital

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Background. Rapid diagnostic testing (RDT) for Gram-positive blood cultures has previously shown to significantly decrease time to appropriate antibiotic therapy as compared with traditional microbiological methods. Implementation of RDT with antimicrobial stewardship team (AST) notification may significantly improve RDT use and decrease time to optimal therapy; however, in community hospitals with limited resources AST notification may not be feasible. This study aimed to determine the impact of RDT implementation without AST notification on time to appropriate antibiotic therapy for blood cultures growing Gram-positive cocci (GPC) in clusters in a community teaching hospital.

Methods. A retrospective quasi-experimental study was conducted evaluating adult inpatients with a blood culture positive for GPC in clusters. The primary outcome of this study was to compare the time to appropriate therapy for Staphylococcal bacteremia in the pre-RDT group (January 1–June 30, 2016) vs. post-RDT group (January 1–June 30, 2017). Secondary endpoints included comparing the number of anti-MRSA doses administered to patients whose cultures grew coagulase-negative staphylococcus (CoNS) determined contaminants and length of stay (LOS) between groups.

Results. Two hundred fifty-two patients were included in the study: 109) and the median number of anti-MRSA doses was also significantly decreased (1 vs. 0 dose, P = 0.003). In the post-RDT group, significantly fewer patients with CoNS cultures had empiric anti-MRSA therapy ordered after Gram-stain (50% vs. 24.4%, P = 0.042). Mean LOS was significantly shorter for patients with CoNS contaminants in the post-RDT group (10.1 vs. 7.5 days, P = 0.036).

Conclusion. Implementation of the RDT without AST notification significantly improved time to de-escalation, decreased empiric anti-MRSA antibiotic exposure, and resulted in significantly shorter LOS for patients with CoNS contaminated blood cultures.

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to pharmacy-managed surveillance software for AST review and intervention. The primary outcome was time to optimal therapy (DOT) from initial culture positivity. Secondary outcomes included DOT based on organism and clinical pharmacy staffing hours, hospital length of stay, and all-cause mortality.

**Results.** Among 324 patients screened with a first episode of GN BSI, 121 and 119 patients were included in the pre- and post-intervention groups, respectively. Apart from intensive care unit admission at the time of culture collection, there were no significant differences in baseline characteristics between the two groups. The post-intervention group had a significantly shorter DOT (60.2 ± 36.0 hours vs. 29.0 ± 24.0 hours, P < 0.01). Notably, time to escalation for patients with third-generation cephalosporin-resistant isolates was significantly shorter in the post-intervention group (48 ± 36.0 hours vs. 19.2 ± 16.8 hours, P < 0.01). In the post-intervention group, DOT was significantly shorter during fully staffed clinical pharmacy hours vs. reduced clinical pharmacy staff hours (18.4 ± 31.2 hours vs. 31.4 ± 38.4 hours, P = 0.014). No differences were seen in length of stay or all-cause mortality.

**Conclusion.** The implementation of RDT with a pharmacy-driven AST substan
tially decreased DOT for GN BSIs. This study also highlights the positive impact of clinical pharmacy staff on shorter DOTs.

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1808. Matrix-Assisted Laser Desorption/Ionization-Time of Flight (MALDI-TOF) and Vitek 2 Along With Antimicrobial Stewardship (ASP) Result in Faster Antimicrobial Therapy for Infected Patients: The CHI Health Experience

**Background.** Rapid organism identification (ID) and antimicrobial susceptibility testing (AST) are critical to treatment of infected patients. We sought to capture time between specimens collected for bacterial culture and appropriate therapy for patients, along with other pertinent patient management data from 2017 (without MALDI-TOF/Vitek 2 and ASP) and 2018 (with MALDI-TOF/Vitek 2 and ASP).

**Methods.** Patients were eligible if admitted to CHI Health in March or April 2018 either with positive sputum, blood, or urine culture. Patients were retrospectively obtained from Microbiology Laboratory records in 2017 and sequent patients with positive cultures were reviewed. A total of 75 patients from each year (25 posi
tive blood cultures, 25 urine cultures, 25 sputum cultures), respectively, were com
pared. A time-in-motion study was performed to compare time to identification (ID), AST results and acted upon by ASP. Data were entered into SPSS (ver. 25) for analysis.

**Results.** Mean patient age and Charlson comorbidity index was not significantly different between 2017 and 2018. Time to obtain culture, delivery to Microbiology, and Gram-stain was not different between the two groups. Time to organism ID was significantly faster in 2018 (2018, 13 ± 23 hours; 2017, 34 ± 17 hours, P = 0.001). Time to AST results was also significantly faster for patients in 2018 compared with 2017 (19.8 ± 14.1 compared with 28.5 ± 15.1 hours, P = 0.001). ASP recommended significantly more adjustments to empiric antimicrobial therapy (25% of 2018 vs. 1% in 2017, P = 0.001). In addition, length of hospital stay was significantly shorter for patients in 2018 compared with 2017 (2018, 8.3 ± 7 days; 2017, 15.6 ± 18.3 days, P < 0.001). Finally, in-hospital length of antimicrobial therapy was significantly shorter in 2018 compared with 2017 (2018, 6.6 ± 3.7 days; 2017, 8.8 ± 7.7 days, P < 0.05).

**Conclusion.** The MALDI-TOF/Vitek 2 leads to an average 18 hours faster microbial ID and AST results. ASP is able to make recommendations for infectious diseases management more appropriately with quicker ID and AST results.

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1809. Improved Vancomycin Utilization With Rapidly Available Xpert MRSA/SA BC PCR and Microbiologist Case Review

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**Session:** 218. Antimicrobial Stewardship: Impact of New Diagnostics

**Background.** Staphylococcus aureus bloodstream infections are life threatening, and are empirically treated with vancomycin. Our objective was to assess the impact of a rap
idly available PCR for methicillin-resistant S. aureus (MRSA) on the amount and duration of vancomycin use in methicillin-sensitive S. aureus (MSSA) bloodstream infections.

**Methods.** In October 2016, the Xpert® MRSA/SA BC assay, a PCR to detect MRSA from blood cultures, was implemented at Kelowna General Hospital. MRSA PCR was performed on one bottle per episode for blood cultures with Gram-positive cocci in clusters at least in 3/4 bottles. The medical microbiologist promptly phoned the most responsible physician with results to streamline antibiotics. All episodes of MSSA bacteremia between January 1, 2013 and September 30, 2016 (pre-implementa
tion group) and January 1, 2017 to January 31, 2018 (post-implementation group), were matched to corresponding vancomycin defined daily doses (DDD) and days of therapy (DOT) in pharmacy records. Patients with 25 DOTS were excluded if they had allergies to β-lactams, polymicrobial infections with organisms requiring vanco
mycin, were on hemodialysis (vancomycin convenience dosing), or were transferred from another hospital with known S. aureus bacteremia. Mean vancomycin DDDs and DOTS, and the proportion of patients receiving less than one dose of vancomycin, were compared between groups. Categorical variables were analyzed using the chi-square test, while continuous variables were compared using the t-test.

**Results.** In the pre-PCR group, 383 episodes of MSSA bacteremia were identified, with 193 excluded. The post-PCR group, 600 episodes were identified, with 35 excluded. Significantly more patients received at least one dose of vancomycin in the pre-PCR (70.2%) compared with the post-PCR group (54.6%) (P < 0.01). The mean DDD was 1.5 in the post-PCR group, less than the pre-PCR group at 2.8 (P < 0.01). The mean DOTS also decreased, with the post-PCR group receiving less vancomycin (1.6 days) compared with the pre-PCR group (2.5 days) (P < 0.01).

**Conclusion.** Rapidly available MRSA PCR for S. aureus bloodstream infection coupled with antimicrobial stewardship performed by medical microbiologists led to a significant decrease in vancomycin use.

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1810. Therapeutic Drug Monitoring of Azole Antifungals at an Academic Medical Center: Opportunities and Lessons Learned

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**Background.** Therapeutic drug monitoring (TDM) is a valuable tool for cer
tain antifungals as it may increase the probability of a successful outcome, minimize drug-related toxicity and interactions, and potentially prevent emergent resistance. With an increasing emphasis on the need for antifungal and laboratory stewardship, we sought to review azole antifungal TDM practices at our institution.

**Methods.** This was a retrospective quality review of TDM at Cleveland Clinic Main Campus during a 6-month period (March 8, 2017–September 8, 2017), including all azole levels resulting during an inpatient admission. Levels were assessed for timing of collection, redundancy, indication, and characteristics of the patient and ordering service. Levels were further adjudicated as guideline-concordant (GC) or -discordant (GD) according to published TDM guidelines (Figure 1). Primary endpoint: percentage of GC azole levels. Secondary endpoints: indication for TDM, percentage of levels within range, actions taken following a level result, cost, and turnaround time.

**Results.** Of 301 azole levels obtained, 184 (61%) and 117 (39%) were classified GC and GD (Fig 3), respectively. GC and GD levels were collected a median 8 days (IQR 5–14) and 3 days (IQR 2–7) into therapy, respectively. GC levels were more likely to be within therapeutic range compared with GD levels (64% vs. 54%; P = 0.076). The most common TDM indications were per lung transplant prophylaxis protocol and concern for absorption (Figure 2). A total of 140 reasons for GD levels were found, with 54 (39%) an improperly timed voriconazole trough, 39 (13%) redundant TDM orders, 37 (12%) not at steady state, and 10 (3%) with unjustified TDM. Of 117 GD lev
dles, 35 (30%) resulted in antifungal modification within 48 hours, most commonly an increase in dose, n = 12 (10%). Mean collection-to-result turnaround time was 1.6 days for all azole levels, and significant levels were attributed to GD levels.

**Conclusion.** Our review of azole TDM suggests a significant proportion of levels obtained are discordant with available TDM guideline recommendations with respect to timing and redundancy. This presents an opportunity to improve test utilization, antifungal-related outcomes, and clinician confidence when interpreting and acting upon concentration data.

**Figure 1.**