**850. External Validation of the Methicillin-Resistant Staphylococcus aureus Bacteremia Score**

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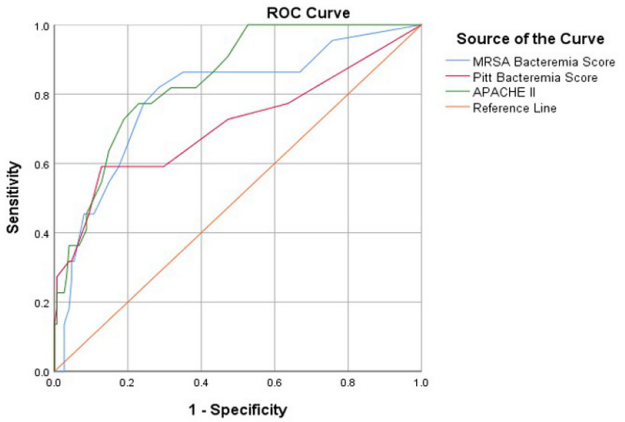
**Session:** P-37. HAI: Gram-positives (MRSA, MSSA, VRE)

***Background.*** Predictive scoring systems, such as the Pitt Bacteremia Score (PBS) and Acute Physiology and Chronic Health Evaluation II (APACHE-II), can optimize clinical decisions and provide adjustment for confounding among patients with Methicillin-Resistant *Staphylococcus aureus* bacteremia (MRSAB). The recently introduced MRSAB score demonstrated superior discriminatory ability in mortality prediction compared to APACHE-II and PBS, however external validation is lacking.

***Methods.*** Single center, retrospective cohort study of adult patients admitted to University of Colorado Hospital from 2013–2020 with initial episode of MRSAB were included. Patients transferred from an outside hospital, left against medical advice, or died/pursued comfort care within 24 hours of index culture were excluded. The primary outcome was discrimination of 30-day all-cause mortality. The discriminatory abilities of APACHE-II, PBS and MRSAB were compared using receiver operating characteristic (ROC) analysis. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were analyzed, and optimal MRSAB score was identified by Youden Index.

***Results.*** Overall, 170 patients met study inclusion. The median (IQR) age was 57 (47-66) years, 69% were male, and 19% were in an ICU during blood culture collection. The most common infection sites were skin and soft tissue (41%), musculoskeletal (23%), and line-related (19%), whereas endovascular (14%) infections were less common. The median (IQR) PBS, APACHE-II and MRSAB scores were 2 (0-4),17 (12-23), and 6.5 (3-11), respectively. Thirty-day all-cause mortality was 12.9%. ROC curve analysis revealed an area (95% CI) for the APACHE-II, PBS, and MRSAB scores of 0.84 (0.77-0.92), 0.71 (0.57-0.85), 0.79 (0.68-0.90), respectively. A threshold MRSAB score of ≥10 was identified, whereby mortality was 3.6% with MRSAB < 10, and 30% with MRSAB ≥10. A MRSAB ≥10 had a sensitivity, specificity, PPV and NPV with corresponding 95% CIs of 0.82 (0.63-0.94), 0.72 (0.68-0.79), 0.30(0.19-0.42) and 0.96(0.92-0.99), respectively.

Receiver operator characteristic (ROC) curves for the prediction of 30-day mortality




***Conclusion.*** The MRSAB score is a useful predictive scoring model, with discriminatory ability comparable to APACHE-II, and excellent NPV at ≥10. Our findings support routine clinical and research application.

***Disclosures.*** **matthew miller, PharmD**, **Allergan** (Speaker's Bureau)**Tetraphase** (Speaker's Bureau)

**851. Compliance with Guidelines for Management of *Staphylococcus aureus* Bacteremia and its Effect on Mortality**

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**Session:** P-37. HAI: Gram-positives (MRSA, MSSA, VRE)

***Background.*** In the US, Staphylococcus aureus Bacteremia (SAB) occurs in about 19.7 /100,000 people. A recent increase in methicillin-resistant Staphylococcus aureus (MRSA) bacteremia infections rate and mortality has led to more infectious diseases (ID) consultations. We assessed if an infectious diseases consultation within 7 days of initial blood culture results was associated to greater compliance with Infectious Diseases Society of America (IDSA) guidelines for managing Staphylococcus aureus bacteremia and a decrease in all-cause mortality and relapse within 90 days.

***Methods.*** A retrospective cohort of patients admitted to two community hospitals from January 2014 to June 2016 with a positive blood culture for methicillin-susceptible S. aureus (MSSA), MRSA, or coagulase-negative Staphylococcus were included in the study. I. Patients were excluded if they were immunocompromised, had a polymicrobial blood stream infection, died within first 48 hours of admission, left against medical advice during treatment or participated in another study requiring an alternative treatment strategy.

***Results.*** A total of 331 patients were included in the analysis. A significantly higher proportion of patients with complicated SAB had an ID consult (61% vs. 17.5%, p< .0001) and for uncomplicated SAB the reverse was true (39% vs 79%, P< .0001). An ID consult was associated with increased compliance with IDSA guidelines (75% vs. 5%, p< .0001). Patients with an ID consult had a significantly higher duration of antibiotic treatment [30(14-42) vs. 5(1.5-12), p< .0001], an earlier start of treatment in number of days [0(0-7) vs. 0(0-12), p=0.036] and a lower mortality within 90 days of blood culture (61% vs. 17.5%, p< .0001). Logistic regression model showed than an ID consult reduced 90-day mortality by 69%, OR 0.313[CI 95 %(0.313-0.154), p=0.001] and transesophageal echography by 78%, OR 0.228[CI 95 %(0.228-0.052), p=0.05].

Population characteristics and outcomes

Table 1: Population Characteristics and outcomes

| | ID Consult (268) | No ID Consult (63) | P-value |
|---|---|---|---|
| Age, Years Median(IQR) | 62(47,75) | 65(48,83) | 0.1 |
| Female, %(N) | 37(98) | 44(28) | 0.247 |
| Hemodialysis at the Time of Blood Culture, %(N) | 10(26) | 8(5) | 0.44 |
| Implanted Prothesis or Device, %(N) | 20.5(55) | 13(8) | 0.155 |
| Intraveinus Drug User, %(N) | 17.5(47) | 8(5) | 0.139 |
| *Bacteremia Results* | | | |
| Uncomplicated *Staphylococcus aureus* Bacteremia, %(N) | 39(105) | 79(50) | <0.0001 |
| Complicated *Staphylococcus aureus* Bacteremia, %(N) | 61(164) | 17.5(11) | <0.0001 |
| MRSA, %(N) | 54.5(146) | 51(32) | 0.598 |
| MSSA, %(N) | 46(123) | 49(31) | 0.635 |
| *Procedures* | | | |
| Compliance with Guidelines, %(N) | 75(202) | 5(3) | <0.0001 |
| Repeat Blood Cultures within 2-4 Days of Culture, %(N) | 94(251) | 19(30) | <0.0001 |
| Echocardiogram within 10 Days of Culture, %(N) | 90(241) | 32(20) | <0.0001 |
| Transesophageal Echocardiogram, %(N) | 28(74) | 3(2) | <0.0001 |
| Transthoracic Echocardiogram, %(N) | 85(227) | 33(21) | <0.0001 |
| Removal of Catheters, %(N) | 66(177) | 36.5(23) | <0.0001 |
| Duration of Effective Antibiotic Therapy, Days, Median (IQR) | 30(14,42) | 5(1.5,12) | <0.0001 |
| Nb. Of Days between Blood Culture Results and start of Antibiotics, Median(Min, Max) | 0(0,7) | 0(0,12) | 0.036 |
| *Outcome* | | | |
| Mortality within 90 Days of Blood Culture, %(N) | 9(25) | 30(19) | <0.0001 |
| Relapse within 90 Days of Treatment, %(N) | 4(10) | 2(1) | 0.345 |

***Conclusion.*** ID consultation in the setting of SAB has been shown to increase compliance with IDSA guidelines and reduce 90-day mortality.

***Disclosures.*** **All Authors**: No reported disclosures

**852. Genomic Clusters of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Causing Bloodstream Infections (BSIs) in Hospitalized Adults, 2018-19**

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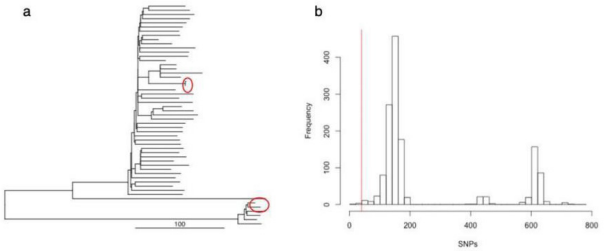
**Session:** P-37. HAI: Gram-positives (MRSA, MSSA, VRE)

***Background.*** MRSA BSIs have 15-50% mortality and are commonly diagnosed in US hospitals. However, the frequency of hospital transmission of MRSA causing BSI is unknown.

***Methods.*** We performed Illumina shotgun whole genome sequencing (WGS) of 106 sequential MRSA isolates from different adults with a BSI at two Philadelphia academic hospitals in a single health system in July 2018-June 2019. We abstracted clinical data from the electronic medical record. Genomic data were analyzed preliminarily using the Staphopia Analysis Pipeline.

***Results.*** Among 106 subjects, 51.9% were male, 47.2% were white, 46.2% were black, 23.6% were < 40 years of age, and mean age was 53.1 years (s.d. 17 years). One isolate had WGS data that were inadequate for analysis. Of 105 genomes, 52 were clonal cluster (CC) 8, 22 were sequence type (ST) 5, and 16 were ST105; the remaining 15 strains belonged to 8 other CCs. Of CC8 strains, 44 were USA300 and 6 were USA500. There were 6 clusters (i.e., < 35 SNP differences in the core genome) among the 105 isolates. Four clusters were CC5 and two were CC8 strains. One cluster of CC5 strains involved 3 subjects, and 5 clusters involved 2 subjects. One cluster of ST8/USA300 strains were separated by only 1 SNP (Fig a). This and two other clustered pairs were from subjects who had overlapping hospital stays. Two of these paired subjects had an overlap in the same unit while the third pair was in the hospital together on a number of occasions (total of 40 days overlap) but never simultaneously in the same unit. The other three clustered pairs did not have temporally overlapping hospital stays, suggesting transmission via a hospital reservoir. One of these three pairs had hospitalizations overlapping in time, one at each study hospital, before each of them had infections with the related MRSA strains. There was not a clear-cut clustering of SNP distances among the isolate genomes into transmission and non-transmission groups, with some pairs of patient isolates separated by 40-80 SNPs (Fig. b).

Figure 1.




(a) Phylogenetic tree of 53 CC8 MRSA isolates based on whole-genome alignment from University of Pennsylvania bloodstream infections in 2019. Scale shows 100 SNPs. Red circles are strains with < 40 SNPs. (b) Histogram of pairwise SNP differences between strains, with red line indicating the 40 SNP threshold. Data shows evidence for healthcare based transmission of bacteremia strains, although different thresholds need to be modeled.

***Conclusion.*** We were able to discern from WGS data alone that some MRSA BSIs in 2 hospitals were likely due to strains transmitted between patients. Universal WGS of BSI strains may detect MRSA outbreaks in real time, even in the absence of overlapping hospitalizations, and is an emerging strategy to detect healthcare transmission of MRSA.

***Disclosures.*** Michael Z. David, MD PhD, GSK (Consultant)

**853. Hospital-acquired Infections by Vancomycin-Resistant *Enterococcus* (VRE): Results in 3 Years of Multicenter Study**

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**Session:** P-37. HAI: Gram-positives (MRSA, MSSA, VRE)

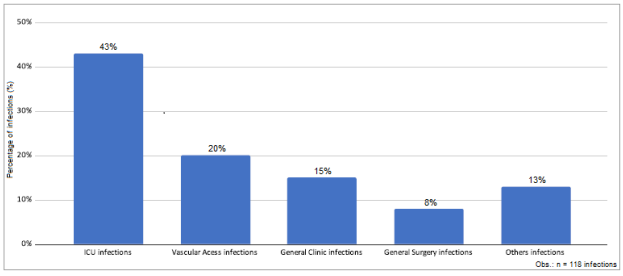
***Background.*** Vancomycin-Resistant *Enterococcus* (VRE) is considered one of the main pathogens of hospital-acquired infections (HAI), responsible for high morbidity and mortality rates. HAI caused by this bacteria, especially in intensive care units (ICU), are concerning for the health system, given that the microorganism is multi resistant to most antimicrobials available, especially vancomycin. Therefore, the present study is built from and analyzes the data of VRE, collected by the Infection Prevetion and Control Service of hospitals in Brazil, to clarify: the incidence rate, the gross lethality of these infections and what are the profiles of infected patients.

***Methods.*** Collection and analysis of epidemiological data, according to the National Healthcare Safety Network (NHSN) protocol of the Centers for Disease Control and Prevention (CDC), in 10 hospitals in Brazil, between Jan/2017 - Dec/2019.

***Results.*** In three years, 118 VRE infections were diagnosed in the hospitals analyzed: 51 from ICU (43%), 24 from Vascular Acess (20%), 18 from General Clinic (15%), 10 from General Surgery (8%) and 15 from Others (13%). Patients ages ranged from 0 to 93 years, with a mean of 62 years (standard deviation of 20 years) and a median of 66 years. Time between admission and diagnosis of infection was 1 to 1001 days, with a mean of 68 days (standard deviation of 25 days) and a median of 59 days. The gross lethality for VRE infections was 47/118 (40%). The infection sites were: Bloodstream Infections – BSI = 34 (29%); Urinary Tract Infections – UTI = 28 (24%); Surgical Site Infections – SSI = 27 (23%); Skin and Soft Tissue Infections – SST = 14 (12%); Bone and Joint Infections – BJ = 5 (4%); Cardiovascular System Infections – CVS = 5 (4%); Lower Respiratory System Infections, other than pneumonia – LRI = 2 (2%); Pneumonia – PNEU = 2 (2%) and Gastrointestinal System Infections – GI = 1 (1%).

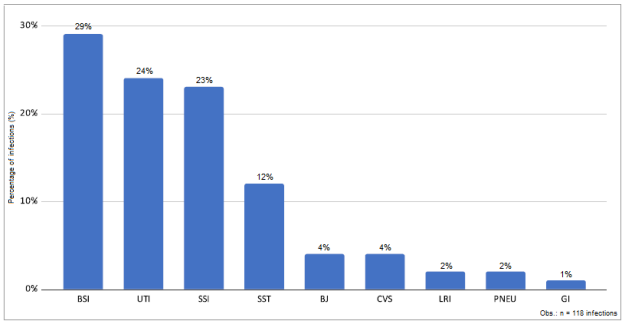
Percentage of VRE infections by hospital units

**Graph 01. Percentage of VRE infections by hospital units**




Percentage of VRE infections by infection sites

**Graph 02. Percentage of VRE infections by infection sites**




Infection sites of VRE infections by hospital

**Table 01. Infection sites of VRE infections by hospital**

| Hospital | BSI | CVS | SSI | UTI | LRI | PNEU | SST | BJ | GI |
|---|---|---|---|---|---|---|---|---|---|
| I | 57% | 29% | 14% | - | - | - | - | - | - |
| II | 33% | 1% | 2% | 33% | 1% | - | - | - | - |
| III | 72% | - | - | 27% | - | - | - | - | - |
| IV | 40% | - | 20% | 20% | - | 20% | - | - | - |
| V | 67% | - | 33% | - | - | - | - | - | - |
| VI | 1% | - | 41% | 25% | 1% | - | 17% | - | - |
| VII | 33% | 1% | 44% | - | - | - | 1% | - | - |
| VIII | 12% | - | 23% | 30% | - | - | 23% | 11% | 1% |
| IX | - | 50% | - | 50% | - | - | - | - | - |
| X | 50% | - | 25% | 25% | - | - | - | - | - |
| **Total** | **29%** | **24%** | **23%** | **12%** | **4%** | **4%** | **2%** | **2%** | **1%** |

***Conclusion.*** VRE infection is a highly lethal event that usually occurs after two months of hospitalization. The main site of infection is the BSI, with a higher incidence in patients over 62 years or the ones in ICU. Early and accurate investigations of multiresistant microorganisms in a hospital setting are necessary to reduce patient morbidity and mortality.

***Disclosures.*** **All Authors**: No reported disclosures

**854. Infection Prevention vs. Antimicrobial Stewardship: Does Nasal Povidone-Iodine Interfere with Methicillin Resistant *Staphylococcus aureus* (MRSA) Screening?**

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**Session:** P-37. HAI: Gram-positives (MRSA, MSSA, VRE)

***Background.*** As part of universal decolonization, intensive care unit (ICU) patients may receive intranasal mupirocin to reduce MRSA infections. However, due to concerns about widespread use of mupirocin promoting resistance, some have proposed a bactericidal antiseptic, povidone-iodine (P-I), as an alternative. There are few data as to whether either agent reduces the sensitivity of MRSA nares screening. This study aimed to discern whether intranasal P-I interferes with MRSA screening via polymerase chain reaction (PCR) and/or culture.

***Methods.*** We performed a prospective proof-of-concept cohort study at our >1200-bed, community-based academic health care system, enrolling 20 patients who screened MRSA-positive by PCR on admission to a medical ICU, medical-surgical ICU, or medical stepdown unit. All patients received twice-daily intranasal P-I (7.5%) for 5 days or until unit discharge. We obtained follow-up nasal MRSA PCR tests after 4-6 days, and confirmed all PCR results with MRSA cultures using CHROMagar™. We calculated sensitivity of MRSA PCR at follow-up using culture as the gold standard.

***Results.*** Twenty patients were enrolled, with a median age of 72 years (range, 53-91). Most (75%) were admitted with active infection, and 40% had known MRSA history. All baseline PCRs were confirmed by positive culture. Patients underwent a mean of 8.1 (range, 4-13) nasal P-I applications prior to follow-up testing. At follow up, 16/20 (80%) remained MRSA-positive via both PCR and culture. Of the 4 patients with negative follow-up results, 1 was both PCR-/culture-, 2 were PCR+/culture- and 1 was PCR-/culture+. All 4 had received ≥1 doses of vancomycin, and one person had received ≥1 doses of linezolid. The sensitivity of MRSA PCR at follow-up was 94%.

***Conclusion.*** MRSA PCR remains highly sensitive even after multiple applications of P-I, and may be more sensitive than culture. If clinicians wish to screen for