**Figure 1. Final Allogeneic Hematopoietic Stem Cell Transplant Recipient Bacterial Sepsis Decision Tree and Criteria Tools**

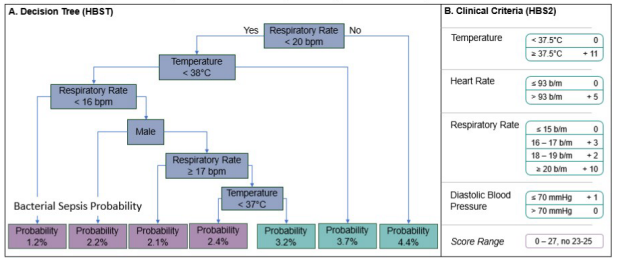
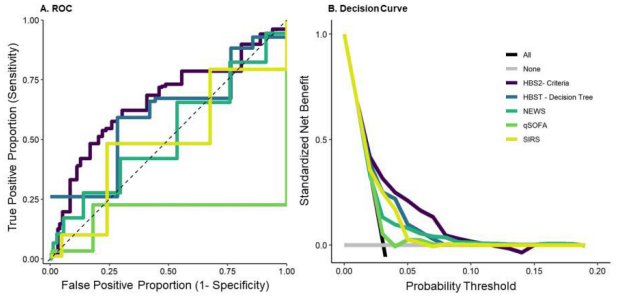



**Figure 2. Receiver Operating Characteristic (ROC) Curve and Decision Curve for Each Evaluated Prediction Tool in Relation to Bacterial Sepsis Among Allogeneic Hematopoietic Stem Cell Transplant Recipients with Potential Infections**




***Conclusion:*** We developed aHCT recipient-specific bedside bacterial sepsis prediction tools with higher AUCs than existing criteria. Tools targeted to high-risk populations may lead to fewer missed sepsis events and, in turn, reduce sepsis related mortality among this high-risk population.

***Disclosures:*** **Steven A. Pergam, MD, MPH**, **Chimerix, Inc** (Scientific Research Study Investigator)**Global Life Technologies, Inc.** (Research Grant or Support)**Merck & Co.** (Scientific Research Study Investigator)**Sanofi-Aventis** (Other Financial or Material Support, Participate in clinical trial sponsored by NIAID (U01-AI132004); vaccines for this trial are provided by Sanofi-Aventis)

## 282. Epidemiological Evaluation of Methicillin-Resistant *Staphylococcus aureus* (MRSA) and Methicillin-Susceptible *Staphylococcus aureus* (MSSA) Bacteremia: A Comprehensive Cancer Center's 10-Year Experience

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**Session:** P-9. Bacteremia

***Background:*** Coagulase-positive *Staphylococcus aureus* bacteremia among cancer patients carries significant morbidity and mortality. This study aims to compare the risk factors and clinical outcomes among cancer patients diagnosed with bloodstream infection (BSI) with methicillin-sensitive *S. aureus* (MSSA) or methicillin-resistant *S. aureus* (MRSA).

***Methods:*** We performed a retrospective cohort study on all patients diagnosed with an active solid tumor or hematologic cancer with positive blood culture for *S. aureus* from January 2009 to May 2019. We collected data on demographics, comorbidities, malignancy type, venous access, neutropenia status, echocardiogram results, treatment (tx) duration, antibiotics usage pre/post culture, hospital LOS, infection severity, and 7-day and 30-day mortality. We used the Chi-square test to analyze categorical variables, t-test to analyze continuous variables, and the Kaplan-Meier survival curve and multivariate regression to analyze mortality.

***Results:*** Two hundred eighty-three cases with malignancies and *S. aureus* BSIs were reviewed, and 168 were identified with BSIs for MRSA or MSSA during the ten years. The mean age for MRSA cases was 73.1 (±13.7) and 70.1 (± 14.6) for MSSA; male patients were most of the sex ($P < 0.01$). MRSA and MSSA bacteremia presented equally in hematologic malignancies, while MSSA was observed more in skin cancer than MRSA. Cancers that obstruct GU tracts may be associated with MRSA and MSSA from urine source as both were overrepresented in patients with bladder and rectal cancer. In most patients, the CVC was promptly removed and appropriate antibiotics were given promptly within 1 hour of the positive blood culture. For patients who underwent echocardiogram, most had a negative result in both groups. There was no significant difference for seven and 30-day mortality between the two groups. The mean hospital LOS was longer for MRSA cases (10.5 ± 13.5) versus MSSA cases (4.88 ± 9.1), ($P < 0.01$).

**Table 1. Characteristics of Cancer Patients with MRSA vs. MSSA**

| Data | | MRSA (n=84) | MSSA (n=84) | *P*-Value |
|---|---|---|---|---|
| Age Group | | | | |
| | 1-25 | 1 (1.2%) | 2 (2.4%) | |
| | 26-50 | 13 (15.5%) | 18 (21.4%) | |
| | 51-75 | 61 (72.6%) | 58 (70.7%) | |
| | 76-99 | 9 (10.7%) | 6 (7.3%) | |
| | Mean | 73.1 (±13.7) | 70.1 (±14.6) | *P* = 0.180 |
| Sex | | | | ***P* = 0.026** |
| | Female | 39 (46.4%) | 25 (29.8%) | |
| | Male | 45 (53.6%) | 59 (70.2%) | |
| Race | | | | *P* = 0.982 |
| | White | 70 (83.3%) | 69 (82.1%)* | |
| | Black | 10 (11.9%) | 9 (10.7%) | |
| | Other | 4 (4.8%) | 4 (4.8%) | |
| Malignancy | | | | *P* = 0.211 |
| | Hematologic | 39 (45.2%) | 31 (34.5%) | |
| | Non-Hematologic | 45 (53.6%) | 53 (64.6%) | |
| Neutropenic Status[3] | | | | *P* = 0.941 |
| | Non-Neutropenic | 48 (63.5%) | 54 (67.1%) | |
| | Moderate-Neutropenia | 5 (6.8%) | 5 (6.3%) | |
| | Severe- Neutropenia | 22 (29.7%) | 22 (26.6%) | |
| Comorbid Conditions | | | | *P* = 0.419 |
| | Mean | 2.12 (±1.7) | 1.90 (±1.7) | |
| Catheterization | | | | |
| | PICC | 65 (77.4%) | 66 (78.6%) | *P* = 0.485 |
| | CVAD | 59 (70.2%) | 55 (65.5%) | *P* = 0.514 |
| History of Bacteremia | | 19 (23.2%) | 10 (12.2%) | *P* = 0.066 |
| TTE/TEE, negative | | 54 (64.3%) | 58 (69.4%) | *P* = 0.583 |
| Insurance Type | | | | *P* = 0.409 |
| | Private | 38 (45.2%) | 47 (56%) | |
| | Medicare/Medicaid | 29 (34.5%) | 21 (25%) | |
| | Other | 10 (12.2%) | 8 (9.7%) | |
| | N/A | 7 (8.5%) | 8 (9.7%) | |
| Prophylactic antibiotics | | | | *P* = 0.749 |
| | Vancomycin | 30 (36.5%) | 32 (40%) | |
| Antibiotics | | | | ***P* < 0.001** |
| | Vancomycin | 69 (81.7%) | 43 (51.2%) | |
| Clinical Outcomes | | | | |
| | 7-day Mortality | 9 (10.7%) | 9 (10.7%) | *P* = 0.598 |
| | 30-day Mortality | 19 (22.6%) | 13 (15.5%) | *P* = 0.428 |
| | Mean Hospital LOS | 10.5 (± 13.5) | 4.88 (± 9.1) | ***P* < 0.01** |
| | Port Removal | 42 (50%) | 43 (51%) | *P* = 0.877 |
| | PICC Removal | 19 (22.6%) | 20 (23.8%) | *P* = 0.821 |
| | Duration of Bacteremia | 5.76 (± 8.59) | 4.00 (± 4.12) | *P* = 0.092 |

[1]P-values are from chi-squared tests or *t*-tests
[2]Some data values missing
[3]Moderate neutropenia absolute neutrophil count (ANC) ≥500 and <1000 cells/microL, severe neutropenia ANC <500 cells/microL
PICC: peripherally inserted central catheter, CVAD: central venous access device, TTE: transthoracic echocardiogram, TEE: transesophageal echocardiogram

Figures 1 & 2. Kaplan-Meier Survival Curve Comparing 7 and 30-day Mortality of Cancer Patients with MRSA vs MSSA BSI

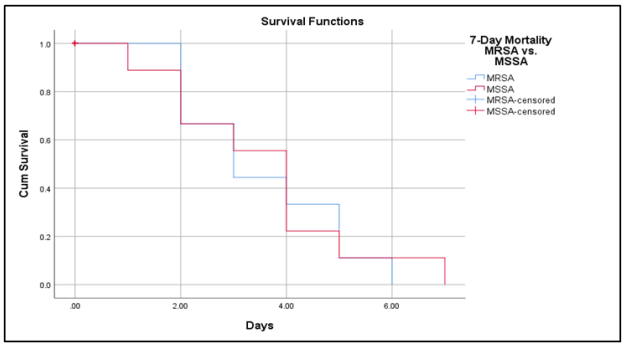


*Figure 1.* Kaplan-Meier survival curve comparing 7-day mortality of cancer patients with MRSA versus MSSA

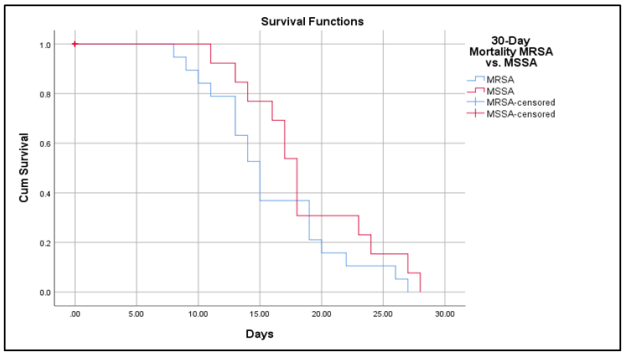


*Figure 2.* Kaplan-Meier survival curve comparing 30-day mortality of cancer patients with MRSA versus MSSA

Figure 3 & 4. Distribution of Cancer Types for MRSA (n=84) and MSSA (n=84) BSI

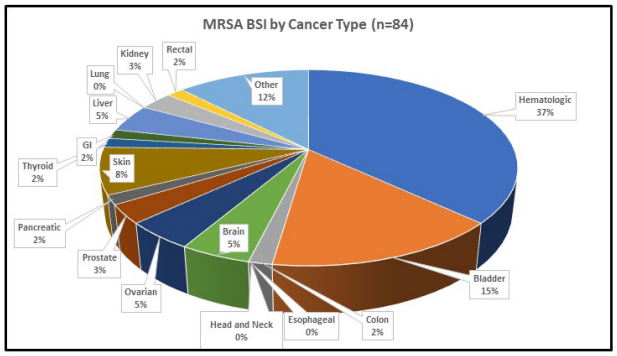


*Figure 3.* Pie chart of MRSA BSIs by Cancer Type (n=84)

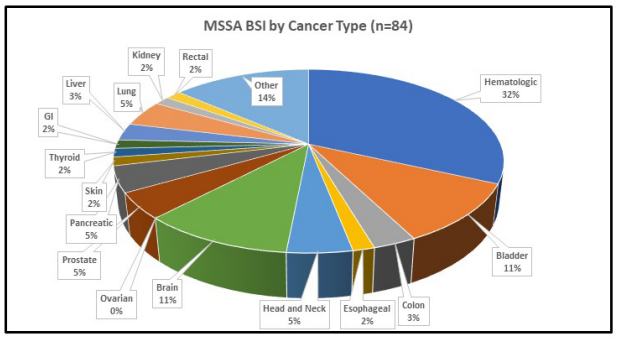


*Figure 4.* Pie chart of MSSA BSIs by Cancer Type (n=84)

***Conclusion:*** Endocarditis with either MRSA or MSSA BSI is not a prominent finding among cancer patients at our institution. Given the extensive usage of CVCs and devices in patients with malignancies, prompt removal and antibiotic administration are essential to reduce morbidity; even then, the LOS for MRSA BSI remains longer than MSSA BSI.

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

### 283. Epidemiology and Clinical Significance of Persistent Bacteremia in Severely Burned Patients

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**Session:** P-9. Bacteremia

***Background:*** Recent literature questions the utility of follow-up blood cultures (FUBC), especially for gram-negative bloodstream infections (BSIs). This has yet to be evaluated in the burn intensive care unit (BICU), where many BSIs are gram-negative. We evaluated the FUBC frequency, positivity rate, and clinical significance of persistent BSI (p-BSI) in BICU patients.

***Methods:*** Patients ≥ 18 years old admitted to the US Army Institute of Surgical Research for combat-related thermal burns from 1/2003–6/2014 were included. P-BSI was defined as the same organism isolated from initial and FUBC (within 1–5 days). Non-p-BSI (np-BSI) included patients without subsequent isolation of the same organism between 1–5 days post-positive blood culture. Exclusion criteria were initial blood culture with usual skin flora, polymicrobial BSI, fungemia, and death within 24 hours of notification of initial positive blood culture. Those factors significantly associated with mortality on univariate analysis were evaluated with binomial logistic regression (BLR).

***Results:*** Of 126 patients meeting inclusion criteria with BSI, 53 (42.1%) had p-BSI and 73 (57.9%) had np-BSI (table 1). 50 (67.6%) np-BSI patients had FUBC. P-BSI and np-BSI patients did not differ in age, gender, or race, but p-BSI and np-BSI patients had median total body surface area (TBSA) burns of 47 (IQR 34–63) and 35.3 (IQR 23.3–56.6), respectively (p=0.021). P-BSI patients had longer hospitalizations, ICU stays, and intubations (p< 0.01; table 1). Microbiology did not differ between p-BSI and np-BSI (p=0.517). Notably, 20 (37.7%) p-BSI patients died compared to 8 (10.8%) np-BSI patients (p< 0.001; table 2). BLR revealed that p-BSI (p=0.031), TBSA (p< 0.001), ISS (p=0.008), and length of ICU stay (p=0.002) and intubation (p< 0.001) were independently significantly associated with mortality.

Table 1: Clinical characteristics of burn patients with and without persistent bacteremia

| | Non-persistent Bacteremia n=73 (%) | Persistent Bacteremia n=53 (%) | p-value |
|---|---|---|---|
| Age, years, median (IQR) | 24 (21-30) | 23 (21-28) | 0.620 |
| Male gender | 71 (97.3) | 52 (98.1) | 1.000 |
| Race | | | 0.640 |
| African American | 11 (15.1) | 4 (7.5) | |
| Hispanic | 7 (9.6) | 6 (11.3) | |
| Other | 15 (20.5) | 12 (22.6) | |
| Caucasian | 40 (54.8) | 31 (58.5) | |
| Conflict Theater | | | 0.277 |
| Operation Iraqi Freedom | 62 (84.9) | 41 (77.4) | |
| Operation Enduring Freedom | 11 (15.1) | 12 (22.6) | |
| TBSA, median (IQR) | 35 (23-54) | 47 (34-63) | 0.016 |
| Second degree burns, median (IQR) | 7 (3-11.5) | 6 (2-11.5) | 0.389 |
| Third degree burns, median (IQR) | 27.5 (11-46.5) | 41 (25-58.5) | 0.007 |
| ISS, median (IQR) | 25 (18-34) | 29 (25-41) | 0.046 |
| Inhalational injury | 31 (42.5) | 24 (45.3) | 0.753 |
| Days from injury to arrival, median (IQR) | 3 (2-4) | 3 (2-4) | 0.853 |
| Hospital days (total), median (IQR) | 51 (31-88) | 79 (43-138) | 0.008 |
| Intensive care unit days, median (IQR) | 18 (11-41) | 48 (17-90) | <0.001 |
| Ventilator days, median (IQR) | 6 (3-15) | 17 (6-55) | <0.001 |
| Days from injury to initial positive blood culture, median (IQR) | 8 (5-15) | 13 (6-35) | 0.060 |
| Microbiology of initial positive blood culture | | | 0.517 |
| *Staphylococcus aureus* | 9 (12.3) | 5 (9.4) | |
| Viridans streptococci | 3 (4.1) | 0 | |
| *Streptococcus* species, other | 3 (4.1) | 0 | |
| *Streptococcus pneumoniae* | 0 | 1 (1.9) | |
| *Enterococcus* species | 1 (1.4) | 0 | |
| *Acinetobacter baumannii* complex | 23 (31.5) | 22 (41.5) | |
| *Klebsiella* species | 15 (20.5) | 11 (20.8) | |
| *Pseudomonas aeruginosa* | 7 (9.6) | 8 (15.1) | |
| *Serratia* species | 7 (9.6) | 4 (7.5) | |
| *Enterobacter* species | 2 (2.7) | 1 (1.9) | |
| *Aeromonas hydrophilia* | 0 | 1 (1.9) | |
| *Escherichia coli* | 1 (1.4) | 0 | |
| *Stenotrophomonas maltophilia* | 1 (1.4) | 0 | |
| *Chryseobacterium* species | 1 (1.4) | 0 | |
| Hospital length of stay following initial positive blood culture, median (IQR) | 42 (20-71) | 58 (31-92) | 0.072 |
| Condition at discharge | | | 0.001 |
| Death | 8 (11.0) | 20 (37.7) | |
| Severe disability | 6 (8.2) | 4 (7.5) | |
| Moderate recovery | 8 (11.0) | 10 (18.9) | |
| Full recovery | 51 (69.9) | 18 (34) | |
| Transfer to another facility | 0 | 1 (1.9) | |
| Mortality | 8 (11.0) | 20 (37.7) | <0.001 |

Table 2: Univariate analysis evaluating associations with mortality in burn patients with bacteremia

| | Survival N=98 (%) | Death N=28 (%) | p-value |
|---|---|---|---|
| Age, median (IQR) | 24 (21-29) | 23 (21-31.3) | 0.839 |
| Male gender | 97 (99.0) | 26 (92.9) | 0.124 |
| Race | | | 0.221 |
| African American | 9 (9.2) | 6 (21.4) | |
| Hispanic | 9 (9.2) | 4 (14.3) | |
| Other | 23 (23.5) | 4 (14.3) | |
| Caucasian | 57 (58.2) | 14 (50.0) | |
| Conflict Theater | | | 0.951 |
| Operation Iraqi Freedom | 80 (81.6) | 23 (82.1) | |
| Operation Enduring Freedom | 18 (18.4) | 5 (17.9) | |
| TBSA, median (IQR) | 35 (23.3-52.3) | 63 (46.8-74.6) | <0.001 |
| Second degree burns, median (IQR) | 6.8 (2.1-11.5) | 7.5 (2.6-12.1) | 0.916 |
| Third degree burns, median (IQR) | 27.8 (12.9-44.6) | 52.5 (41.4-68.0) | <0.001 |
| ISS, median (IQR) | 25 (17.3-34) | 34 (26-50) | <0.001 |
| Inhalational injury | 38 (38.8) | 17 (60.7) | 0.039 |
| Days from injury to arrival, median (IQR) | 3 (2-4) | 3 (2-4) | 0.722 |
| Hospital days (total), median (IQR) | 62.5 (36.8-102.5) | 45 (10.5-66.8) | 0.439 |
| Intensive care unit days, median (IQR) | 20.5 (11-48) | 63.5 (18-97.5) | 0.003 |
| Ventilator days, median (IQR) | 6.5 (3-13.8) | 54.5 (18.5-83.5) | <0.001 |
| Days from injury to initial positive blood culture, median (IQR) | 10 (5-21.8) | 10 (6.8-24) | 0.573 |
| Persistent Bloodstream infection | 33 (33.7) | 20 (71.4) | <0.001 |
| Microbiology of initial positive blood culture | | | 0.767 |
| *Staphylococcus aureus* | 11 (11.2) | 3 (10.7) | |
| Viridans streptococci | 3 (3.1) | 0 | |
| *Streptococcus* species, other | 3 (3.1) | 0 | |
| *Streptococcus pneumoniae* | 1 (1.0) | 0 | |
| *Enterococcus* species | 1 (1.0) | 0 | |
| *Acinetobacter baumannii* complex | 32 (32.7) | 13 (46.4) | |
| *Klebsiella* species | 21 (21.4) | 5 (17.9) | |
| *Pseudomonas aeruginosa* | 11 (11.2) | 4 (14.3) | |
| *Serratia* species | 9 (9.2) | 2 (7.1) | |
| *Enterobacter* species | 3 (3.1) | 0 | |
| *Aeromonas hydrophilia* | 1 (1.0) | 0 | |
| *Escherichia coli* | 1 (1.0) | 0 | |
| *Stenotrophomonas maltophilia* | 0 | 1 (3.6) | |
| *Chryseobacterium* species | 1 (1.0) | 0 | |

***Conclusion:*** P-BSI was common in this burn population. Severe burns and longer duration of hospitalization, ICU stays, and intubation, but not microbiology were associated with p-BSI. However, p-BSI (in addition to more traditionally