223. Predicting Mortality Among Immunocompromised Patients Who Present With Bloodstream Infection

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Background. The revised definition of sepsis (Sepsis-3) uses Sequential Organ Failure Assessment (SOFA) and quick SOFA (qSOFA) to identify patients with sepsis instead of systemic inflammatory response syndrome (SIRS) criteria. Subsequent studies revealed contradictory results pertaining to qSOFA, and limited data are available for immunocompromised patients. The objectives of this study were to (1) evaluate the performance of Sepsis -3 in a cohort of immunocompromised patients with microbiologically-proven sepsis, defined as having received antibiotics and having bloodstream infection (BSI); and (2) to compare its performance in the BSI cohort to its performance in immunocompromised patients who received antibiotics but did not have BSI (Non-BSI cohort).

Methods. Adult patients with hematologic malignancy or solid transplant recipients admitted to Michigan Medicine between 2012–2017 with suspected infection were included based on criteria used in the Sepsis-3 study: having both a body fluid culture and having received intravenous antibiotics. SOFA, qSOFA and SIRS components within 1 day of the index date (culture date or antibiotic date, whichever came first) were extracted from the medical record. For each group, a baseline risk model for mortality was created including age, gender, race, and Charlson comorbidity index. Each score (SOFA ≥ 2, qSOFA ≥ 2, SIRS ≥ 2) was added to the baseline risk model as a dichotomous variable and AUROC values were calculated.

Results. 2822 patients with a mean age of 56.8±15.6 were included. 349 (12.4%) had BSI. The most common immune compromising conditions were solid-organ transplantation (47%), lymphoma (21.3%) and acute leukemia (17%). 14% of patients in the BSI cohort died during hospitalization compared with 6.6% in the non-BSI cohort ($P < 0.001$). For the BSI cohort, when SOFA ≥ 2, qSOFA ≥ 2, SIRS ≥ 2 scores were added to the model, the AUROC values were less than those for the non-BSI cohort (table). The addition of SOFA ≥6 to the baseline risk model produced the highest AUROC values in both the BSI and non-BSI cohorts (figure).

Conclusion. Among immunocompromised patients, an SOFA score ≥6 was the strongest predictor of mortality. Surprisingly, sepsis scores performed better in the non-BSI cohort than in the BSI cohort.

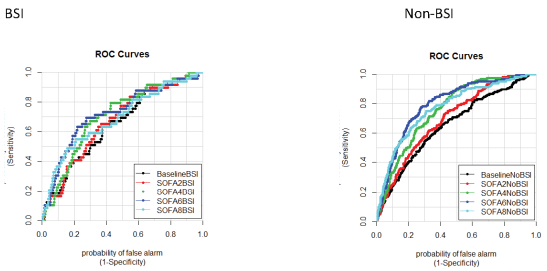
Table: Comparison of AUROC of the mortality risk models between patients with or without BSI:

	AUROC (CI) Entire cohort N=2822	AUROC (CI) BSI group N=349	AUROC (CI) Non-BSI group N=2473	P-value (BSI vs Non-BSI)
Baseline risk model	0.66 (0.67, 0.75)	0.66 (0.58,0.73)	0.656 (0.61, 0.70)	0.98
Adding SOFA≥2	0.70 (0.66, 0.73)	0.670 (0.59,0.75)	0.70 (0.66, 0.74)	0.51
Adding SOFA≥3	0.73 (0.69, 0.76)	0.69 (0.61,0.77)	0.73 0.70, 0,77)	0.34
Adding SOFA≥4	0.75 (0.72, 0.78)	0.71 (0.63,0.78)	0.76 (0.73, 0.79)	0.20
Adding SOFA≥5	0.78 (0.74, 0.81)	0.71 (0.63,0.79)	0.79 (0.75, 0.82)	0.10
Adding SOFA≥6	**0.78 (0.75, 0.82)**	**0.72 (0.64, 0.80)**	**0.80 (0.76, 0.83)**	**0.09**
Adding SOFA≥7	0.77 (0.73, 0.80)	0.71 0.63, 0.79)	0.79 (0.75, 0.82)	0.11
Adding SOFA≥8	0.75 (0.72, 0.79)	0.69 (0.61, 0.78)	0.77 (0.74. 0.81)	0.08
Adding qSOFA≥2	0.76 (0.72, 0.79)	0.685 (0.60, 0.77)	0.78 (0.74, 0.81)	0.046
Adding SIRS≥2	0.71 (0.67, 0.74)	0.674 (0.60, 0.75)	0.714 (0.67, 0.75)	0.35

BSI, bloodstream infection; SOFA, sequential organ failure assessment; AUROC, area under receiver operating characteristic curve

Figure

AUROC of mortality risk models with SOFA score values 2,4,6,8 among patients with BSI and without BSI



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224. Epidemiology of Bloodstream infections in a Cohort of Allogeneic Hematopoietic Stem Cell Transplant Patients from 2009 to 2018

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Background. Due to severe immunosuppression, patients undergoing allogeneic hematopoietic stem cell transplantation (aSCT) are at increased risk of infection and especially bloodstream infections (BSI) remain a major cause of death. Knowledge of the specific epidemiology of pathogens and resistances is of utmost importance to optimize antimicrobial treatment strategies.

Methods. Based on the Cologne Cohort of Neutropenic Patients (CoCoNut) database, we conducted a retrospective analysis of blood cultures collected within 100 days following transplantation of patients undergoing aSCT between January 2009 and December 2018 at the University Hospital of Cologne, Germany. Contamination of coagulase-negative Staphylococci (CoNS) isolates (single positive isolate within 5 days) was considered within the analysis.

Results. In total, 843 aSCT patients were available for analysis (484/843 [57%] male). The median age was 53 (interquartile range [IQR] 43–62) years, predominant underlying diseases were acute myeloid leukemia (47%, 397/843), lymphoma (14%, 117/843), and acute lymphoblastic leukemia (11%, 89/843). Median inpatient stay was 39 (IQR 34–50) days, while 67/843 (8%) patients died. Antibacterial prophylaxis was administered in 289/843 (34%) and antifungal prophylaxis in 738/843 (88%) patients. BSI was diagnosed in 233/843 (28%) patients. In total, 5,489 pairs of blood cultures were taken (median 4 per patient, IQR 2–8), while a pathogen could only be detected in 922/5,489 (17%). Most frequent pathogens were CoNS (259/922, 28%), *Enterococcus* spp. (219/922, 24%), E. *coli* (132/922, 14%), *Klebsiella* spp. (44/922, 5%), *P. aeruginosa* (39/922, 4%), *S. aureus* (37/922, 4%), and *Candida* spp. (42/922, 5%). Polymicrobial infection was detected in 58/922 (6%) cases. Within *Enterococci* isolates, 24/219 (11%) were VRE. None of the *Klebsiella*, but 9/132 (7%) of *E. coli* isolates were ESBL positive. In 4/37 (11%) cases *S. aureus* isolates were MRSA.

Conclusion. Patients in the early phase after aSCT are at high risk of BSI with a predominantly gram-positive spectrum. Empirical antimicrobial treatment must consider pathogen epidemiology and resistance patterns while waiting for blood culture results.

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

225. Bloodstream Infections in Adult Allogeneic Stem Cell Transplant Recipients with Acute Gastrointestinal Graft-vs. -Host Disease within the First 180 Days Post-Transplantation

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Background. Infections are the most common cause of non-relapse mortality in adult allogeneic stem cell transplant (allo SCT) recipients. Acute gastrointestinal graft-vs.-host disease (GI GVHD) often leads to friable mucosa and interventions increasing infectious risk. We describe the relationships between increasing grades of acute GI GVHD and incidence of bloodstream infections (BSI) at our institution.

Methods. We reviewed 441 adults who underwent allo SCT from 2011 to 2017 and were diagnosed with GI GVHD, non-GI GVHD, or no GVHD based on the Modified Glucksberg Scale within the first 100 days of transplant. The maximum grades of GI GVHD and non-GI GVHD were used in the analysis. A BSI episode constituted a blood culture positive for bacteria or fungi and antibiotic treatment. The incidence of BSI within the first 180 days of transplantation was estimated with the cumulative incidence method.

Results. Overall BSI incidence by day 180 was 32%; Gram-negative bacilli were the predominant organisms. Adjusting for grade of non-GI GVHD, patients with acute grade 4 GI GVHD had higher risk of BSI as compared with patients with no GI GVHD (HR 3.02, $P < 0.001$), while those with grade 3 GI GVHD had similar risk (HR 1.01, $P = 0.98$). Patients with grade 1 or 2 GI GVHD demonstrated lower BSI risk compared with those with no GI GVHD (HR 0.48, P = 0.015; HR 0.44, $P = 0.08$, respectively). Results were similar after adjusting for patient- and transplant-related risk factors for BSI. Grade of GI GVHD had no association with non-BSI risk. Patients who developed BSI or non-BSI had significantly higher overall mortality risk compared with those without infectious complications (HR 2.52, $P < 0.001$ for BSI; HR 1.60, $P = 0.001$ for non-BSI).

Conclusion. Acute grade 4 GI GVHD may reliably indicate higher BSI and overall mortality risk in this population. Understanding the relationships between acute GI GVHD and BSI can guide future treatment strategies for adult allo SCT recipients.