	LR - Acc	RF - Acc	SVM - Acc	ENS - Acc	LR - AUC	RF - AUC	SVM - AUC	ENS - AUC
28 days	0.46	0.79	0.78	0.81	0.65	0.83	0.74	0.81
91 days	0.54	0.61	0.58	0.57	0.59	0.68	0.64	0.66
182 days	0.62	0.81	0.85	0.79	0.72	0.82	0.73	0.78
365 days	0.65	0.81	0.85	0.72	0.70	0.85	0.73	0.80

Table 3: Model performance on test set. LR: Logistic regression, RF: Random forests, SVM: Support vector machine, ENS: Ensemble classifier. Acc – Accuracy. AUC: Area under receiver-operator characteristic (ROC) curve. Underlined values are the highest for each model measure.

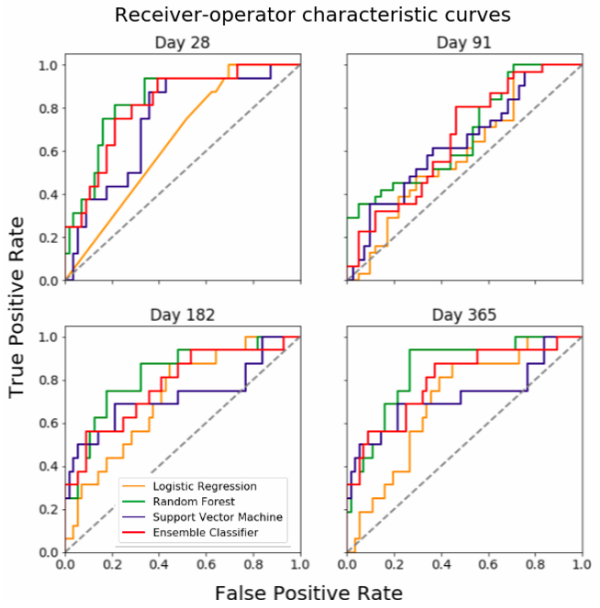


Figure 1: Test set receiver-operator characteristic (ROC) curves for each predictive model at 28, 91, 182 and 365 days.

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

580. Association Between Central Venous Catheter Repair and Bloodstream Infections in a Pediatric Oncology Center

Ruba Barbar, MD[1]; Hana Hakim, MD, MS, CIC[1]; Patricia Flynn, MD, MS[1]; Aditya H. Gaur, MD[1]; Darenda Wright, RN, BSN, CPN, VA-BC[1]; Angie Owings, RN, MSN, CIC[2]; Yin Su, MS[2] and Li Tang, PhD[1]; [1]St. Jude Children's Research Hospital, Memphis, Tennessee; [2]St Jude Children's Research Hospital, Memphis, Tennessee

Session: 64. HAI: Pediatric
Thursday, October 3, 2019: 12:15 PM

Background. Central venous catheters (CVCs) are important for healthcare delivery in pediatric oncology patients. It is common to repair CVC breakage to prevent replacement. Existing evidence regarding the association between CVC repair and bloodstream infections (BSI) is limited in the general pediatric population and lacking in pediatric oncology patients. We aim at evaluating whether repairing broken CVCs is associated with an increased risk for subsequent BSI in a pediatric oncology center.

Methods. This is a retrospective case-crossover study of pediatric oncology patients with broken CVCs that underwent repair between July 2015 and June 2017. The incidence and characteristics of BSI in the 30-day pre-repair period were compared with those in the 30-day post-repair period. Wilcoxon-Mann–Whitney and Fisher's Exact tests were used for comparison of continuous and categorical variables, respectively. Univariate logistic regression was used to identify potential risk factors for BSI post CVC repair. Multiple breakages of the same CVC, and BSIs in overlapping observation periods of consecutive breakages are assumed independent.

Results. Sixty-four patients had 99 episodes of CVC breakage/repair in 68 CVCs. Median age (range) at repair was 2.5 (0.15–17.6) years. 48% of CVC breakages occurred in patients with solid tumors, 24% in HSCT recipients, and 19% in patients with leukemia. Only 25% of patients had neutropenia at repair and 14% had CVC occlusion 72 hours prior to breakage. All CVCs were made of silicone and 88% were double lumen external tunneled. First CVC breakage occurred at a median (range) of 130 (2–718) days since insertion, and CVCs were removed at a median (range) of 72.5 (3–753) days from the last repair. End of treatment was the most common cause (43%) for removal. The post-repair incidence of BSI was 4.5 per 1000 line-days compared with a pre-repair incidence of 4.3 (RR= 0.95, 95% CI 0.44, 2.18). There is no statistical difference between the characteristics of the pre-repair and post-repair BSI (Table 1). Figure 1 shows the organisms causing BSI before and after CVC repair. None of the evaluated variables was identified as a significant risk factor for BSI 30 days after CVC repair (Table 2).

Conclusion. Repair of CVC in pediatric oncology patients was not associated with increased risk of BSI.

Table 1: Comparison of the incidence, characteristics, clinical course, and outcomes of Bloodstream infections occurring 30 days before vs 30 days after CVC breakage and repair

Variable	BSI 30 days before CVC breakage/repair (N=12)	BSI 30 days after CVC breakage/repair (N=12)	P-value
Median (range) age at BSI in years	2.63 (0.86 - 10.53)	2.29 (0.82 - 12.39)	0.42
Double lumen external tunneled CVC, n (%)	10 (83)	12 (100)	0.48
Median (range) ANC at repair	1,400 (0 - 29,200)	2,050 (0 – 8,600)	0.39
Diagnosis at BSI, n (%)			0.58
HSCT recipient	5 (42)	5 (42)	
Hematology	2 (17)	0 (0)	
Leukemia	2 (17)	2 (17)	
Solid Tumor	3 (25)	5 (42)	
Classification of BSI, n (%)			>0.99
CLABSI	5 (42)	5 (42)	
MBI-LCBI	5 (42)	5 (42)	
SPBC	2 (17)	2 (17)	
Organism, n (%)			0.71
Gram-negative bacteria	2 (17)	3 (25)	
Gram-positive bacteria	9 (75)	7 (58)	
Polymicrobial	1 (8)	2 (17)	
HAI vs Ambulatory, n (%)			>0.99
Ambulatory	8 (67)	9 (75)	
HAI	4 (33)	3 (25)	
ICU within 7 days of BSI	0 (0)	3 (25)	0.22
Death within 30 days of BSI	0 (0)	2 (17)	0.48
Line removal due to BSI	0 (0)	3 (25)	0.22

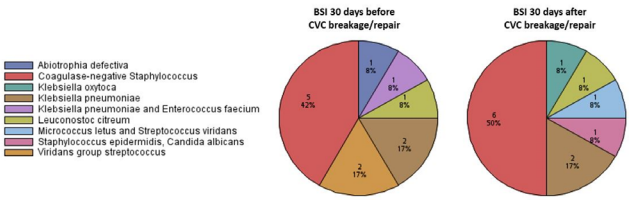
BSI, bloodstream infection; CVC, central venous catheter; HSCT, hematopoietic stem cell transplant; CLABSI, central line associated bloodstream infection; MBI-LCBI, mucosal barrier injury – laboratory confirmed blood infection; SPBC, single positive blood culture; HAI, hospital acquired infection; ICU, intensive care unit; ANC, absolute neutrophil count.

Table 2: Univariate analysis to assess potential risk factors for BSI 30 days after CVC breakage and repair

Risk factor	Odds Ratio	Odds Ratio 95% Confidence Limits	P-value
Age at repair in years	1.07	[0.93, 1.23]	0.38
Neutropenia	1.63	[0.44, 5.97]	0.46
Inpatient location at time of CVC breakage/repair	1.82	[0.53, 6.28]	0.35
Occlusion within 72 hours prior to breakage/repair	0.50	[0.06, 4.24]	0.53
BSI within 30 days before repair	1.5	[0.29, 7.85]	0.63
Prior CVC breakage/repair	0.35	[0.07, 1.69]	0.19
Line type of DL vs. SL external tunneled	>999.99		0.97
Diagnosis at CVC breakage/repair			
HSCT vs. Hematology	>999.99		0.96
Leukemia vs. Hematology	>999.99		0.96
(Solid Tumor & NO) vs. Hematology	>999.99		0.96

BSI, bloodstream infection; CVC, central venous catheter; HSCT, hematopoietic stem cell transplant; NO, neuro-oncology; DL, double lumen; SL, single lumen.

Figure1: Organisms causing the bloodstream infections (BSI) occurring 30 days before or 30 days after the CVC breakage and repair



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

581. The Epidemiology of Imipenem-Resistant *Acinetobacter baumannii* Bacteremia in a Pediatric Intensive Care Unit and Carbapenem Use

Dongsub Kim, MD[1]; Haejeong Lee, MS[2]; Christina M. Croney, PhD[3]; Ki Sup Park, MS[4]; Hyo Jung Park, PhD[5]; Joongbum Cho, MD., PhD.[6]; Kwan Soo Ko, PhD[2]; Jinyeong Kim, MS.[4]; Sohee Son, PhD.[7]; Joon-sik Choi, MD.[8]; Soo-Han Choi, MD.,PhD.[9]; Heejae Huh, MD.,PhD.[10]; Doo Ryeon Chung, MD, PhD[11]; Nam Yong Lee, MD.,PhD.[10] and Yae-Jean Kim, MD.,PhD.[7]; [1]Department of Pediatrics, School of Medicine, Kyungpook National University, Buk-gu, Taegu-jikhalsi, Republic of Korea; [2]Department of Molecular Cell Biology, Sungkyunkwan University School of Medicine, Seoul, Seoul-t'ukpyolsi, Republic of Korea; [3]Department of Microbiology, University of Alabama at Birmingham, Birmingham, Alabama; [4]Samsung Biomedical Research Institute, Seoul, Seoul-t'ukpyolsi, Republic of Korea; [5]Department of pharmacology, Samsung medical center, Seoul, Seoul-t'ukpyolsi, Republic of Korea; [6]Department of Critical Care Medicine, Samsung Medical Center,

Sungkyunkwan University School of Medicine, Seoul, Seoul-t'ukpyolsi, Republic of Korea; [7]Department of Pediatrics, Sungkyunkwan University School of Medicine, Samsung Medical Center, Seoul, Seoul-t'ukpyolsi, Republic of Korea; [8]Department of Pediatrics, Sungkyunkwan University School of Medicine, Samsung Medical Center, Gangnam-gu, Seoul-t'ukpyolsi, Republic of Korea; [9]Department of Pediatrics, Hallym University Dongtan Sacred Heart Hospital, Hallym University College of Medicine, Hwaseong, Kyonggi-do, Republic of Korea, [10]Department of Laboratory Medicine and Genetics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Seoul-t'ukpyolsi, Republic of Korea, [11]Samsung Medical Center, Seoul, Seoul-t'ukpyolsi, Republic of Korea

Session: 64. HAI: Pediatric
Thursday, October 3, 2019: 12:15 PM

Background. *Acinetobacter baumannii* (AB) infections cause high mortality and morbidity in intensive care unit patients. There are limited data on the epidemiology of imipenem-resistant *A. baumannii* (IRAB) amongst pediatric ICU patients.

Methods. A retrospective chart review was performed in patients with AB bacteremia in a pediatric intensive care unit at a tertiary teaching hospital from January 2000 to December 2016. Antimicrobial susceptibility tests, multilocus sequence typing (MLST) and PCR for antimicrobial resistance genes were performed for stored isolates. In addition, antibiotic prescription days of therapy (DOT per 1,000 patient-days) of the pediatric department from January 2001 to December 2016 was analyzed.

Results. Bacteremia episodes occurred in 27 patients. Male patients were 11 (41%) and the median age at the onset of bacteremia was 5.2 years (range, 0–18.6 years). There was a clear shift in antibiogram of AB during the study period. From 2000 to 2003, all isolates were imipenem-sensitive (ISAB, $N = 6$). From 2005 to 2008, both IRAB ($N = 5$) and ISAB ($N = 4$) were isolated. However, since 2009, all the AB isolates were IRAB ($N = 12$). In 33% (9/27) of patients, first AB was isolated from tracheal aspirate and patients developed bacteremia later (median duration from AB positive tracheal culture to AB positive blood culture, 8 days [range 5–124]). The overall mortality of patients with AB bacteremia was 59.3% (16/27) within 28 days. There was no statistical difference in mortality between ISAB and IRAB groups (50% vs. 71%; $P = 0.42$). From MLST analysis of 10 available isolates, sequence type 138 was predominant ($N = 7$). All 10 isolates were positive for OXA-23-like and OXA-51-like carbapenemase. In 2001, carbapenem DOT per 1,000 patient-days was 15.3 and later strikingly raised to 82.5 in 2009 when all the isolates were imipenem resistant. After this IRAB outbreak in PICU, proactive infection control and antimicrobial stewardship were reinforced among multidisciplinary teams in PICU. IRAB outbreak was terminated and carbapenem DOT per 1,000 patient-days was decreased to 51.7 in 2016.

Conclusion. IRAB bacteremia causes serious threat in high-risk pediatric patients in PICU. Proactive infection control measures and antimicrobial stewardship are crucial to manage serious IRAB infection in PICU.

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

582. Impact of Central Line Bundle for Prevention of Umbilical Vein Catheter-Related Bloodstream Infections in a Neonatal Intensive Care Unit

İlker devrim, Prof. Dr.[1]; Ferit Kulalı, MD[2]; İlknur Çağlar, MD[3]; Yeliz Oruc[4]; Nevbahar Demiray[4]; Vecihe Dursun, MD[1]; Gamze Gulfidan[1]; Nuri Bayram, MD[5] and şebnem çalkavur[1]; [1]Dr. Behçet Uz Child Disease and Pediatric Surgery Training and Research Hospital, Izmir, Turkey; [2]Izmir SBU Dr. Behcet Uz Child Disease and Pediatric Surgery Training and Research Hospital, Izmir, Turkey; [3]Dr. Behçet Uz Children's Hospital, Izmir, Turkey; [4]Dr. Behcet Uz Child Disease and Pediatric Surgery Training and Research Hospital, Izmir, Turkey; [5]Dr. Behçet Uz Children's Hospital İzmir, Izmir, Turkey

Session: 64. HAI: Pediatric
Thursday, October 3, 2019: 12:15 PM

Background. Umbilical vein catheters (UVC) are one of the most common types of vascular access device in the neonatal intensive care units. Central line-associated bloodstream infections were reported to be in the first place of healthcare-associated infections in preterm infants. In this study, we aimed to evaluate the effectiveness of the bundle applications in the prevention of umbilical vein catheter-associated bloodstream infections in neonates including premature infants.

Methods. This 40 months cross-sectional study included two periods, including pre-bundle period (from August 1, 2015 to March 31, 2017) and bundle period (April 1, 2017 to November 30, 2018). The umbilical vein catheter-related bloodstream infections, catheter line days, number of the patients were recorded and compared between the prebundle and bundle periods. Bundle steps were defined as education-training-assignment, evaluation of daily catheter indications, hand hygiene and aseptic technique while insertion, maximal sterile barrier precautions, closure of the catheter area with transparent semi-permeable membrane, using needless connectors in stead of 3-way stop-cocks, and single-use prefilled saline syringes for flushing.

Results. During the whole study period total umbilical vein catheter days were 2,228 days. During the prebundle period there was 10 and in the bundle period there was 2 umbilical vein catheter-related bloodstream infections (Table 1). While umbilical vein-associated bloodstream infection rate was 8.9 per 1,000 catheter days in the pre-bundle period, and significantly decreased to 1.79 in the bundle period ($P < 0.05$). After the introduction of bundle applications, it was observed that the rate of infection decreased by 68% ($P < 0.05$)

Conclusion. Our study showed that implementation of central line bundle including needless connectors and single-use prefilled syringes for umbilical vein-related bloodstream infections was effective for the prevention of catheter-related bloodstream infections in neonatal intensive care units.

Variables	Pre-bundle period	Bundle period
Number of patients	1101	1206
Total patient days	13651	17347
Umbilical vein catheter days	1112	1116
Umbilical vein catheter related blood stream infections	10	2
Umbilical vein catheter associated bloodstream infection (per 1000 umblical vein catheter days)	8.9	1.79

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

583. Improving Catheter Scrub Technique and Compliance in a Level IV Neonatal ICU

Misti G. Ellsworth, DO[1]; Sarah Milligan, MPH, CIC[2]; Lauren Yager, MBA, BSN, RNC-NIC[3]; Ann Kubanda, BSN, RNC-NIC[3]; Krysten Webber, BSN[3] and Amir M. Khan, MD[4]; [1]University of Texas McGovern Medical School, Houston, Texas; [2]Memorial Hermann Texas Medical Center, Houston, Texas; [3]Memorial Hermann, Houston, Texas; [4]UTHealth McGovern Medical School, Houston, Texas

Session: 64. HAI: Pediatric
Thursday, October 3, 2019: 12:15 PM

Background. Central line-associated bloodstream infections (CLABSIs) are challenging to prevent in the neonatal population due to the long-term necessity of central access for nutrition and medication. Neonates are a population at high risk for CLABSIs, and infections in this group are associated with prolonged hospitalization, greater healthcare costs, and increased mortality. Current bundles for CLABSI prevention include a friction scrub of the catheter hub prior to each use. Real-time audits of correct technique can be challenging. In July of 2018, our team developed a new strategy for auditing scrub technique in an attempt to reduce CLABSI rates.

Methods. This project took place in a NICU with 118 level 4 beds from July 2018 to February 2019. Our NICU is located in a large metropolitan area and serves as a referral center for complex neonates throughout the region. The intervention period encompassed 25,085 patient-days and 6,206 line days. Real-time friction scrub audits were performed for both dedicated line team staff as well as bedside nurses. In order to determine whether a healthcare worker's (HCW) scrub technique was successful, a colorless luminescent product was applied to a practice catheter hub that adhered to the hub, but was not visible to the HCW. The HCW would then demonstrate a friction scrub on the practice catheter, and the hub was placed under a black light to show where any residual product may be present. This process was repeated until the staff member was able to remove the product from the hub. Once the staff was successful, monthly real-time audits were continued to reinforce the correct technique.

Results. Between July 2018 and February 2019, compliance with scrub technique and ability to clear product from catheter hubs increased by 50%. The CLABSI rate in the first 9 months after intervention was 0.806 per 1000 line days as compared with 2.170 per 1000 line days in the previous fiscal year.

Conclusion. The number of CLABSI's during the intervention period was 63% less when compared with the previous fiscal year. This process, in conjunction with our other CLABSI prevention practices, has significantly decreased both our CLABSI rate and overall numbers. This project emphasizes the importance of focusing on the basics of infection prevention practices and continual auditing to prevent practice creep.

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

584. Use of Multi-Disciplinary Prevention Rounds to Reduce Central Line-Associated Bloodstream Infections in a Neonatal Intensive Care Unit

Matthew Linam, MD, MS[1]; Jessica Wright, RN, BSN, RNC-NIC[2]; Kum Kim, RN, BSN, RNC-NIC, NIDCAP[2]; Cara Van Treek, BSN, RNC-NIC, NE-BC[2] and Patrick Spafford, MD[2]; [1]Emory University and Children's Healthcare of Atlanta, Atlanta, Georgia; [2]Children's Healthcare of Atlanta, Atlanta, Georgia

Session: 64. HAI: Pediatric
Thursday, October 3, 2019: 12:15 PM

Background. Despite successful implementation of evidence-based prevention bundles, central line-associated bloodstream infections (CLABSIs) continue to occur in neonatal intensive care units (NICUs). We hypothesized that multi-disciplinary prevention rounds may be able to further reduce CLABSIs.

Methods. We implemented bedside rounds in a 39-bed tertiary NICU in November 2018 with the focus of reducing CLABSIs. Standardized rounds for all patients with a central venous line (CVL) occurred 2–3 times/week on weekdays during either the day or evening shifts. Rounds included NICU nursing leadership, the Hospital Epidemiologist and the patient's nurse. Questions focused on the CVL