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Session: P-37. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. The International Nosocomial Infection Control Consortium surveillance reported Central line-associated bloodstream infection (CLABSI) rate of 4.1 per 1000 central-line days in 703 ICUs in 50 countries.

Methods. At the Singapore General Hospital (SGH) a 1,700-bed tertiary care hospital, we conducted a retrospective matched case control study over a 3-year period from 2018 to 2020, to identify risk-factors associated with the development of healthcare associated CLABSI in adult inpatients. Cases and controls were patients ≥18 years of age with central lines in situ for at least 48hrs from date of admission. Case definition was based on National Healthcare Safety Network (NHSN) framework to diagnose Bloodstream Infection (BSI) and CLABSI events. Controls had to be admitted within 30 days of the date of admission of the case patients and should not have developed CLABSI. Cases were matched to controls on a 1:2 ratio.

Results. 127 cases and 252 controls were included in the analysis. Cases and controls did not differ in age, gender, BMI, presence of diabetes mellitus or presently enforced infection prevention measures (e.g. Central line bundle care). More cases were receiving chemotherapy (10.2% versus 0.8%, p< 0.001), were on TPN (17.3% versus 8.3%, p=0.015) and had been admitted to critical care (73.2% versus 60.7%, p=0.017). Cases were also more likely to have peripherally inserted central venous catheters (37% versus 25%, p=0.017) and have the insertion done in the radiology department under radiological guidance (69.3% versus 55.2%, p=0.011). The median length of stay (LOS) was 44 days (IQR: 0 – 86.8) for cases and 19 days (IQR: 0 - 66.6) for controls (p< 0.001). Inpatient mortality was 25.2% (n=32) for cases 13.9% (n=35) for controls (p-value < 0.010). In multivariate analysis, receiving chemotherapy (OR 11.1, 95%CI: 2.2 – 54.3, p=0.003), being admitted to intensive care unit (ICU) (OR 2.0, 95%CI: 1.1 – 3.8, p=0.019), having a Peripherally Inserted Central Cather (OR 1.8, 95% CI 1.0-3.4, p=0.045), and being colonized with MRSA (OR 1.9, 95%CI: 1.2 – 3.2, p=0.013) were associated with healthcare associated CLABSI.

Conclusion. Novel approaches are required to reduce risk of healthcare associated CLABSI, focusing on interventions for chemotherapy administration, care within ICUs and PICC lines.

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

776. Reducing Central Line Associated Bloodstream Infections (CLABSI) in a High-Risk Cohort of Patients by Standardizing Skin Preparation Prior to Pulmonary Artery Catheter Insertion

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Session: P-37. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. Central line associated bloodstream infections (CLABSI) are a recognized complication of all central venous access devices including pulmonary artery catheters (PAC). At our institution, PACs are utilized frequently, often for prolonged durations, for patients with advanced heart failure in the cardiac care unit (CCU) who are awaiting heart transplant. In early summer 2018, our hospital infection prevention (IP) department detected an uptick in CLABSI attributable to the CCU. After 9 months of zero CLABSI, two CLABSIs attributable to the CCU were identified during a 3 month period from November 2017-January 2018. Four additional CLABSIs were identified between May-July 2018 prompting an investigation by IP. Review of the 9 CLABSIs attributed to the CCU from May 2018 – June 2019 led IP to prioritize improving PAC insertion practices in our cardiac catheterization lab as a mean to reducing CLABSI (see table 1).

	9 CLABSI May 2018 – June 2019
Patients with a PAC inserted in cath lab	8/9 (88.9%)
CLABSI with *Staphylococcus epidermidis*	7/9 (77.8%)
PAC with dwell time ≤10 days	6/9 (66.7%)

Table 1

Methods. IP performed 5 observations of PAC insertion in the cath lab. During the observations of skin preparation, the prep time was performed correctly 40% of the time, correct application 60% of the time and dry time 60% of the time (see table 2, Figure1). Interventions included scheduling a training day for all cath lab staff with the skin prep vendor, performing competency check-offs, and identifying super-users to train future staff. Furthermore, skin antiseptic utilization according the manufacturer's instructions for use was implemented, the coverage area for the applicator was reviewed and a chart for reference was provided.The staff was provided with posters on correct skin prep technique as a visual cue in the procedure room.

Percent compliance of elements for PAC insertion skin prep in the Cath lab	
Prep time at least 30 seconds	2/5 (40%)
Application technique with back and forth strokes	3/5 (60%)
Area of prep dried completely	3/5 (60%)

Table 2

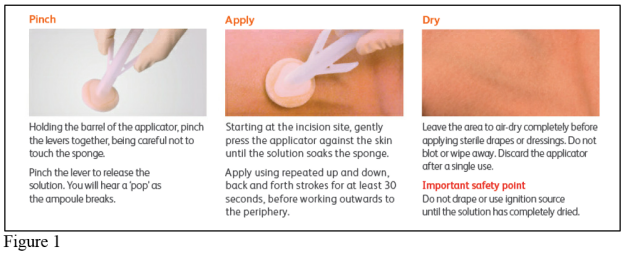

Figure 1

Results. Since the project was implemented in September 2019, there has been 1 CLABSI identified that was possibly related to a PAC inserted in the cath lab. During this time 3 CLABSIs were identified in the CCU but were felt to be unrelated to cath lab insertion.

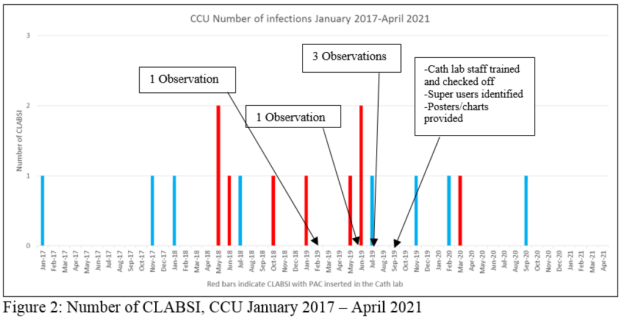

Figure 2: Number of CLABSI, CCU January 2017 – April 2021

Conclusion. Since the project was implemented in September 2019, there has been 1 CLABSI identified that was possibly related to a PAC inserted in the cath lab. During this time 3 CLABSIs were identified in the CCU but were felt to be unrelated to cath lab insertion.

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

777. Implementation of Antimicrobial Impregnated Catheters to Reduce Central Line Associated Bloodstream Infections (CLABSI) in a Pediatric Setting

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Session: P-37. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. Antimicrobial impregnated catheters (AIC) are one strategy to prevent CLABSI with existing data for central lines required for short duration, however, the strength of evidence, particularly for children, is lacking. Recent 3-year CLABSI data at our institution show 60 (51%) infections occurred in central lines within 8 weeks of insertion, suggesting an opportunity for evaluation of an intervention targeting this time frame. We implemented AIC to evaluate their effectiveness in reducing CLABSI standardized infection ratio (SIR) in patients requiring central venous access for less than 8 weeks. We also monitored for complications (malfunction, line exchange, fungal infection).

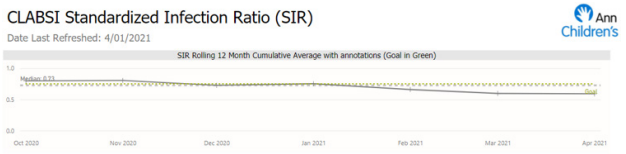
Methods. A stepped wedge observational design was used to implement Minocycline + Rifampin impregnated catheters in a rolling fashion across the institution. Children > 3kg were eligible if admitted to a participating unit and required central venous access through a peripherally inserted central catheter (PICC), non-tunneled catheter, or tunneled non-cuffed femoral catheter for < 8 weeks. Units, prioritized based on CLABSI SIR, were added to the intervention monthly until AIC were used throughout the institution. A multidisciplinary team (infectious diseases and infection control experts, CLABSI leaders, unit-based physicians and nurses, proceduralists, supply chain) met weekly to facilitate implementation, assess for CLABSI and monitor for complications.

Figure 1. Study design.

	Oct 2020	Nov 2020	Dec 2020	Feb 2021	Mar 2021	April 2021	May 2021
PICU							
CCU							
Anesthesia/OR							
Floor 17 (Oncology)							
Floor 20							
NICU							
Floor 19							
Floor 21							

This figure describes the stepped wedge study design where units were phased into the invention on a rolling monthly basis allowing for comparison between and within units. The shaded boxes represent time periods when units were using antimicrobial impregnated catheters and the white boxes represent time periods when units were using standard non-impregnated catheters.

Results. AIC were systematically implemented over a 7-month period. The institution's CLABSI SIR decreased from 0.80 to 0.59 during this timeframe. There were no NHSH defined CLABSI in patients with an AIC during the intervention. Obstacles included shortage of catheters due to supply chain disruption, adjustment of technique for line insertion and cracked/broken lines. Infections and complications were reviewed by the multidisciplinary team and compared to historical rates with non-impregnated lines.



This figure shows the institution's rolling 12-month SIR during the intervention period.

Conclusion. CLABSI SIR decreased at our institution during the intervention period. While many efforts likely led to this reduction (optimizing maintenance bundle, unit based CLABSI initiatives), we believe the use of AIC contributed to this improvement. There were no pediatric-specific safety events identified during implementation.

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778. Prediction of Bloodstream Infection Events and Infections of the Lower Respiratory Tract in ICU Patients: Expected and Unexpected Infections

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Session: P-37. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. Bloodstream infection (BSI) - Central and Non-Central Line Associated - and infections of the lower respiratory tract (RESP) - pneumonia and non pneumonia lower respiratory infections - are some of the main causes of unexpected death in Intensive Care Units (ICUs). Although the leading causes of these infections are already known, risk prediction models can be used to identify unexpected cases. This study aims to investigate whether or not it is possible to build multivariate models to predict BSI and RESP events.

Methods. Univariate and multivariate analysis using multiple logistic regression models were built to predict BSI and RESP events. ROC curve analysis was used to validate each model. Independent variables: 29 quantitative parameters and 131 categorical variables. BSI and RESP were identified using Brazilian Health Regulatory Agency protocols with data collected between January and November 2020 from a medical-surgical ICU in a Brazilian Hospital. Definitions: if an infection is 5% or less likely to occur according to the model used and it eventually occurs, it will be classified as "unexpected", or else, if an infection is 10% or less likely to occur, it will be classified as "probably unexpected". Otherwise, infections will be classified as "expected". Patients with a 30% or more risk for BSI or RESP will be classified as "high risk".

Results. A total of 1,171 patients were accessed: 70 patients with BSI (95% confidence interval [CI], 3.1%-5%), 66 patients with RESP (95% CI, 2.9%-4.7%), 235 deaths (95% CI, 11.8%-14.9%). Of the 160 potential risk factors evaluated, logistic models for BSI and RESP identified respectively five and seven predictors (Tables 1 and 2, and Figure 1). Patients admitted to the ICU with Covid-19 had a three fold BSI risk and five times more RESP risk than patients without this diagnosis.

Table 1. Independent predictors of Infections of the Lower Respiratory Tract in ICU: results of multivariate analysis performed using a logistic regression model.

Variable	Logistic coefficient	S.E.	Odds Ratio	p-value
Comorbidity: Hypothyroidism	1.03	0.31	2.8	0.0002
Comorbidity: Autologous bone marrow transplantation	3.09	1.07	21.89	0.0008
Length of hospital stay before admission to the ICU (days)	0.03	0.01	1.03	0.0041
COVID-19 infection	1.63	0.31	5.11	0.0097
Number of secondary diagnosis at ICU	0.27	0.03	1.31	< 0.001
Constant	-5.10			

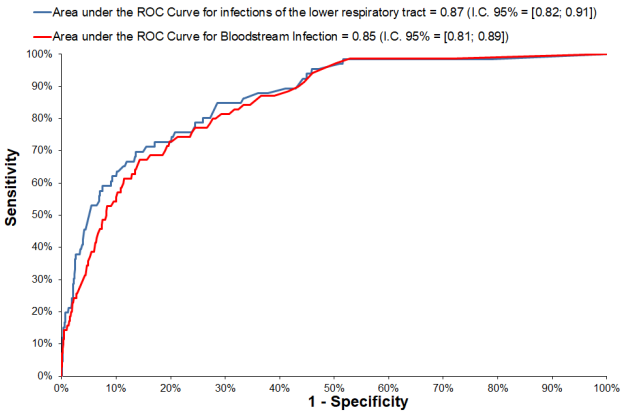
Obs.: S.E. = Standard Error

Table 2. Independent predictors of Bloodstream Infection Events in ICU (Central Line-Associated BSI + Non-central Line Associated BSI): results of multivariate analysis performed using a logistic regression model.

Variable	Logistic coefficient	S.E.	Odds Ratio	p-value
Blood transfusion at ICU	1.22	0.30	3.38	0.0002
Comorbidity: Morbid obesity	1.10	0.40	3.02	0.0051
Seizures at ICU admission	1.36	0.57	3.88	0.0163
Comorbidity: Immunosuppression	0.93	0.28	2.54	0.0022
COVID-19 infection	1.20	0.35	3.30	0.0026
Comorbidity: diabetes with complications	0.89	0.35	2.42	0.0139
Number of secondary diagnosis at ICU	0.19	0.03	1.21	< 0.001
Constant	-5.04			

Obs.: S.E. = Standard Error

Figure 1. Receiver operating characteristic (ROC) curve for the fitted models: area under the ROC Curves were higher than 0.85 for both models.



Conclusion. The built models make possible the identification of the expected infections and the unexpected ones. Three main course of actions can be taken using these models and associated data: (1) Before the occurrence of BSI and RESP: to place high risk patients under more rigorous infection surveillance. (2) After the occurrence of BSI or RESP: to investigate "unexpected" infections. (3) At discharge: to identify high risk patients with no infections for further studies.

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

779. COVID-19 Pandemic and Catheter-associated Urinary Tract Infection Trends

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