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NACNS 2018 ANNUAL CONFERENCE

PUTTING THE PIECES TOGETHER CNSs Bridging the Gaps in Health Care

CNS Driven Quality Initiative to Reduce Catheter-Related Bloodstream Infections (CLABSIs) Among Oncology Patients: A Cross-Over Clinical Trial Comparing CHG 3.15%/70% Alcohol vs Alcohol Alone for Disinfection of Needleless Connectors with Central Lines

Thursday, March 1, 1:45-3:00p.m. Session D1

PROJECT TEAM
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BACKGROUND

- Central Venous Catheters (CVC) lines are essential for treatment of pediatric/adult patients with oncological malignancies, yet, this places them at high risk for central line acquired blood stream infections (CLABSIs), leading to increased morbidity/mortality, and health-care costs. Needleless connectors (NC) are placed on CVCs to close the system, preventing entry of microorganisms to the intraluminal surface of CVCs, but are linked to increased CLABSI rates. The best disinfection method for NCs is unknown.

- The Joint Commission's (TJC) monograph on blood stream infections cites that CLABSIs are the most frequent complication of CVCs, and are associated with increased mortality (12-35%) rate, morbidity and excessive length of stay (24-days)[2]. CLABSIs cost the nation more than $1 billion/ annually[1].

Major sources of contamination of the catheter site include:

- Improper hand hygiene of health care staff;
- Extraluminal (skin) contamination/insertion site;
- Hematogenous spread from another distant site of infection;
- Intraluminal catheter hub/NCs

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Background

- Due to a persistent inability to reach a '*zero*' zone CLABSI rate, even with best practices, a CNS-led clinical team designed a novel evidence-based, improvement project to obtain that goal.
- **Standardized Infection Ratio (SIR) is a risk-adjusted summary measure that compares the observed number of infections to the expected number of infections based on National Healthcare Safety Network (NHSN) aggregate data.**
- An SIR <1.0 means the infection rate is lower than that of standard population.
- In 2013, CUROS™ Disinfecting Caps were added to CVC care, yet, despite on-going surveillance about proper use of Disinfecting Caps, this intervention did not reduce CLABSIs over time.

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Purpose of the Study

- **Purpose: Reduce the CLABSI rate among adult/pediatric oncology patients from a baseline incidence rate ratio of 3.2/1000 line days (Peds) and 1.3/1000 line days (Adults) (January – July) 2016, by at least 50% by end of trial (January 31), 2017.**
- **Primary Aim:** Examine the effectiveness of a new disinfectant product by PDI (Prevantics® Device Swab) in reducing CLABSIs. A cross-over six-month trial will be conducted to test the efficacy of using 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) wipe (*) vs 70% Isopropyl Alcohol Alone and 5-second wipe vs 15-second Scrub for Standard Disinfection of Needleless Connectors (NCs) on CVCs will be conducted.
- **Secondary Aim:** was to determine the financial impact of adopting the Prevantics® Device Swab, including elimination of the (70% Isopropyl Alcohol and CUROS™ Disinfecting Cap); and the direct impact on reducing costs r/t CLABSIs among adult/pediatric patients.

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METHODOLOGY

DESIGN

- A prospective, cross-over design was used to conduct a two-phase non-experimental trial among adult/pediatric patients with CVCs.
- Trial had 2-Timed Phases over a six-month period (Aug, 2016–Jan, 2017).

Setting:

- 24-bed Peds Hematology/Oncology / 54-bed adult oncology units. All patients with CVCs were eligible.
  - Note, the standard of care for CVC hubs prior to trial, was 70% Isopropyl Alcohol pad with a (15s scrub /15s dry).

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Trial Procedures

TRIAL PERIOD 1 (Aug–Oct, 2016)

- Both units, used the CUROS™ Disinfecting Caps plus the Prevantics® CHG 3.15% /70% Alcohol Device Swab to scrub the hub **in place of alcohol prep pad (single intervention),** using a 5s scrub/5s dry technique.

TRIAL PERIOD 2 (Nov, 2016–Jan, 2017)

- Both units, NO CUROS™ Disinfecting Caps (1st intervention), using only Prevantics® CHG 3.15%
- 70% Alcohol Device Swab (2nd intervention), using 5s scrub/5s dry technique.

- **Primary outcome measure was a reduction in CLABSIs; secondary outcome we theorized that removal of CUROS™ would not negatively impact number the CLABSI rate, while trialing a new product for scrubbing hub**

Measurement

We reported CLABSIs by number/ month and quarterly incidence rate.

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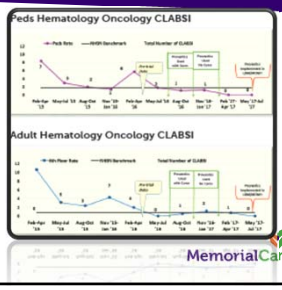
Results

- A total of 243 (n=93 peds /150 adults) patient admissions (5,302 patient line days) across units.
- Mean patient age was 8.6 years pediatric/63.5 years adults.
- CLABSI prevalence went from (13 previous 6 months) to (5 during 6-month trial).
- **Rate decreased significantly to 1.1/1000 line days from baseline of 3.2/1000 line days (Peds) and 1.3/1000 line days (Adults) to 0.83 1000 line [P< .001] respectively.**
- **No statistically significant change in CLABSIs rates occurred from Trial Period-1 and Trial Period-2 to validate keeping CUROS™**



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Estimated Costs to Treat CLABSIs

- **A recent systematic investigation published in *Advances in Neonatal Care*[8] estimates the cost of CLABSI to be the most costly HAIs, adding an average LOS of (10-24 days) and an additional ($45,454) per hospital stay.[9-10]**
- **This is also supported in a JAMA[9] review, which estimates ($45,814) added costs to a patient's medical bill (95% confidence interval [CI], $30,919 - $65,245), per infection, vs a patient without CLABSI, an average LOS (5.2 days) and costs $9,377.**
- **Using the ($45,454) per CLABSI, we've calculated the estimated CLABSI-related costs from the current trial on MemorialCare Miller Children's Pediatric/Hematology and Long Beach Medical Center Adult Oncology units.**
- The (pre-intervention costs) for 14 CLABSIs is ($636,356.00) compared to six-month trial data using Prevantics® Swab, which produced a significant reduction of CLABSI to 5 @ ($227,270.00), generating an estimated $409,086.00 savings/cost avoidance.
- We've continued to decrease our CLABSI rates even lower, our 3rd- 4th Quarters 2017 across the oncology units was 0.01 (2 CLABSIs).
- **Furthermore, we've adopted the use of the CHG 70% Alcohol Swab across the medical center for standard CVC Care, with an overall CLABSI rate of 0.2/1,000 catheter line days, yielding an additional $250,000 cost savings, including the elimination of the CUROS**

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CONCLUSIONS & RECOMMENDATIONS

- Prevantics® Device Swab trial resulted in a statistically significant decline in CLABSIs among high-risk oncology patients, demonstrating a 62% reduction (P = .001). Moreover, during February -July, 2017, (post-trial period), we remained in the 'zero' zone for CLABSIs.
- A CLABSI-related estimated costs savings of $409,086 was associated with decrease (13 to 5) CLABSIs post-trial (unadjusted LOS).
- CNS-led team presented trial findings to key stakeholders, and recommended elimination of the CUROS™ Disinfecting Caps and house-wide adoption/system wide of the Prevantics® Device Swab for all CVC care.

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IMPLICATIONS FOR PRACTICE

- Carrying out a rigorous new product trial yielded interprofessional teamwork and a major hospital wide change in practice, policies and products, to sustain a SIR <1.0 in CLABSIs to sustain a 'zero' rate in CLABSIs through December 2017.
- Clinicians favored the new product as it's more effective than 70% Isopropyl Alcohol pads alone, and it decreases nursing time per patient during each CVC access (est. 25/times day per patient).
- Example the (5-s scrub and 5-s dry) vs. (15s scrub/ 15s dry) converts to (4.2 mins/Prevantics® vs. 12 mins 70% Isopropyl Alcohol) "more time available to improve the patient experience and care" according to the nurses.

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