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"Reduction in Central Line Associated Blood Stream Infections in Oncology Patients. Post-trial of CHG 3.15%70% Alcohol vs Alcohol and 2 Scrub Times (5s vs. 15s) for Routine Disinfection of Needleless Connectors."

Poster presentation at Association for Vascular Access (AVA) annual scientific meeting, September 2018. Previously presented at Collaborative Alliance for Nursing Outcomes (CALNOC), October 2017.

Background

- The use of central venous catheters (CVCs) for the treatment of pediatric/adult patients with oncological malignancies places them at high-risk for central line-related bloodstream infections (CLABSIs).
- Historical CVC maintenance included catheter hub disinfection with 70% alcohol swabs – 15-second scrub/15-second dry.
- Despite introducing alcohol-impregnated caps (**CUROS**™) in 2010 to improve hub disinfection practice, the CLABSI rate remained unacceptably high.
- Goal of the trial was to reduce the CLABSI rate by 50%.

Methodology/Study Design

- A quasi-experimental interrupted time series design was used to conduct a two-phase trial on adult and pediatric hematology-oncology patients with CVCs of a new product for hub disinfection.
- The trial had 2-timed phases over a 6-month period (Aug, 2016–Jan, 2017).
- 24-bed pediatric and 54-bed adult hematology-oncology units.

Experiment

- TRIAL PERIOD 1 (Aug–Oct, 2016): Trial units retained the **CUROS** Disinfecting Caps and replaced 70% alcohol hub disinfection with **Prevantics**® 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) Device Swab, using a 5s scrub/5s dry technique for CVC access.
- TRIAL PERIOD 2 (Nov, 2016–Jan, 2017): Trial units eliminated the use of **CUROS** Disinfecting Caps and used only **Prevantics** 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) Device Swab for 5s scrub/ 5s dry for CVC access.
- The 6-month period prior to Trial 1 was used as a historical baseline for total # of CLABSIs and CLABSI rates/1000 central line (CL) days. CLABSI surveillance methods remained unchanged for the baseline and trial periods.

Reduction in Central Line Associated Bloodstream Infections in Oncology Patients Post Trial of CHG 3.15% 70% Alcohol vs. Alcohol and 2 Scrub Times (5s vs. 15s) for Routine Disinfection of Needleless Connectors

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Background

- Central venous catheters (CVCs) are essential for the treatment of pediatric/adult patients with oncological malignancies, yet, this places them at high-risk for catheter-related bloodstream infections (CLABSIs).
- CLABSIs can result in substantial morbidity, mortality, and health-care-associated costs.[1]
- Due to a persistent inability to reach a 'zero' zone CLABSI rate, even with best practices, a clinical team designed a novel improvement project to obtain that goal.
- The 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 below 1.0 means the infection rate is lower than that of standard population.
- In 2010, 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. For the trial, we hypothesized that eliminating CUROS™ would not negatively impact the CLABSI rate, while introducing a new product for scrubbing the hub.

PURPOSE

THE GOAL of this performance improvement project was to reduce the CLABSI's rate by (50%) among Oncology Hematology patients.

Methodology

DESIGN

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

Setting: 24-bed Peds / 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).

PROCEDURES

TRIAL PERIOD 1 (Aug–Oct, 2016)
Both units, **using the CUROS™** Disinfecting Caps plus the Prevantics® 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) Device Swab for 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® 3.15% Chlorhexidine/70% Isopropyl Alcohol (CHG) Device Swab (2nd intervention), using 5s scrub/ 5s dry technique.

Measurement

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

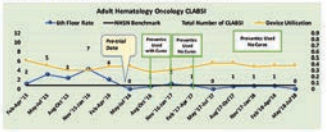
Results

There were 243 (n=93 peds /150 adults) patient admissions (5,302 patient days) across the units. Mean patient age was 8.6 years pediatric and 63.5 years adults.

- CLABSI prevalence went from (13 previous 6 months) to (5 during 6-month trial). The 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™

Peds Hematology Oncology CLABSI

Adult Hematology Oncology CLABSI



Conclusions

CONCLUSIONS & RECOMMENDATIONS

- The Prevantics® trial resulted in a statistically significant reduction (62%) in CLABSIs among high-risk oncology patients. CLABSI rates fell below NHSN benchmarks-Peds (0–0.97) NHSN (1.7), while adults (0-.64) NHSN (0.80), [P< .001] respectively. Post-trial (February-July 2017), CLABSIs remained in 'zero' zone.
- Notably, surveillance a year later shows sustainability near 'zero', with CLABSI rates Peds (0 - 0.96 range); Adults (.54 -.63) compared to the NHSN benchmarks above.
- CLABSI estimated costs savings of $409,086 was associated with decrease (13 to 5) CLABSIs post-trial (unadjusted LOS).
- Team presented trial findings to key stakeholders, and recommended elimination of the CUROS™ Disinfecting Caps and house-wide adoption of the Prevantics® Device Swab for all CVC care.

IMPLICATIONS FOR PRACTICE

- A rigorous new product trial yielded interprofessional teamwork and a hospital-wide change in practice, policies and products, to sustain a Standardized Infection Ratio (SIR) <1.0 (CLABSIs), while sustaining a near 'zero' rate in CLABSIs through July 2018.
- Clinicians saw the benefits of adding the Prevantics® CHG Swab to our prevention bundle, as the product was much more effective than 70% Isopropyl Alcohol pads and Alcohol caps alone.
  - Staff also noted a decrease in nursing time/ (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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Results/Conclusions

- During the 6-month trial period, there were 93 pediatric and 150 adult admissions to the hematology-oncology units.
- The total # of CLABSIs decreased from 13 in the baseline period to 5 in the 6-month trial period using **Prevantics** Device Swab, a 62% reduction.
- The CLABSI rate for the pediatrics trial unit significantly decreased from a baseline of 3.2/1000 CL days to 1.1/1000 CL days in the 6-month trial period (P<.001).
- The CLABSI rate for the adult trial unit significantly decreased from a baseline of 1.3/1000 CL days to 0.83/1000 CL days in the 6-month trial period (P<.001).
- When **CUROS** was removed in trial period 2, there was no significant change in CLABSI rates between the trial periods, leading to a decision to discontinue the use of the caps.
- During the 6-month post-trial period (Feb. 2017- July 2017), only 1 CLABSI occurred on the adult unit and zero CLABSIs occurred on the pediatric unit.
- An estimated cost savings of $409,086 was attributed to the CLABSI reduction observed during the trial period.
- Nursing staff trialing the product favored **Prevantics** Device Swab due to the shorter scrub and dry times and improved outcomes.
- A recommendation was made to hospital administration to switch to **Prevantics** Device Swab facility-wide and eliminate the use of **CUROS** caps.

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