

Use of Chlorhexidine for Bathing in a Tertiary-Care Neonatal Intensive Care Unit (NICU) and Impact on Rates of CLABSI

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Abstract

Despite the implementation of recommended measures for CLABSI prevention, rates remained high. Chlorhexidine (CHG) baths were recommended, but only implemented in April 2012.

Objective: To describe the CHG bath protocol in our NICU and its impact on CLABSI rates.

Methods: Active CLABSI surveillance, using standard definitions, is an ongoing process. CHG baths, using 2% aqueous CHG wipes, are recommended for infants with central venous lines (CVL) from birth, if birth weight (BW) is ≥ 1000 g or after 28 days of life in infants born < 1000 g. CHG baths are given 2x/week for infants < 28 weeks, every other day for infants 29-35 weeks, and daily afterwards. Adverse events reporting is done by nurses in NICU and reported to the program manager. CLABSI rates/1000 CVL days were compared using chi-square on square root-transformed rates (SAS 9.2).

Results: CHG wipes have been used for 20 infants with BW < 1000 g who still had a CVL after 28 days of life (mean BW 790 ± 126 g) and 150 infants with BW ≥ 1000 g (mean BW 2832 ± 968 g). Our CLABSI rates decreased from 5.93 (2009-12) to 1.32/1000 CVL days (2012-3); $p < 0.001$. Interestingly, our device utilization ratio (DUR) also decreased from 0.54 to 0.39 ($p < 0.001$). There was no reported adverse event.

Conclusion: The implementation of CHG baths in our NICU was not associated with adverse events. The significant decrease in CLABSI rates is likely partly secondary to CHG baths, but may also be due to the increased awareness around CLABSI prevention.

Introduction

Rates of central line associated bloodstream infections (CLABSI) remained high in our NICU despite the implementation of insertion and maintenance bundles for central venous catheters (CVC), at $> 5.0/1000$ catheter-days.

Given the effectiveness of chlorhexidine gluconate (CHG) in the prevention of CLABSI in adult and pediatric settings, we implemented CHG bathing in our NICU for a selected infant population.

Objectives

- To describe the CHG bathing protocol used at the Montreal Children's Hospital NICU
- To describe the impact of CHG bathing on our CLABSI rates.

Methods

Study setting and population:

- NICU level III, mainly surgical population and referral from other NICUs. No deliveries at The Montreal Children's Hospital
- On average 425 admissions/year; > 8000 patient-days
- 24-bed unit

Blood Stream Infection (BSI) definition: (same as NNIS/NHSN) – prospective continuous surveillance in place

- BSI:
 - ≥ 1 blood culture (BC) positive for a recognized pathogen
 - ≥ 2 BC + with common skin commensal AND signs of infection
- CLABSI: Primary BSI with CVC in place
- Acquired while in NICU or within 48 hours from discharge

CHG adverse events reporting: To the unit manager by bedside nurses

CHG bathing protocol:

- CHG 2% wipes are used instead of mild soap for neonates with a CVC who are:
 - Born at > 1000 g
 - Born 1000 g or less, but aged 28 days or more

Statistical Analysis:

- CLABSI rates calculated per 1000 catheter-days from 2009-2012 (pre-intervention) vs. 2012-2013 (post-intervention)
- Chi-square used to compare rates

Results

Table 1: Bathing protocol

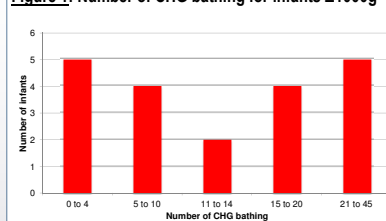
Conditions	Bath Schedule	Product Used
BW ≤ 1000 g and/or GA ≤ 28 weeks Gestational Age (GA)	2 baths/week	Sterile water x first 7 DOL, then pH neutral soap
BW > 1000 g and/or GA ≥ 29 weeks	1 bath q 2 days	pH neutral soap
GA ≥ 36 weeks	Daily	pH neutral soap

Table 2: CHG 2% wipes use in infants with CVC

Infants with CVL	Bath Schedule	Product Used
BW ≤ 1000 g and/or GA ≤ 28 weeks AND 28 days of age	2 baths/week	Replace soap by 2% CHG wipes
BW > 1000 g and/or GA ≥ 29	1 bath q 2 days	Replace soap by 2% CHG wipes
GA ≥ 36 weeks	Daily	Replace soap by 2% CHG wipes

Results

Figure 1: Number of CHG bathing for infants ≤ 1000 g



Results

Figure 2: BW distribution of infants > 1000 g bathed with CHG

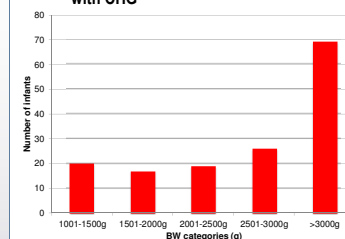


Figure 3: CLABSI Rates and Device Utilization Ratio (DUR) in NICU

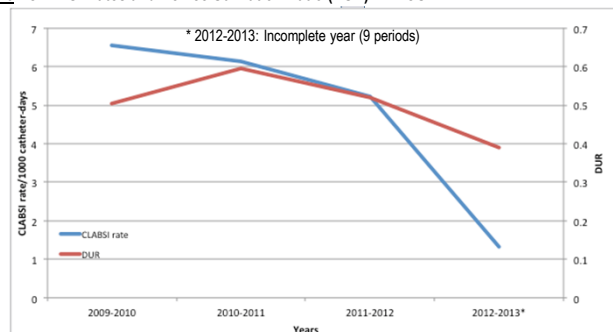


Table 3: Comparison 2009-12 vs. 2012-13

	CLABSI (n)	Catheter-days	Patient-days	CLABSI rate	DUR
2009-2012	66	11138	20652	5.93	0.54
2012-2013	3	2266	5814	1.32	0.39

- During the first 9 periods of the intervention year, there was a 78% reduction in CLABSI rates and a 28% decrease in device utilization ratio
- In the last 3 periods of the intervention year (data being analyzed), 6 CLABSI occurred... increasing our annual CLABSI rate to 2.63/1000 catheter-days
- Rates remained stable in CHG non-eligible patients, but decreased from 6.0 to 1.92/1000 catheter-days in patients who were CHG eligible

• CHG bathing (April to December 2012):

- 20 infants with BW ≤ 1000 g aged 28 days or more (mean BW 790 g)
- 150 infants with BW > 1000 g (mean BW 2832 g)
- *** No adverse event (skin rashes or burns) reported

Conclusion

- CLABSI rates decreased significantly in our NICU population eligible for CHG bathing when a CVC was in place
- DUR also decreased – it was however unclear if this was the cause or the consequence of decreasing CLABSI rates (i.e. less IV antibiotic days needed)
- The increasing number in the last 3 periods of the year was felt to be associated with a sub-optimal nurse-to-patient ratio
- There was no reported adverse events
- CHG bathing using 2% CHG wipes may be used in specific patient population in the NICU when other measures failed to decrease CLABSI rates.

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