

Chlorhexidine Gluconate (CHG) Bathing and Central Line Associated Bloodstream Infections (CLABSI) and Bloodstream Infections (BSI)

Key Points

- Studies indicate CHG bathing reduces BSI, including CLABSI.ⁱ
- CHG application requires adequate education, training, monitoring, and feedback to obtain and maintain CHG skin concentrations.ⁱⁱ
- CHG bathing is a cost effective method of decreasing skin bacterial burden.^{iiiiv}

Introduction

Bloodstream infections represent 10% of all HAIs, comprising an estimated 71,900 infections in hospitals annually.^v More than 84% of bloodstream infections in acute care hospital settings are estimated to be associated with a central line.^v These infections represent a significant expenditure to hospitals, with total cost ranging from \$0.6 billion - \$2.7 billion annually.ⁱ

Blood cultures are used by health systems to detect blood stream pathogens causing CLABSIs and BSIs.^{vi} Inadequate skin preparation is thought to be the most common cause of blood culture contamination. Daily CHG bathing would reduce patient bioburden by reducing colonization.^{vii}

Surveillance may occur in any inpatient location including critical/intensive care units (ICU), specialty care areas (SCA), neonatal units including neonatal intensive care units (NICUs), step down units, wards, and long term care units.^{viii}

The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis, John C. O'Horo, MD, et al.

Infection Control and Hospital Epidemiology, March 2012.

- This is a systematic review to assess the efficacy of daily bathing with chlorhexidine gluconate (CHG) for prevention of bloodstream infections.
- All studies reviewed were conducted between 2005 and 2010. Participants were inpatients from medical, surgical, trauma, combined medical-surgical intensive care units (ICUs) and long-term acute care hospitals.
- Study results indicate daily CHG bathing reduces the risk of healthcare-associated BSI, including CLABSI.

Beyond the bundle - Journey of a Tertiary Care Medical Intensive Care Unit to Zero Central Line-Associated Bloodstream Infections, Matthew C Exline, et al. Critical Care 2013

- The study setting was a 25-bed medical ICU located in 1200-bed tertiary care academic hospital at the Ohio State University Wexner Medical Center from January 2008 to December 2011.
- Initial interventions included: central line insertion checklist, demonstration of competencies for line maintenance and access, daily line necessity checklist, quality rounds by nursing leadership, heightened staff accountability, follow-up surveillance by epidemiology and identification of noncompliance.
- Intensive environmental terminal cleaning started in December 2010, followed by CHG bathing of all patients in 2011. This intervention was introduced to reduce the potential bacterial burden on patients. Patients admitted to the ICU underwent a CHG bath on admission and daily with a diluted solution of 4% chlorhexidine gluconate.
- The net infection rate at the end of the two-year intervention period decreased by 53%.

Evidence *continued*

Effectiveness of Chlorhexidine Bathing to Reduce Catheter-Associated Bloodstream Infections in Medical Intensive Care Unit Patients, Susan C. Bleasdale, MD, et al. Archives of Internal Medicine, OCT 22, 2007

- This 52 week clinical trial compared CHG bathing with soap and water bathing, and the effects on blood stream infections (BSI) in the 22- bed medical intensive care unit (MICU) at John H. Stroger Jr (Cook County) Hospital.
- CHG bathing resulted in a 61% relative decline in incidence of primary BSIs. The primary BSI rate was reduced by improving a required, routine patient care activity (ie, patient bathing) without introducing additional actions.
- Daily bathing with CHG ensures that most patients will have relatively low baseline bacterial skin burden, which would compensate partially for deficiencies in skin antisepsis and minimize inadvertent contamination of the central venous catheter or related equipment during catheter insertion.

Does Chlorhexidine Bathing in Adult Intensive Care Units Reduce Blood Culture Contamination? A Pragmatic Cluster-Randomized Trial, Edward J. Septimus, MD et al, Infection Control and Hospital Epidemiology, October 2014

- This study determined the effect of strategies to prevent ICU infections, and subsequent effect on blood culture contamination.
- Surveys show contamination of percutaneous blood cultures is thought to be due to the introduction of organisms from the skin of the patient into the collected sample.
- Blood cultures are used to diagnose bacteremia and guide antimicrobial therapy. Contamination is a common problem leading to unnecessary antimicrobial therapy, unnecessary removal of central lines, unnecessary testing, increased length of stay, and increased cost.
- Study results indicate that universal decolonization including daily CHG bathing resulted in a significant reduction in blood culture contamination. This was partly attributed to patient bioburden reduction.

Action Items

The Society for Healthcare Epidemiology of America (SHEA) recommends to bathe ICU patients over 2 months of age with a chlorhexidine preparation on a daily basis as part of basic practices for preventing and monitoring CLABSI.

Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals: 2014 Update

CHG application requires adequate education, training, monitoring, and feedback. Reeducation and feedback to nurses significantly improves CHG concentrations on the skin.

Decolonization in Prevention of Health Care-Associated Infections

Edward J. Septimus, Marin L. Schweizer, Clinical Microbiology Reviews, April 2016

CHG bathing is cost-effective, especially when compared with the cost of a CVC-associated BSI. Even for budget-constrained healthcare facilities, the changes in Medicare reimbursements will further underscore the importance of implementing programs for preventing CVC-related infections.

Prevention of Bloodstream Infections by Use of Daily Chlorhexidine Baths for Patients at a Long-Term Acute Care Hospital, L. Silvia Munoz-Price, et al. Infection Control and Hospital Epidemiology, November 2009.

This synopsis of a published article has been compiled by Mölnlycke Health Care as a service to healthcare professionals. It does not contain the complete text and Mölnlycke Health Care makes no representation as to its completeness in addressing all issues in the article.

i. The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis, John C. O'Horo, MD, et al, Infection Control and Hospital Epidemiology, March 2012
ii. Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals: 2014 Update, Jonas Marschall, MD, et al, Infection Control and Hospital Epidemiology, July 2014
iii. Effectiveness of Chlorhexidine Bathing to Reduce Catheter-Associated Bloodstream Infections in Medical Intensive Care Unit Patients, Susan C. Bleasdale, MD, et al. Archives of Internal Medicine, OCT 22, 2007
iv. Decolonization in Prevention of Health Care-Associated Infections, Edward J. Septimus, Marin L. Schweizer, Clinical Microbiology Reviews, April 2016
v. Central Line Associated Bloodstream Infections, <https://www.vdh.virginia.gov/Epidemiology/Surveillance/HAI/clabsi.htm>
vi. Current Approaches to the Diagnosis of Bacterial and Fungal Bloodstream Infections for the ICU, Patrick R. Murray, PhD and Henry Masur, MD, Crit Care Med., December 2012
vii. Does Chlorhexidine Bathing in Adult Intensive Care Units Reduce Blood Culture Contamination? A Pragmatic Cluster-Randomized Trial, Edward J. Septimus, MD et al, Infection Control and Hospital Epidemiology, October 2014
viii. CDC Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central line-associated Bloodstream Infection), January 2016 Stopping C Difficile Infections, March 2012