Getting to Zero: Central Line-Associated Bloodstream Infections and Catheter Associated Urinary Tract Infections

April 10, 2013

A partnership of the Healthcare Association of New York State and the Greater New York Hospital Association
Agenda

- Refocus on CLABSI
  - Where are we in NYSPFP with CLABSI reduction?
  - Overview of central line maintenance best practices
- Plan for Optimizing Use of Urinary Catheters in the ED Setting
  - NYSPFP proposal to reduce patient harm from CAUTIs
  - Hospitals’ experience with reducing catheter insertions
- Next steps
Refocus on CLABSI
Where We Stand Today: NYSPFP Monthly CLABSI SIRs

NYSPFP December 2012 SIR: 0.62
CMS SIR Target: 0.32
Hospital Engagement Network Comparison Q2, 2012 (Rate per 1,000 Central Line Days)
Current Status of CLABSI Reduction in NYSPFP Hospitals

SIRs:
- NYSPFP 2010 baseline SIR: 0.87
- NYSPFP second half of 2012 SIR: 0.68
- CMS Target SIR: 0.32

CLABSI 2012 Rates:
- NYSPFP ICU Setting: 1.14 CLABSI per 1,000 central line days
- NYSPFP Non-ICU Setting: 1.13 CLABSI per 1,000 central line days
- CMS Target: 0.48 CLABSI per 1,000 central line days

Substantial reductions in CLABSI over time, though there are opportunities to reach CMS’s targets.
CLABSI Summary

- A great deal of success in NYSPFP hospitals
- Substantial opportunities to reach CMS targets
  - Opportunities in both ICU and non-ICU settings
- Where we go from here:
  - Compliance with basic central line insertion and maintenance bundles
  - Vigilant focus on central line maintenance
  - Efforts in non-ICU settings
  - Focus on “getting to zero” with CLABSI reduction
Central Line Maintenance: What’s new
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Objectives

Describe the elements of a central line maintenance bundle for prevention of central line bloodstream infection (CLABSI)

Review additional optional interventions for the prevention of CLABSI

Show an example of CLABSI reduction post implementation of a maintenance bundle on general medical wards
CLABSI Prevention Focuses on

- Insertion
- Maintenance
- Removal
The Central Line Insertion Bundle

1. Hand hygiene
2. Maximum barrier precautions:
   - Mask, sterile gown, full barrier drape, cap, sterile gloves
3. > 0.5 % Chlorhexidine with alcohol prep
4. Optimal site selection (avoid femoral site)
5. Daily review of catheter necessity
Why Is A Central line Maintenance Bundle Needed?
Common Sources of Central Line Colonization

Contaminated catheter hub

Contamination at the insertion site
Central Line Maintenance Bundle

Compliance with best practices for central line (CL) maintenance led to further reduction in CLABSI in settings where:

- Compliance with the CL insertion bundle is already high
- Central line dwell time is prolonged

Guerin K et al. Am J Infect Control 2010;38:430-433
Components of a Central Line Maintenance Bundle

1. Hand Hygiene
2. Proper Dressing Change
3. Aseptic technique for accessing and changing needleless access device
4. Standardize tubing change
5. Daily review of catheter necessity

# Strength of the Body of Evidence

<table>
<thead>
<tr>
<th>Strength Category</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>IA</strong></td>
<td>Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.</td>
</tr>
<tr>
<td><strong>IB</strong></td>
<td>Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale; or an accepted practice (e.g., aseptic technique) supported by limited evidence.</td>
</tr>
<tr>
<td><strong>IC</strong></td>
<td>Required by state or federal regulations, rules, or standards.</td>
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<tr>
<td><strong>II</strong></td>
<td>Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.</td>
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<tr>
<td><strong>Unresolved issue</strong></td>
<td>Represents an unresolved issue for which evidence is insufficient or no consensus regarding efficacy exists.</td>
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## Central Line Maintenance Bundle

<table>
<thead>
<tr>
<th>Category</th>
<th>Instructions</th>
<th>Source</th>
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<tbody>
<tr>
<td><strong>Hand Hygiene</strong></td>
<td>- Wash hands with soap and water or alcohol based hand rub before accessing line or changing dressing</td>
<td>(IB)</td>
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<tr>
<td><strong>Dressing change</strong></td>
<td>- Clean site with &gt;0.5 % chlorhexidine/alcohol for 30 sec</td>
<td>(IA)</td>
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<td></td>
<td>- Change transparent dressing every 7 days</td>
<td>(IB)</td>
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<tr>
<td></td>
<td>- Gauze dressing every 2 days</td>
<td>(II)</td>
</tr>
<tr>
<td></td>
<td>- Assess dressing integrity, change if loose or soiled</td>
<td>(IB)</td>
</tr>
<tr>
<td><strong>Needleless access device</strong></td>
<td>- Clean before accessing with chlorhexidine, iodine, or 70% alcohol “using twisting motion (for at least 15 sec”*)</td>
<td>(IA)</td>
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<tr>
<td></td>
<td>- Change aseptically no more frequently than every 72 hrs. and with tubing change</td>
<td>(II)</td>
</tr>
<tr>
<td><strong>Administration Sets</strong></td>
<td>- Change no more frequently than every 96 hours but at least every 7 days</td>
<td>(IA)</td>
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<tr>
<td></td>
<td>- Change every 24 hours for TPN containing lipids and blood and after each chemotherapy infusion*</td>
<td>(IB)</td>
</tr>
<tr>
<td><strong>CVC need assessment</strong></td>
<td>- Assess central line necessity daily*</td>
<td>(IA)</td>
</tr>
<tr>
<td></td>
<td>- Promptly remove CVC when no longer necessary</td>
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</tbody>
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*Not specified in guidelines

Implementation of the CL Maintenance Bundle

Review and standardize policies

Educate nursing staff:
  • Include demonstration
  • Observation - one on one

Measure compliance with policy

Provide regular feedback of compliance and CLABSI rates

Consider oversight by a “maintenance” team
Additional Options: Chlorhexidine Dressing

If the CLABSI rate is not decreasing despite adherence to basic prevention measures:

Use **chlorhexidine-impregnated sponge** for temporary short-term catheters

No recommendation is made for other types of chlorhexidine dressings. Unresolved issue
Additional Options: Sutureless Securement Device

Use a sutureless securement device to reduce the risk of infection for intravascular catheters.

Removal and replacement of the securement device should be done with dressing changes.
Additional Options: Chlorhexidine Bathing

Patient Bathing

- Bathing reduces cutaneous microbial bio-burden
- Use a 2% chlorhexidine wash for daily skin cleansing to reduce CLABSI (Category II)
Meta-analysis of CHG Bathing

- 12 studies performed in adult ICU mostly medical and 1 LTAC
- Reduced incidence of healthcare associated BSI (including CLABSI)
  - Pooled odds ratio: 0.44 (95%CI 0.33-0.59; p<0.0001)
- Similar benefit for CHG cloth or liquid prep
- Evidence strongest in Medical ICU
- Side effects rare

Multicenter Study of CHG Bathing In ICU and BMT


- Primary BSI per 1000 pt-days: Control period (5) vs. Intervention period (3)
P = 0.006

- CLABSI per 1000 catheter days: Control period (4) vs. Intervention period (2)
P = 0.004
CHG Bathing Hospital-Wide

- Compliance with bathing:
  - 90% in ICU
  - 58% in non-ICU

- Effect on CLABSI rates could not be demonstrated possibly due to
  - Low baseline rates
  - Enforcement of the CL insertion and maintenance bundles

Implementing CL Maintenance Outside the ICU
The Rochester CLABSI Collaborative

- Project funded by NYSDOH since 2008
- Focus on CLABSI surveillance and prevention outside the ICU
- 6 hospitals - 37 units
- Education of nurses on line care maintenance
Line Care Maintenance Bundle Focused on

1. Hand Hygiene
2. Aseptic access of needleless device
3. Proper dressing change technique
4. Regular IV tubing change
5. Regular CVC need assessment
Stages of the CLABSI Prevention Nursing Education

Year 1 - Nursing Grand Rounds
- Pre-intervention CLABSI data and nursing survey presented
- Central Line Maintenance bundle introduced
  - *Initiated quarterly feedback of CLABSI rates*

Year 2 - Computer Based Training
- Hospitals mandated completion for all nurses
- Completion required at hire and annually

Year 3 - CLABSI Citywide Workshop
- Review of CLABSI surveillance results
- Discussion on controversial issues with surveillance and prevention

Survey of Nurses - Pre and Post Education

“Scrubbing the Hub” 10-15 sec

% positive response

0% 20% 40% 60% 80% 100%

0-2 times 4-5 times >= 10 times don't pay attention

2008 2010
Audits-Year 2

1. Observation of nurses practice (n=200)
   - Needleless access device scrubbing
   - CVC dressing change

2. Status of dressing and administration sets (n=800)
   - CVC dressing integrity
   - Documentation of CVC dressing assessment, tubing and needleless access device change & date

Results of audits
>90% compliance with all the recommended line maintenance guidelines
82% compliance with scrubbing the needless access device
Nursing Audits Post CL Maintenance Education

- Scrub access port for 15 sec
- IV tubing dated
- Scrub insertion site 30 sec, let dry
- Dressing dated
- Trans. dressing changed every 7 days
Collaborative CLABSI Rates: Pre- and Post-Intervention

Pre-Intervention  
2.6/1,000 line-days

Post-Intervention  
1.3/1,000 line-days

Rate Ratio: 0.50 (p = 0.0179)*

*Using an interrupted time series analysis ARIMA model
CLABSI Rates in Relation to Educational Intervention

![Graph showing CLABSI rates over time with pre-intervention, intervention, and post-intervention phases. The graph includes a line indicating the mean CLABSI rate for each time period.](image)

- **Pre-intervention** (4/08 - 4/09)
- **Intervention** (4/09 - 4/10)
- **Post-intervention** (4/10 - 10/12)

- **CLABSI per 1,000 line days**
- **Mean CLABSI rate for time period**

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**Legend:**
- Pre-intervention
- Intervention
- Post-intervention

**Note:**
- The graph illustrates the CLABSI rates over time, with a clear trend indicating a reduction post-intervention.
Lessons Learned
Outside the ICU

Diversity of staff and patients

Low nurse to patient ratio

Engagement of staff more challenging on units with low number of central lines or low rates of CLABSI

Nurse champions and IV team have an important role in CLABSI prevention
Acknowledgments

Project PI’s and Coordinator
Ghinwa Dumyati, MD
Mark Shelly, MD
Cathy Concannon, HPC

Infection Preventionists
Ann Marie Pettis, RN CIC
Linda Greene, RN CIC
Donna Farnsworth, RN CIC
Gloria Karr, RN CIC
Lynnette Ward, RN CIC
Robin Knab, RN CIC

Physician/Epidemiologists
Keely Dwyer-Matzky, MD
Paul Graman, MD

Nursing Leadership & Education
Michelle Miller, RN
Jan Taylor, RN
Diane Martin, RN
Jennifer Harris, RN

Vascular Access Teams
Nancy Adair, RN
Kelly Van Parys, RN
Pam DeVries, RN
Dennis Kupka, RN
Sue Trimboli, RN
Sue Williams, RN
Suzanne Colayori, RN
CLABSI Prevention Guidelines