european standards of
care for newborn health

Topic Expert Group: **Patient safety and hygiene practice**

Central venous catheter infection prevention

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Target group
Critically ill infants and parents

User group
Healthcare professionals, neonatal units, hospitals, and health services

Statement of standard
Each hospital has central venous catheters insertion and maintenance bundles, that are consistently applied to reduce the incidence of central line-associated bloodstream infections.

Rationale
Central venous catheters (CVC) are intravascular devices used in NICU settings. In addition to ensuring long-term intravenous access to preterm and critically ill infants, CVC are used for the administration of parenteral nutrition and medications that cannot be safely administered through a peripheral intravenous catheter. (1) CVC are important components of care, but their use is associated with an increased risk of central line-associated bloodstream infections (CLABSI). (2) CLABSI are in turn responsible for considerable mortality, morbidity, prolonged hospital stay, and additional costs for healthcare systems. (3)

Definitions of neonatal bloodstream infection vary across studies. (4–6) Bloodstream infection according to the Centers for Disease Control and Prevention (CDC), can be considered to be CVC-related if a catheter has been in place for at least 24 hours or if it was removed less than 48 hours before the infection. (7)

The prevalence of CLABSI is usually expressed as CLABSI per 1000 central line-days. (8) Reported incidence in neonatal units varies depending on several factors, including the hospital site and the gestational age group, and may be as high as >10.0 per 1000 central line-days. (9,10)

The Institute for Health Improvement (IHI) and the CDC, developed ‘care bundles’ that aim to reduce the incidence of CLABSI. Care bundles (defined as small, straightforward set of evidence-based practices, according to the IHI) can be divided into two subgroups: insertion bundles and maintenance bundles. (11,12)

Basic elements for the care bundles are maximal sterile barrier precautions during insertion, skin antisepsis, and hand hygiene. Care bundles have proven effective in reducing the incidence of CLABSI in neonatal units. (8)

Benefits

Short-term benefits
- Reduced risk of CLABSI (1–3,8–10,13)
- Reduced risk of comorbidity associated with bloodstream infections (consensus)
- Reduced mortality (consensus)

- Reduced stress for parents (consensus)

Long-term benefits

- Reduced risk of antibiotic resistant bacteria (consensus)
- Reduced risk of poor neurodevelopmental outcome (consensus)
- Reduced healthcare costs (8)
- Reduced length of hospital stay (8)

Components of the standard

Component	Grading of evidence	Indicator of meeting the standard
For parents and family		
1. Parents are informed and instructed by healthcare professionals about hand hygiene. (14,15) (see TEG Patient safety & hygiene practice)	A (High quality) B (High quality)	Patient information sheet
2. Parents are asked to instruct the own family and relatives to apply hand hygiene guidelines.	B (Moderate quality)	Patient information sheet
For healthcare professionals		
3. A unit guideline on central venous catheter (CVC) insertion and maintenance bundles is adhered to by all healthcare professionals. (3,14)	A (High quality) B (High quality)	Guideline
4. Training on insertion and maintenance bundle elements is attended by all responsible healthcare professionals.	B (High quality)	Training documentation
5. An insertion bundle is used: (8) • Antiseptic technique for healthcare provider's hand hygiene • Maximal sterile barrier precautions (caps, masks, sterile gowns, sterile gloves) • Patient's skin antisepsis with chlorhexidine • Full-drape	A (High quality)	Guideline
6. A maintenance bundle is used: (8) • Applying hand hygiene • Aseptic performance before catheter manipulation	A (High quality)	Guideline

- Disinfection of CVC hubs
- Daily review of CVC dressing and site of insertion
- Prompt removal when the central line is no longer needed.

7. Insertion of a CVC: checklist is used before starting the intervention. (16)	A (High quality)	Guideline
For neonatal unit		
8. A unit guideline on CVC insertion and maintenance bundles is available and regularly updated.	B (High quality)	Guideline
9. The prevalence of bloodstream infections per 1000 central line-days is documented.	B (Moderate quality)	Audit report
10. Training on CVC insertion and maintenance bundle elements is ensured. (15)	B (High quality)	Training documentation
For hospital		
N/A		
For health service		
11. A national guideline on CVC insertion and maintenance bundles is available and regularly updated.	B (High quality)	Guideline
12. Central line-associated bloodstream infections rates are publicly available.	B (Moderate quality)	Audit report

Where to go – further development of care

Further development	**Grading of evidence**
For parents and family	
• Facilitate parents to use publicly available central line-associated bloodstream infections (CLABSI) rates to question variation between hospitals.	B (Moderate quality)
For healthcare professionals	
N/A	
For neonatal unit	
• Ensure an incidence <5 CLABSI per 1000 central line days. (17)	B (Moderate quality)
• Report all deviations from guideline practice as clinical incidents using the hospital reporting system (critical incidence reporting system).	B (Moderate quality)

For hospital	
• Prepare fluids and medication under optimal aseptic conditions.	B (High quality)
For health service	
• NICU benchmarking: report the prevalence of CLABSI per 1000 central line days.	B (Moderate quality)
• Provide benchmarking standards: excellent performance <3.5 CLABSI per 1000 central line days, moderate performance 3.6 to 5 CLABSI per 1000 central line days, and poor performance ≥5.1 CLABSI per 1000 central line days.	B (Moderate quality)

Getting started

Initial steps
For parents and family
• Parents and family are verbally informed by healthcare professionals about hand hygiene.
For healthcare professionals
• Attend training on insertion bundles.
• Attend training on maintenance bundles (for nurses).
For neonatal unit
• Develop and implement a unit guideline on central venous catheter (CVC) insertion and maintenance bundles.
• Develop information material on hand hygiene for parents.
• Document all bloodstream infections among admitted infants.
• Document the number of central line days.
• Provide appropriate equipment.
For hospital
• Support healthcare professionals to participate in training on CVC insertion and maintenance bundle elements.
For health service
• Develop and implement a national guideline on CVC insertion and maintenance bundles.
• Publish the incidence of central line-associated bloodstream infections per 1000 catheter days.

Source

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