Best Practice Guidelines in the Care and Maintenance of Pediatric Central Venous Catheters

2nd Edition

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Disclosures

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• Worked for Floating Hospital for Children, BD, Argon, 3M
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Objectives

1) Understand the most current recommendations published regarding the use of maintenance bundles for the care and maintenance of CVCs in the neonatal and pediatric populations.

2) Describe the etiology, symptoms, treatment and preventative strategies recommended for the most common CVC-related complications.

3) Provide vascular access clinicians with the knowledge and desire to bring best practices back to the bedside and disseminate clinical recommendations to their home facilities regarding the care and maintenance of CVCs in the neonatal and pediatric populations.
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Pediatric Special Interest Group

• Multidisciplinary group of practitioners dedicated to best practice in the science of vascular access for children and infants

• Membership includes clinicians, educators, and manufacturers
Pediatric Special Interest Group
Mission & Vision

The mission of the Pediatric Special Interest Group is to build a community for professional collaboration and evidence-based practice for pediatric vascular access.

Our vision is to be the voice of vascular access in pediatrics.
Purpose of Guideline Development

• Best Practice Guidelines in the Care and Maintenance of Pediatric Central Venous Catheters are based upon general conclusions of health care professionals who have balanced potential benefits derived from a particular mode of medical therapy against certain risks inherent in such therapy.
• Professional judgement of attending healthcare professionals is the primary component of quality medical care
• Guidelines intended to supplement not replace professional judgement.
• Central Venous Catheters are an **integral** part of care for infants and children
• More **complex patients** combined with technology innovation
• Choosing the **correct device** and providing care are essential
• Often peripheral vascular management is difficult

**Guidelines address the specific needs of the infant and pediatric patient**
**Benefits of CVCs in the Pediatric Patient**

- **Longer Survival**
  - Longer survival of chronically ill children or prolonged hospitalization leads to repeated need for venous access

- **Too Many Peripheral Sticks**
  - Peripheral IV placement often takes too many sticks

- **Vessel preservation**
  - Utilizing CVCs for treatment preserves vessels and decreases needlestick pain
Types of CVCs used in Pediatrics

- Peripherally Inserted Central Catheter (PICC)
- Non-tunneled CVC
- Tunneled CVC
- Implanted port
- Hemodialysis catheter
- Apheresis catheter

Appropriate device selection early in their hospital course leads to improved patient outcomes and cost effectiveness.
Device Selection

- Catheter Size
- Vessel Size
- Catheter Composition
- Catheter Technology

- Antimicrobial
- Antibiotic
- Antithrombogenic
Device Selection Considerations

1. Diagnosis
2. VAD history
3. Anatomical variances
4. Type and length of therapy
5. Patient support, caregiver ability, resources available
Complications

• Require prompt attention to prevent serious sequelae
• Catheters are associated with a variety of complications
• Type influenced by smaller size inherent in children and length of therapy
• Information to recognize and treat complications in a timely fashion
• Occlusion, migration, thrombus, infection most frequently associated with pediatrics

Goal is to recognize complications and treat early and effectively
Types of Complications

- Occlusion
- Catheter-Related Vessel Thrombosis
- Phlebitis
- Catheter Tip Malposition
- Catheter Fracture
- Air Embolism
- Infiltration and Extravasation
- CLABSI
Pediatric CVC Maintenance Bundle

Bundle Recommendations

- Care Practices
- Assessment
- Catheter Site Care
- Leadership
- Catheter Management
True Impact of HAIs

- **Antibiotic Recipients**: 1 in 2 - More than half of all hospital patients receive antibiotics.
- **Contracting HAI’s**: 1 in 25 - Hospitalized patients acquire an infection.
- **Deaths Annually**: 75,000 - As a result of HAIs in hospitalized patients.
- **Non-ICU HAI’s**: 1/2 - Of reported HAIs are occurring outside the traditional ICU setting.

**Estimated number of HAI’s in the U.S.**: 722,000 - Among the healthcare system’s Acute Care population.
“Inclusive” Hygiene

• Hands & Provider:
  • Healthcare Provider, Patient as appropriate), and Family
  • 60-90% Alcohol Based (Ethyl)
  • Available, Compliant, and Peer Accountability

• Clinical Environment of Care:
  • EPA-registered, hospital-grade disinfectant with efficacy against Mycobacterium and non-enveloped viruses
  • High Touch Surfaces
Bundle Recommendations

• Care Practices
  • Hand hygiene
  • Glove use
  • Surface disinfectant
  • Use of Maintenance kits or CVC carts
Bundle Recommendations

• **Assessment**
  - Daily assessment of catheter site and surrounding area
  - Daily assessment for necessity of CVC
  - Daily assessment for appropriateness of vascular access device

Photo provided by Stephanie Pitts
Insertion and Maintenance Bundle

**Insertion:**
- Hand Hygiene
- Aseptic Technique
- Barrier Precautions
- Line/Device Necessity
- Vessel Preservation

**Care/Maintenance:**
- Dressing Change
- Access of Needleless Access Sites
- Daily Line/Device Necessity
- Prompt Removal
Impact of AR to Pediatric Populations
Bundle Recommendations

- **Catheter Site Care**
  - Skin Antisepsis with Chlorhexidine Gluconate unless contraindicated
  - CVC dressing assessment and change
  - Use of a catheter securement device
  - Proper accessing of devices
  - Use of a hemostatic agent at CVC insertion site
  - Use of an antimicrobial product at CVC insertion site
  - Daily bathing with Chlorhexidine Gluconate solutions
Bundle Recommendations

• Leadership
  • Education
  • Competency
  • Specialty teams
  • Routine Surveillance of CVCs
  • Leadership Support

Photo provided by Stephanie Pitts
Bundle Recommendations

• Catheter Management
  • Optimal CVC tip location
  • Use of needless connectors
  • Antisepsis of needless connectors
  • Needleless connector and administration set change
  • Blood sampling

Photo provided by Stephanie Pitts
Blood Sampling From a CVC

- General guidelines
- Discard method
- Reinfusion method
- Push-pull or mixing method
- Flushing
- Flushing Techniques

Photo provided by Meghan Meehan
Bundle Recommendations

• **Catheter Management**
  - CVC flushing practices
  - Assessment of CVC patency
  - Management of occluded CVCs
  - Use of Antimicrobial catheters
  - Use of ethanol locking
  - Replacement of CVCs
Education

All Clinicians caring for children with CVCs should be knowledgeable about:

- Catheter choices
- Procedures planned for catheter placement
- Ongoing assessment of CVC
- Identifying and targeting prevention of potential complications
- Care and maintenance of the CVC
Education

- Education should be updated on an ongoing basis to reflect the dynamic environment of pediatrics.
- Competencies should be evaluated on an ongoing basis and be integrated into policies and procedures.
- Comprehensive Staff Education:
  - Decreases infection rates
  - Is a strong predictor of long-term success with PICCs
  - Decreases CVC occlusion rates
Developing a Specialty Team

• Competent trained clinicians for CVC maintenance procedures
  • Minimizes CVC complications
  • Can serve as an oversight of policy and procedures, education and process improvement

Photo purchased from Fotosearch
Development of a Process Improvement Plan

- Evidence shows great benefit from being part of a collaborative quality improvement effort

- **For confirmed CLABSI a review is recommended in order to examine all care aspects of the CVC**

  Consider surveillance on:
  - Hand hygiene
  - Sterile or Aseptic Technique
  - Use of clean gloves with CVC access
  - Proper skin disinfectant
  - Needless connector/infusion tubing change technique
  - Dressing change technique
  - Adherence to CVC maintenance bundle
  - Complication rates
Conclusion

• The Guidelines are to create an awareness of the risks and complications for the pediatric patients.
• Create a culture with the ability to choose and care for the right device at the right time
• Improve the care and maintenance
• Help to develop Policy and procedures
• It is directed to all those that care for infants and children with any type of CVC