Bringing The Periphery Into Focus

Risks Associated with Peripheral IVs
Objectives

- Identify risks associated with Peripheral Intravenous (PIV) Catheters
- Discuss changes in standards and guidelines impacting practice
- Explore the evolving practices in PIV management and risk reduction
Right to the Point: PIV Scope and Magnitude

• PIVs are most frequently used invasive device in hospitals
• Up to 70% of patients require a PIV during their hospital stay\(^1\)
• 330M IV catheters are sold in the US each year

Nothing Routine About It: The Patient Experience

- **60%** of first attempts to insert are unsuccessful\(^1\)
- **27%** of patients endure 3 or more attempts\(^1,2\)
- **57%** of RNs report that they were not taught how to insert PIVs during nursing school\(^3\)

BSI related to PIV

- 0.2-0.7 per 1,000 device-days infection rate\(^1\)
- Population is so large that the number of patients potentially affected is actually quite significant
- This risk exists with or without extended dwell times\(^4\)

Vascular Catheters are the single most common source of bacteremia and fungemia\(^2\)

An estimated 5% to 25% of peripheral catheters were colonized with bacteria at the time of removal\(^3\)

As many as 10,000 *Staphylococcus aureus* bacteremias from peripheral catheters annually in the United States\(^3\)

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3. Short Peripheral Intravenous Catheters and Infections  Lynn Hadaway MEd, RN, BC, CRNI® Journal of Infusion Nursing, August 2012 Vol 35:4
Appreciation of Role of PIV in Hospital onset S. aureus bacteremia – New Evidence

- 122 episodes of primary SA HABSI:
  - 78 (64%) were CLABSIs,
  - 44 (36%) were non-CLABSIs (source: PIV or midline)

- Complicated SA HABSI was significantly more common in the non-CLABSI group (15.9% [n = 7] vs 0% [n = 0], P ≤ .001).

Need More Reasons to be Concerned?

1. In 2008 the Center for Medicare and Medicaid Services (CMS) began its program of disallowing reimbursement for vascular catheter-associated infections. (Note: there is no modification for type or location of the catheter or the type – local or bloodstream [BSI] – of infection)

2. Vascular catheter-related infections would encompass all devices used to access the vasculature without regard to specific tip location or limiting only to BSIs.

3. Reporting standards are changing.

How Big of a Problem are Healthcare Associated Infections (HAIs)?

- Point Prevalence Survey; National Healthcare Safety Network (NHSN) N=183 hospitals, 2011
- Patients at risk = 11,282
  - 452 (4.0%) with > one HAI
  - Distribution by site – see pie chart
  - C. difficile = 70% of GI infections

- Nationwide estimates:
  - 648,000 patients with 721,800 HAIs/year and of these the three most frequent sites are pneumonia, surgical site and gastrointestinal infections.

Who Gets HAIs? 1/25 on any given day in U.S. hospitals; many are older adults

44% are 65 or older

1 in 9 die

The Affordable Care Act: Value Based Purchasing

As part of the Affordable Care Act, congress has authorized the inpatient Value Based Purchasing Program, which provides a data reporting infrastructure for hospitals to help ensure quality patient outcomes.

- Value Based Purchasing program is part of the Centers for Medicare & Medicaid Services (CMS)
- CMS efforts have been linked to the Medicare payment system to improve healthcare quality, which includes quality of care provided in the inpatient setting.

The Affordable Care Act
Value Based Purchasing Timeline

Clinical process gives way to outcomes and efficiency over time as the model becomes more Pay for Performance

<table>
<thead>
<tr>
<th>FY 2018 Value Based Purchasing Domains*</th>
<th>Baseline Period</th>
<th>Performance Period</th>
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<tbody>
<tr>
<td>Clinical Process of Care</td>
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Guidelines and Standards

**CDC 2011**

- “There is no need to replace peripheral catheters more frequently than every 72-96 hours to reduce risk of infection and phlebitis in adults [36, 140, 141]. Category 1B”

- “No recommendation is made regarding replacement of peripheral catheters in adults only when clinically indicated [142–144]. Unresolved issue”

- “Some studies have suggested that planned removal at 72 hours vs. removing as needed resulted in similar rates of phlebitis and catheter failure [142–144]. However, these studies did not address the issue of CRBSI, and the risk of CRBSIs with this strategy is not well studied.”

Guidelines and Standards

APIC 2016

- Repeated (PIV) sites may be required for lengthy courses... thus increasing costs
- Superficial phlebitis results in pain, and lack of (PIV) sites can delay treatment and prolong hospitalization.
- Venipuncture has been documented to produce nerve damage, such as complex regional pain syndrome
- Additionally, the vesicant nature of medications can result in necrotic ulcers requiring surgical debridement.

SHEA 2014

- Peripheral artery catheters and peripheral venous catheters are not included in most surveillance systems, although they are associated with risk of bloodstream infection independent of CVCs

Guidelines and Standards

INS Standards of Practice 2016

• Consider monitoring bloodstream infection rates for peripheral catheters, or vascular catheter associated infections (peripheral) regularly

• Use the venous site most likely to last the full length of the prescribed therapy

• Make no more than 2 attempts at short peripheral intravenous access per clinician, and limit total attempts to no more than 4

• Use a new pair of disposable, nonsterile gloves in conjunction with a “no-touch” technique for peripheral IV insertion, meaning that the insertion site is not palpated after skin antisepsis
Guidelines and Standards

INS Standards of Practice 2016

• Consider increased attention to aseptic technique, including strict attention to skin antisepsis and the use of sterile gloves, when placing short peripheral catheters... contamination of nonsterile gloves is documented

• Consider the use of maximal sterile barrier precautions with midline catheter insertion

• For peripheral catheters, consider two options for catheter stabilization: (1) in integrated stabilization feature on the catheter hub combined with a bordered polyurethane securement dressing or (2) a standard round hub peripheral catheter in combination with an adhesive ESD.
INS Standards of Practice 2016

- Remove the short peripheral catheter if it is no longer included in the plan of care or has not been used for 24 hours or more (V)

- Notify the LIP about signs and symptoms of suspected catheter related infection and discuss the need for obtaining cultures (e.g. drainage, blood culture) before removing a peripheral catheter

- Remove short peripheral and midline catheters in pediatric and adult patients when clinically indicated based on findings from site assessment and or clinical signs and symptoms of systemic complications (e.g. Bloodstream infection).

- Perform dressing changes on short peripheral catheters if the dressing becomes damp, loosened, and/or visibly soiled and at least every 5 to 7 days.
Signs and symptoms of complications with or without infusion through the catheter include but are not limited to the presence of (I):

1. Any level of pain and or tenderness with or without palpation
2. Changes in color: erythema or blanching
3. Changes in skin temperature: hot or cold
4. Edema
5. Induration
6. Leakage of fluid or purulent drainage from the puncture site
7. Other types of dysfunction (e.g., resistance when flushing, absence of the blood return)
Potential Benefits of Longer Dwell

Fewer Invasive Procedures

- Improved patient experience
- Increased nursing efficiency
- Vein preservation
- Fewer breaches in skin
- Reduction in material costs

Regardless of dwell time, risks are still associated with PIVs\(^1\)

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Inherent Risks of Blood Stream Access

1. Contamination of catheter hubs
2. Skin organisms

Central Venous Catheters

Peripheral Venous Catheter

Blood vessel access
What are You Doing to Reduce Skin Colonization Around PIVs?

Regardless of the insertion site, skin organisms are responsible for 60% of all CRBSIs¹

Do you Really Need to See The Site of Insertion?

**CVC Site Assessment and Care**
- “The sensitivity of local inflammation for diagnosis of CVC-related BSI was dismal (0-3%)”¹
- “In general, site appearance cannot be relied on to identify catheter colonization or CVC-related BSI.”¹
- “Monitor the catheter sites visually when changing the dressing or by palpation through an intact dressing ...if patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or bloodstream infection, the dressing should be removed to allow thorough examination of the site.”²

**PIV Site Assessment and Care**
*INS 2016 Standards for identification of PIV Complications³*
- **Visual Assessment**
  - Infiltration
  - Redness >1 cm from insertion site
  - Phlebitis
  - Non-intact or saturated dressing
- **Palpation**
  - Warmth
  - Palpable cord beyond the IV catheter tip
- **Subjective Patient Information**
  - Tenderness, pain or discomfort
  - Numbness or tingling

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3. Infusion Therapy Standards of Practice, Journal of Infusion Nursing. 2016, V39 (1S)
Building a Better Process

• Education
• Standards of Practice
  • Clinical indication
• Bundles
  • Insertion practices
  • Maintenance practices
“Were you taught to insert short peripheral IV catheters while in school?” (N=344)

- 43% Yes
- 57% No

“If no, how did you learn to insert short peripheral IV” (N=235)

- On-the-job training 71%
- See one, do one 11%
- Trial and error 5%
- Attended a PIV insertion workshop 9%
- Other 4%

Moving to Clinical Indication

Not a foreign concept

- Staff competency/assessment expectations (including ER)
- Compliance with good skin prep and strict aseptic technique
- “No touch” technique at insertion
- Optimal insertion location, gauge, technique
- Protecting the site from bacterial re-colonization
- Device dressing and securement
- Scrub the Hub / disinfectant caps
- SURVEILLANCE – who will monitor the patient outcomes?

Understanding Clinical Indication

- Pediatrics
- Current “PRN” or complication related site changes
- Physician-ordered extensions

Back to Basics
The Bundle Approach

The reduction in CLABSI incidence in 2009 compared with 2001 was greatest for *Staphylococcus aureus* CLABSIs – *A 73% Reduction*¹

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PIV Case Study

Successfully Implementing A New Standard of Care for Peripheral IVs

Methodist Hospitals, Gary, IN

674 bed hospital reduces bloodstream infections, realizes multiple efficiencies and improved patient outcomes through peripheral IV policy change and peripheral IV bundle creation
PIV Case Study

CHALLENGE:

• Conducted surveillance on all lab-confirmed bloodstream infections for the past 13 years
• Aware of the inherent risks associated with PIVs
• A cluster of infections in the fall of 2013

SOLUTION:

• Improved maintenance practices
• Improved focus on line management and patient hygiene
• PIV related product enhancements
• Protective Disk with CHG added to PIV dressings
• A move to Clinically Indicated replacement (February, 2014)
• Extensive education (IV basics, PIV bundle, patient safety)
PIV Case Study

1 Year post-implementation

- 37% reduction in house-wide Laboratory Confirmed Bloodstream Infections
- 19% reduction in PIV related BSIs
- 48% reduction in PIV kit usage
- 68% fewer CLABSIs than predicted via NHSN
- Staff satisfaction re: not re-sticking patients with functioning lines
- Positive feedback from patients and families re: fewer re-sticks
Moving the Needle: One Standard of Care for All Vascular Access Devices

- Protective Disk with CHG
- Alcohol Impregnated Caps
- Scrub the Hub Prior to Access
- Sterile Transparent Dressing
- CHG Solution Skin Prep
- Flushing Protocols
Evidence You Should Ask For

- Cleared Indication
- Highest Level of Evidence/ Studies
- National Guideline Recommendations
Resources, Implementation Tools, & Educational Support
To make a large impact, make a small change to the most frequently performed invasive procedure in your institution.