Standardizing Practice for Vascular Access Devices, What does the Evidence Say?

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DISCLOSURES

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Objectives

- Choose infusion devices focusing on patient safety first
- Integrate the human element with standards and guidelines in device selection
- Recognize there are options to deliver same therapies to a single patient
- Formulate care plans that are individualized and collaborative
Literature Review

- The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC)¹
- Infusion Nurses Society (INS) Standards of Practice²
- Centers for Disease Control (CDC) Guidelines for the Prevention of Intravascular Catheter Related Infections¹²
- Institute for Healthcare Improvement (IHI) – Central Line Bundle

The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC)¹

Infusion Nurses Standard Of Practice

INS Standard 1

- Infusion therapy is provided with attention to patient safety and quality. Care is individualized, collaborative, culturally sensitive, and age appropriate.

- Ethical principles are used as a foundation for decision making. The clinician acts as a patient advocate; maintains patient confidentiality, safety, and security; and respects, promotes, and preserves human autonomy, dignity, rights, and diversity.

- Clinician decisions related to infusion therapy practice, including device and/or product selection, are not subject to commercial or other conflicts of interest.
Scenario 1
79Y, male with a history of dementia, urinary frequency and CAD. Patient currently has his second SFR PICC line in 2 days due to inadvertent removal by the patient. Current physician orders include completion of IVPB Acyclovir, Q12 hours for 2 more doses. RN found the Acyclovir infusion half completed, PICC dressing removed and 10 centimeters extending from the insertion site. Patient complaint of upper arm pain where the PICC was located

1. PIV
2. Midline
3. PICC
4. Call Pharmacy

PIV
INS Standard 26
• Consider the infusate characteristics in conjunction with anticipated duration and availability of peripheral vascular access sites.
• Consider a 20-24 gauge catheter for most infusion therapies.
• Consider 18 to 24 gauge catheter for neonates, pediatric patients, and older adults to minimize insertion related trauma.

Assessment findings:
• Left forearm has a large straight peripheral vein that can easily accommodate and 18 gauge PIV
• Left forearm has small, hard peripheral veins with slow venous refill.

Midline
INS Standard 26
• Consider a midline catheter for medications and solutions such as antimicrobials, fluid replacement, and analgesics with characteristics that are well tolerated by peripheral veins.
• Use with caution with intermittent vesicant administration due to risk of undetected extravasation. The administration of vancomycin for less than 6 days through a midline catheter was found to be safe in 1 study.
**PICC**

**INS Standard 26, 46**

- Recognize risks with PICCs, including venous thrombosis and an increased risk for CLABSI in hospitalized patients.
- Recognize risk factors associated with infiltration & extravasation – subsequent peripheral catheters after the first insertion.
- Altered mental status or cognition.

**Pharmacy**

- Notify physician of half dose – what does your institution do about a sub therapeutic dose?
- The most frequent adverse reactions reported during administration of acyclovir were inflammation or phlebitis at the injection site
- Acyclovir can be given in both oral and intravenous routes
  
  *Does your hospital have therapeutic substitution protocols?*

**Scenario 2**

Gentleman appearing to be mid 40’s collapses in the hospital lobby. He is alone and does not have any identification. His skin is grey and clammy, before collapsing he was heard quietly moaning but at this time is non responsive. A weak femoral pulse is palpable. Peripheral veins suitable for cannulation are challenging to locate. The code cart arrives with options for a central vascular access, peripheral iv’s in various gauges, and intraosseous device.

1. PIV
2. IO
3. CVC
PIV
INS Standard 22, 44, 45
- Vascular visualization technology is used in patients with difficult venous access and/or after failed venipuncture attempts. ²
- Make no more than 2 attempts at short peripheral intravenous access per clinician, and limit total attempts to no more than 4. Multiple unsuccessful attempts cause patient pain, delay treatment, limit future vascular access, increase cost, and increase the risk for complications²

IO
INS Standard 55
- In the event of cardiac arrest, anticipate use of the IO route if intravenous access is not available or cannot be obtained quickly. Pediatric advanced life support guidelines suggest the use of the IO route as the initial vascular access route²
- The IO route may also be considered for emergent and non-emergent use in patients with limited or no vascular access; when the patient may be at risk of increased morbidity or mortality if access is not obtained, such as during shock, life-threatening illness or status epilepticus, extensive burns, major traumatic injuries, or severe dehydration; and/or when delay of care is compromised without rapid vascular access. Use of IO infusion is also reported in anesthesia²
- Limit dwell time of the IO device to no longer than 24 hours. Assess for an appropriate replacement vascular access device (VAD)²

CVC
INS Standard 44, 45
- Consider labeling catheters inserted under suboptimal aseptic conditions in any health care setting (eg, “emergent”). Remove and insert a new catheter as soon as possible, preferably within 24 to 48
- Bacterial phlebitis may be related to emergent vascular access device (VAD) insertions and poor aseptic technique.
Scenario 3
35 Year old woman presents to ED with GI Bleed, has been experiencing headaches and taken "a lot" of ibuprofen recently. She has a sedentary lifestyle and is considered a difficult access. ER inserted a PIV in her right AC which infiltrated during a power injection of CT contrast. Successful insertion of an 18G PIV into the left AC was completed after 4 attempts which is now red swollen and painful.

1. PIV
2. Midline
3. PICC

PIV
INS Standard 26, 27, 33
- Make no more than 2 PIV insertion attempts per clinician, and limit total attempts to no more than 47
- Use a 20- to 24- gauge catheter based on vein size for blood transfusion: when rapid transfusion is required, a larger-size catheter gauge is recommended7
- Avoïds areas of flexion and areas of pain on palpation: avoid compromised areas; areas of valves; areas of previous infiltration or extravasation7
- Use US for short PIV placement in patients with difficult venous access and/or failed venipuncture attempts7

Midline
INS 22, 26
- Use US guidance for insertion of midline catheters in patients with difficult venous access7
- Consider infusate characteristics in conjunction with anticipated duration of treatment (eg, 1-4 weeks)7
- Consider a midline catheter for medications and solutions such as antimicrobials, fluid replacement, and analgesics with characteristics that are well tolerated by peripheral veins7
- Midline preferred to PICC if proposed duration is less than or equal to 14 days7
PICC
INS Standard 26

- PICC preferred to midline catheter if proposed duration of infusion is greater than or equal to 15 days1
- Use CVADs to administer any type of infusion therapy2

Scenario 4

35Y female triathlete was admitted to the ICU 5 days ago for cellulitis of the left leg. During diagnostic testing an adrenal mass was identified. An 18 gauge R AC PIV was initiated in ER on admission but failed during the last IV antibiotic dose. Current orders include 16 days of IV antibiotics. Additionally, pathology results from the mass will be shared with the patient by the oncologist tomorrow.

1. PIV
2. Midline
3. PICC
4. CVAD

PIV
INS Standard 26, 58

- Consider the infusate characteristics in conjunction with anticipated duration of infusion therapy (e.g. less than 6 days) and availability of peripheral vascular access sites1

- Chemotherapy???
  - Avoid the following sites: dorsal hand, wrist, antecubital fossa, near a joint, and in the limb where there is impaired circulation2
  - Do not use an established IV site that is greater than 24 hours old2
  - If the IV attempt is unsuccessful, additional attempts should be proximal to the previous attempt or on the opposite arm2
**Midline**

INS 22, 26

- Use US guidance for insertion of midline catheters in patients with difficult venous access

- Consider infusate characteristics in conjunction with anticipated duration of treatment (eg, 1-4 weeks)

- Consider a midline catheter for medications and solutions such as antimicrobials, fluid replacement, and analgesics with characteristics that are well tolerated by peripheral veins

- Midline preferred to PICC if proposed duration is less than or equal to 14 days

**PICC**

INS Standard 26

- Use a PICC with caution in patients who have cancer or are critically ill due to venous thrombosis and infection risk

- PICC preferred to midline catheters if proposed duration of therapy is greater than or equal to 14 days

**CVAD**

INS Standard 26

- CVAD placement include episodic chemotherapy treatment anticipated for more than 3 months

- Implanted Port
  - Consider an implanted vascular access port for patients who are anticipated to require intermittent long-term infusion therapy. When used intermittently, ports have a lower incidence of CRBSI, however continuous port access has infection rates that are similar to other long term CVADs
  - The implanted vascular access port, when not accessed has the advantage of allowing for ease of bathing, swimming and is associated with an improved patient self-image
Scenario 5
You are called for IV access on a patient with a history of a 5 Fr PICC that "needed to be replaced". Once you arrive to the unit you learn that the patient suffered a left parietal infarct resulting in left sided neglect with loss of motor and sensory, facial droop, and dysphagia. Diagnostic testing at the time of the stroke also found the PICC tip in the aortic arch and emboli in lumen and tip.  

- PIV
- Midline
- PICC
- Call a consult

PIV & Midline
INS Standard 26

- Do not use peripheral catheters or midlines for...parenteral nutrition...
- Avoid the use of a midline catheter when the patient has a history of thrombosis, hypercoagulability, decreased venous flow to the extremities
- Determine if TPN can be switched to PPN. Patients on PPN require either PO intake or parenteral nutrition

PICC
INS Standard 26

- Appropriate to administer prescribed continuous infusion therapy (eg. parenteral nutrition)
- Recognize risks with PICCs, including venous thrombosis and an increased risk for CLABSI in hospitalized patients
Call a Consult
Pharmacy, Attending Physician, Speech

- Severe swallowing difficulties that do not allow sufficient oral food intake and are anticipated to persist more than one week require early enteral nutrition via a feeding tube.
- If a sufficient oral food intake is not possible during the acute phase of a stroke, enteral nutrition shall be preferably given via a nasogastric tube.
- Stroke patients who are malnourished or who are at risk for pressure sores should receive oral nutritional support.
- If nutritional support is likely for a longer period of time (>28 days) a PEG should be placed in the stable phase (after 14-28 days).

Nursing Time & Delays in Therapy

- What does it cost your institution???
  PIV, Midline, PICC, CVC, Port
- Increased Length of Stay
- Delays in Treatment – complications in medical conditions
- Interrupted Therapy – sub-therapeutic antimicrobial levels

What does this mean in dollars?
Potentially $100.2 million in lost revenue?

3% HRRP
2% VBP
1% HACs
6%
Value Based Purchasing

- Clinical Care Process
- Clinical Care Outcomes
- Patient & caregiver Experience
- Safety
- Health & Cost Reduction

Thank you

Questions?

References

References