The Peripheral IV’s: What makes us Successful & is it Best Practice?

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About Your Speaker

- Bonnie Onyschuk RN, BScN
- Graduated from Laurentian University >150 years ago
- Past Positions:
  - Med/Surg ICU in a downtown teaching hospital in Toronto (Wellesley Hospital)
  - Clinical educator in several hospitals (community + teaching facilities)
  - Diabetes Ed Specialist with BD
- Member: several CVAA chapters, INS, CNA, RNAO
- Disclosure: Clinical Specialist with BD
Infusion Therapy Outcomes

- Successful completion of therapy
- Reduce catheter related complications
- Minimize number of venipunctures
- Reduce related costs
- Patient satisfaction
- Closed to potential for infection
- Minimize needlesticks and blood exposure
What has changed in our environment?

• Majority of hospitalized patients require infusion therapy
• Increasing elderly population
• Minimal nursing education on IV therapy
• Minimal traditional IV teams; Increase in vascular access resource teams with focus on PICCs + other CVCs
• Average age of a nurse in Canada is 45 (CIHI 2011)
• Renewal of Infusion standards
Key Clinical Considerations

Consider the Therapy

• **Type of solution to be administered**
  – What is osmolality?
  – What is pH?
  – Consequences of infiltration?

• **Flow Rates**
  – Are there therapy requirements?
  – What is the viscosity?

• **Duration of Therapy**
  – Short or prolonged course of therapy?
  – Consider long term options early
Osmolarity

- Osmolarity vs. osmolality
- Solute concentration in solution expressed in mOsm/l
- Normal Serum Osmolarity = 280 - 295 mOsm/l

<table>
<thead>
<tr>
<th>Degree of Risk</th>
<th>Osmolarity Solution</th>
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<tbody>
<tr>
<td>Low Risk</td>
<td>240 – 450 mOsm/l</td>
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<tr>
<td>Moderate Risk (varies with length of therapy)</td>
<td>450 – 600 mOsm/l</td>
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<tr>
<td>High Risk</td>
<td>Greater than 600 mOsm/l</td>
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- Risk for chemically induced phlebitis=other complications
Chemical Properties of Solutions

- Isotonic or near Isotonic: 250-450 mOsmol/L
- Hypotonic: < 250 mOsmol/L
- Hypertonic: > 450 mOsmol/L
- Normal pH: 7.35 – 7.45
- Ideal Infusate pH: 6-8

*Irritant*: Destructive effects on venous endothelium

*Vesicant*: Destructive effects on venous endothelium and risk of extensive tissue damage
## Common Irritant and Vesicant Drugs and Solutions

<table>
<thead>
<tr>
<th>Examples of Known Irritants</th>
<th>Examples of Known Vesicants</th>
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<tbody>
<tr>
<td>• penicillins</td>
<td><strong>Antineoplastics:</strong></td>
</tr>
<tr>
<td>• cephalosporins</td>
<td>• vinblastine sulfate</td>
</tr>
<tr>
<td>• amphotericin-b</td>
<td>• vincristine sulfate</td>
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<tr>
<td>• acyclovir sodium</td>
<td>• doxorubicin hcl</td>
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<tr>
<td>• ganciclovir sodium</td>
<td><strong>Other parenterals:</strong></td>
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<tr>
<td>• phenobarbital</td>
<td>• calcium solutions</td>
</tr>
<tr>
<td>• diazepam</td>
<td>• contrast media</td>
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<tr>
<td>• potassium solutions</td>
<td>• potassium solutions</td>
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<tr>
<td></td>
<td>• dopamine hcl</td>
</tr>
<tr>
<td></td>
<td>• sodium nitroprusside</td>
</tr>
<tr>
<td></td>
<td>• 10, 20 &amp; 50% dextrose</td>
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Catheter Size

Goals for selection of gauge & length
- Lessen vessel trauma during insertion
- Ensure adequate hemodilution

INS Standard 32.3, 2011
“The catheter selected shall be of the smallest gauge and length…. and will manage prescribed therapy”
Veins of the Foot

- Dorsal Venous Arch
- Saphenous Vein
Tunica Intima
Smooth Elastic endothelial lining

Practice Considerations:
- Smallest, shortest catheter possible
- Stabilize catheter
- Isotonic infusions in smaller veins
- Shorten infusion times with irritants (less “contact time”)
Location, location, location

AVOID:

• Flexion & extension areas
  – INS (S41) recommends avoidance of areas of flexion for IV catheter insertions.

• Compromised areas

• Sites below recent venipunctures

• Lower extremities

• Restrained areas
Tourniquets

INS Standard 31, 2011, Practice Criteria
The tourniquet should be single-patient use.

Types
- Rubber band
- Velcro strap
- Blood pressure cuff

Placement
- 3-6 inches above site
  - High on extremity
    - Hypertensive patients
- Low on extremity
  - Hypotensive patients

In Peds and Elderly, consider NO tourniquet
Vein Enhancement Techniques

- Gravity
- Fist clenching
- Heat
- Skin stimulation
- Infant stimulation
Skin Prep

INS 2011 46. Vascular Access Device Site Care and Dressing Changes

Practice Criteria C.
“Chlorhexidine solution is preferred for skin antisepsis as part of VAD site care. One percent to two percent tincture of iodine, iodophor and 70% alcohol may also be used. Chlorhexidine is not recommended for infants under 2 months of age.”

RNAO 2005
“Two percent chlorhexidine gluconate is the antiseptic cleansing agent of choice.”
Vein Stabilization

Skin Traction

- Used to prevent the vein from rolling away
- Accommodates threading of the catheter
- Straightens curved or twisting veins
Insertion Methods

- **Direct**
  - on top of vein
  - directly through the skin and into the vein in one motion

- **Indirect**
  - side or bottom of vein
  - through skin then into vein
• Lower insertion angle and advance entire unit
• Thread catheter into vein
Newborn/Neonate

- Fluid overload risks
- Heat loss
- <32 weeks minimal SQ tissue
- Immature immune system
- Threadlike veins
  - Tunica intima fragile
  - Hypotension, lower blood flow
- Phlebitis uncommon
Pediatrics

- Electronic monitoring devices
- Solution container volume
- Volume control chambers
- Monitor at least every hour*
- Increased Sub-q tissue
  - Difficult access
  - Difficult to recognize infiltration
Elderly

- Skin changes
  - Loss of subcutaneous tissue
- Vein wall changes
- Fragile skin makes anchoring vital to get long life out of IV
Elderly

- Emotional/Physical assessment
- Difficulties adapting to change
- Impairments in visual acuity, hearing and manual dexterity
Elderly

• Caregiver abilities/issues.
• Environment in which care will be given must be assessed prior to discharge and home therapy.
• Access to emergency management
• Storage and Disposal of medications and equipment
Considerations for Elderly

- Assess, Assess and Re-assess!
- Smaller is better (thicker vessel walls ↓ the lumen)
- Hemodilution is your friend!
- Watch fragile skin
- Get knowledgeable about elderly before IV attempts (know changes to elderly)
- GOOD lighting (side-lighting best)
- Take time for skin prep and drying (fragile skin)
- DO NOT FAN/Blot or Blow!
Tips for Success

- Enough hands
- Do you have all the equipment
- Adequate vein stabilization
- Appropriate securement is very important!
Who Guides Our IV Practice Today?

- **Standards of Practice**
  - Authoritative statements whose intent is to insure quality of practice and education
  - Are generally viewed as the *minimum* acceptable level of practice
  - Bear weight in a court of law

- **Guidelines**
  - Recommendations for the safe provision of patient care
  - Are promulgated through evidence within the field of practice and/or through professional consensus
  - Bear weight in a court of law
Key Guiding Documents


Questions
References