Vascular Access Device Planning

Infusion Therapy Standards of Practice

The appropriate type of vascular access device (VAD), peripheral or central, is selected to accommodate the patient’s vascular access needs based on the prescribed therapy or treatment regimen; anticipated duration of therapy; vascular characteristics; and patient’s age, comorbidities, history of infusion therapy, preference for VAD location, and the ability and resources available to care for the device.

The most appropriate VAD device selection should occur as a collaborative process between the clinicians, patient and patient caregivers. The device selected should be the smallest outer diameter with the fewest number of lumens and be the least invasive for the prescribed therapy. Consideration of peripheral vein preservation should always be a factor in VAD decision making.

Organizations:
- AVA: Association of Vascular Access
- AVAinfo.org
- INS: Infusion Nurses Society
- INS1.org
- ONS: Oncology Nursing Society ONS
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- APIC: The Association for Professionals in Infection Control
- APIC.org
- The Joint Commission
- JointCommission.org
- Center of Disease Control
- CDC.gov

Selecting the appropriate device for a patient is a critical part of a clinician's job. These materials are being provided for your information only and are not a substitute for clinical judgment.
Infusion therapy

Process map

Expected outcomes

• Successful completion of prescribed therapy
• Minimize therapy related complications
• Minimize the number of venipunctures
• Minimize supply and labor costs
• Patient satisfaction
• Reduced needlestick injuries and needle exposure to healthcare workers

Considerations for vascular access device selection

Therapy considerations

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Daylight朋友 dangers,</th>
<th>Handset safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Handset safety</td>
<td></td>
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<tr>
<td>Comfort</td>
<td>Handset comfort</td>
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</table>

Device considerations

<table>
<thead>
<tr>
<th>Size</th>
<th>Diameter: flows range (lengths cm)</th>
<th>Flow characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Handset safety</td>
<td></td>
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Provider considerations

<table>
<thead>
<tr>
<th>Care and maintenance</th>
<th>Insertion site infection</th>
<th>Catheter care</th>
<th>Maintenance protocols</th>
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</table>

Placement and management

<table>
<thead>
<tr>
<th>Placement</th>
<th>Point of service</th>
<th>Access</th>
<th>Medical imaging</th>
<th>Diagnostic imaging</th>
<th>Interventions (angiography)</th>
<th>Catheter care</th>
<th>Catheter care</th>
<th>Maintenance protocols</th>
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<tbody>
<tr>
<td>Intravenous</td>
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Ventricles associated with lower reported ips of extravasation published drug information and variables including pH, osmolality, viscosity, diamer, and volume should be considered, among other factors. The first step in reducing the risk of extravasation is to identify and recognize medications and solutions that are associated with tissue damage when the solution escapes from the vascular pathway. It is important to recognize that large infiltrations of nonvesicant medications or solutions may also be associated with severe tissue damage.

Diagnosis—Vascular Access Device

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Considerations</th>
<th>Visible/palpable vein</th>
<th>History of difficult access</th>
<th>Developmental age</th>
<th>Patient education and preference</th>
<th>Anatomical limitations/contraindications</th>
<th>Noncytotoxic vesicant list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular Access Device</td>
<td>Placement: point of service</td>
<td>Intravenous: central venous access</td>
<td>Intraosseous</td>
<td>Intraosseous</td>
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<tr>
<td>Central:</td>
<td>PICC catheters</td>
<td>Midline catheters</td>
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<tr>
<td>Peripheral:</td>
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Therapy

Infusion therapy is a complex clinical practice and varies greatly between individual patients and the therapies they receive. To safely infusion medications/solutions and minimize damage to the vascular axis, variables including pH, osmolality, viscosity, diamer, and volume should be considered, among other factors. The first step in reducing the risk of extravasation is to identify and recognize medications and solutions that are associated with tissue damage when the solution escapes from the vascular pathway. It is important to recognize that large infiltrations of nonvesicant medications or solutions may also be associated with severe tissue damage.

Vascular Access Device Tip Termination

Poiseuille’s Law:

The physics of flow through a tube

Flow through a tube, including both catheters and blood vessels, is related to the following factors:

• Radius of the tube
• Pressure gradient across the tube
• Length of the tube
• Viscosity of fluid in the tube

Flow rate through a tube is exponentially greater in central veins compared to peripheral veins.

Noncytotoxic vesicant list

<table>
<thead>
<tr>
<th>Red list</th>
<th>Yellow list</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Calcium chloride</td>
<td>• Arginine</td>
</tr>
<tr>
<td>• Calcium gluconate</td>
<td>• Aminophylline</td>
</tr>
<tr>
<td>• Sodium bicarbonate</td>
<td>• Dextrose concentration ≥ 3%</td>
</tr>
<tr>
<td>• Phenylephrine</td>
<td>• Dextrose concentration ≥ 12.5%</td>
</tr>
<tr>
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<td>• Dextrose concentration ≥ 20%</td>
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</tr>
<tr>
<td>• Vancomycin hydrochloride</td>
<td>• Dextrose concentration ≥ 20%</td>
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Tip Termination

Intravenous: Peripheral IV, Proximal IJ, and Distal Tapes
Distal Femur (Pediatric only)
PVC: range, hand up through upper arm
Catheter: CAV both for SVC and the IVC
Medline: arterial/venous or central arterial
Infusion: IV or IV line, with TR line, or central venous catheter
Central: CAV both for SVC and the IVC
Venous: central venous catheter, peripheral venous catheter

Parenteral nutrition
• Vancomycin hydrochloride
• Phenobarbital sodium
• Phenobarbital sodium
• Nafcillin
• Mannitol ≥ 3%
• Dextrose concentration ≥ 10% to 12.5%
• Arginine
• Amiodarone
• Acyclovir
• Calcium gluconate
• Calcium chloride

Changes in radius have the greatest effect on flow rate (A flow rate is exponentially greater in central veins compared to peripheral veins.

Infusions are impossible to deliver intravenously in a significantly greater in central veins compared to peripheral veins.

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Diabetes Nursing Society, Noncytotoxic Vesicant List, 2016
Considerations for vascular access device selection

Infusion therapy process map

Expected outcomes

Therapy considerations

Device considerations

Provider considerations

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**BD® Peripheral Vascular Access Devices**

- **BD™ Insite™ AutoGuard™ BC Pro Shielded IV Catheter System**
- **BD™ Nexiva™ Shielded IV Catheter**
- **AccuGlide™ Catheter**
- **PowerGlide™ Pro™ Catheter**
- **PowerGlide™ Pro ET Catheter**
- **PowerGlide™ ST Catheter**
- **PowerMedida™ Catheter**
- **Provena™ Medida Catheter**

**BD Vialon™ Biomaterial**
- **Cue™ Needle-Tracking System**
- **Seldinger technique / Modified technique**
- **Early flashback indication**

**BD® Central Vascular Access Devices**

- **PowerPICC™ Catheter**
- **PowerPICC™ SOLO™ Catheter**
- **PowerPICC™ Provena™ Catheter**
- **PowerGroshong™ PICC Catheter**
- **Groshong™ NXT PICC Catheter**
- **VeloCath™ Catheter**
- **PowerHohn™ CVC Catheter**
- **PowerLine™ CVC Catheter**
- **PowerPort™ Implantable Ports**
- **PowerPort™ ClearVUE™ Implantable Ports**
- **Integrated extension**
- **Blood control technology**
- **Integrated wire**
- **Power injectable**
- **Diffusion tip technology**
- **Integrated stabilization**
- **Dual lumen**

**BD® Intraosseous Driver**

- **BD™ Intraosseous Powered Driver**
- **BD™ Intraosseous Manual Driver**

**Emergent access**
- **Passive needle safety**
- **Blood sampling**
- **Ergonomic design**
- **Manual Insertion Driver with battery life indicator**
- **Short dwell**

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