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.

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INS Standards of Practice 26.1, 26.2, 26.3, 26.4 page S51

Organizations:
AVA: Association of Vascular Access AVAinfo.org
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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

Vascular Access Device Planning

Infusion Therapy Standards of Practice

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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

Potential complications

- Successful completion of central line placement
- Minimize therapy-related complications
- Minimize the number of punctures
- Minimize supply and labor costs
- Patient satisfaction
- Reduced needlestick injuries and blood exposure to healthcare workers

Therapy considerations

- Place catheter - Hand-hygiene and drug safety
- Duration
- Infection
- Dexterity
- Intraosseous/IV/vascular
- Velocity
- Volume
- Compatibility
- Blood sampling
- Monitoring
- Centralized/extended CT

Vascular Access Device Tip Termination

Intraosseous: (Peripheral Nerve, Ipsilateral and Distant Limbs)
Dental Ferrum (Pedodontic only)
PVC: range, hand up through upper arm
Central: CAA both for SVC and the IVC
Midline: amygdaloid create

Poisellei’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:

- Flow rate by 16 times!
Infusion therapy process map

Expected outcome

- Successful completion of intervention
- Minimize therapy-related complications
- Maintain the number of punctures
- Minimize supply and labor costs
- Patient satisfaction
- Reduced needlestick injuries and blood exposure to healthcare workers

Therapy considerations

| Purpose | Device selection | Considerations for vascular access

- Yellow list
- Red list

Device considerations

| Size | Noncytotoxic vesicant list

- Yellow list

| Well-recognized vesicants with multiple citations and reports of tissue damage upon extravasation

- Red list

| Vesicants associated with fewer reported-published reports of extravasation, published drug information and infusate characteristics indicate caution and potential for tissue damage

Provider considerations

| Place of venue and considerations | Place of device |

- PIVC
- Intraosseous
- Midline
- Central

Placement: point of service

- Head
- Medical Imaging
- Diagnostic imaging
- Interventional radiology
- Cardiac catheterization lab
- Emergency department
- Specialty unit
- Surgical services
- Perioperative
- Critical Care/ICU/step-down
- Med-surg/Telemetry

Placement: equipment

- Ultrasound and/or vein visualization technology
- Vascular access device
- Needle guidance

Procedure cost

- Procedure success rates

Noncytotoxic vesicant list

- Calcium chloride
- Calcium gluconate
- Contrast media: nonionic
- Calcium gluconate
- Calcium chloride
- Calcium lactate
- Calcium phosphate
- Calcium gluconate
- Calcium chloride
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Vascular Access Device Tip Termination

- Intravenous: Predominantly Hydrophobic (Petri dishes)
- Dermal Ferrari: Predominantly Hydrophobic (Petri dishes)
- PVC: range, hand up through upper arm
- Central: I.V. for SVC and the IVC

Maligne: amphotericin create

Changes in radius have the greatest effect on flow rate! (r4). Doubling the radius of a vessel lumen increases the flow rate by 16 times!

- Viscosity of fluid in the tube
- Length of the tube
- Diameter: French size/guage
- Pressure gradient across the tube

Viscosity, osmolarity, dilution 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.

Infusion therapy is a complex clinical practice and varies greatly between individual patients and the therapies they receive. To safely infuse medications/solutions and minimize damage to the vasculature, infusion variables including pH, osmolarity, viscosity, dilution and volume should be considered, among other factors.

Poissonne: Low, The physics of flow through a tube

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

1. Radius of the tube
2. Pressure gradient across the tube
3. Length of the tube
4. Viscosity of the fluid in the tube

Changes in radius have the greatest effect on flow rate! (r4). Doubling the radius of a vessel lumen increases the flow rate by 16 times!
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