Navigating Vascular Access Issues

The Oley Foundation
27th Annual Consumer/Clinician Conference
Redondo Beach, CA
June, 27 2012

Anita Piano, BS, RN, VA-BC
Administrative Nurse, PICC Service
UCLA Health System
Objectives

At the conclusion of this presentation, participants will be able to:

1. Discuss key factors a clinician considers when selecting a vascular access device.

2. Describe three new technologies that are currently being used in the placement and care of vascular access devices.

3. Identify three actions that may be taken to reduce the risk of complications related to vascular access devices.


Best Practice Guidelines in the Care and Maintenance of Pediatric Central Venous Catheters

Created by Pedivan
A pediatric vascular access network of AVA

Support for this publication was provided by an unrestricted educational grant to Pedivan by the 3M Corporation.
March 2010
Vessel Health and Preservation

- Early planning for access reduces complications and improves patient comfort
- Staff and patient education is vital for vascular access device (VAD) infection prevention

Right Line
Right Patient
Right Time

(Moureau et al, 2012)
The Role of Industry
Medium to Long Term Vascular Access Devices (VADs)

- Peripherally Insertion Central Catheter (PICC)
- Tunneled Central Venous Catheter
- Subcutaneous Infusion Port

(Courtesy of Genentech)
## VAD Indications

<table>
<thead>
<tr>
<th>Catheter Type</th>
<th>Description</th>
<th>Placement</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICC</td>
<td>Valved or non-valved</td>
<td>At bedside or Interventional Radiology (IR)</td>
<td>&gt; 6 days IV therapy</td>
</tr>
<tr>
<td></td>
<td>Single, double, triple lumen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunneled CVC</td>
<td>Single or multi-lumen</td>
<td>OR or IR</td>
<td>Long term infusion therapy</td>
</tr>
<tr>
<td>Subcutaneous Infusion Port</td>
<td>Single or double lumen</td>
<td>OR or IR</td>
<td>Long term infusion therapy</td>
</tr>
</tbody>
</table>
Pre-procedure Evaluation

• Vascular Access History
• Sedation History
• Labs – completed and pending
• Anatomy
• Studies
  • CXR
  • Dopplers
  • MRV
  • Echocardiogram
A Great Story Teller
Procedure Environment
Lifestyle Considerations

• Normal activities
• Exposure to moisture
• Independence
• Ability/resources to care for device
• Comfort level
• Experience of catheter operators
• Patient/caregiver preference
Which VAD is Best?

• Prescribed therapy or treatment
• Expected dwell time
• Protects vascular integrity

Choose the most appropriate device as the *first choice, not as a last resort.*
Prevention starts at insertion

- Smallest catheter possible
- Fewest number of lumens
- Select largest vessel possible
  - maximize dilution
  - Promote blood flow
- Select healthiest insertion site

(Moureau et al., 2012)
Bigger Isn’t Always Better

- Asymptomatic thrombosis rates as high as 40%
- CVR – Catheter to Vein Ratio
- Simulated PICC model showed PICCs may decrease venous flow by 93%
  (Nifong, McDevitt, 2011)
What Does Stenosis Look Like?
This isn’t your mother’s catheter

• Valved vs. non-valved
• Power injectable
• Antimicrobial
  • Chlorhexidine/Silver Sulfadiazine
  • Minocycline/Rifampin
  • Platinum/Silver
• Antithrombogenic
• Coated and integrated into the materials
Who is inserting your VAD?

- Training and Experience of clinician
- Setting
- Complication rates
- Ultrasound Guidance
  - Few number of attempts
  - Reduced complications on insertion
  - Increased speed of insertion
- Confirming catheter tip location
- Maximal Barrier Precautions
- CLIP form
Technology - Insertion

- Ultrasound
- Tip location devices
## Recommended Catheter Tip Position

<table>
<thead>
<tr>
<th>Organization</th>
<th>Tip Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion Nurses Society (INS)</td>
<td>Lower on-third of SVC to CAJ</td>
</tr>
<tr>
<td>Association for Vascular Access (AVA)</td>
<td>Distal SVC close to the CAJ</td>
</tr>
<tr>
<td>FDA CVC Working Group</td>
<td>Lower on-third of SVC</td>
</tr>
<tr>
<td>Oncology Nurses Society (ONS)</td>
<td>SVC at junction of right atrium</td>
</tr>
<tr>
<td>Society of Interventional Radiology</td>
<td>SVC/RA junction</td>
</tr>
</tbody>
</table>
Complications Rates Associated with Tip Position

• Replace dressing on short-term CVC sites at least every 7 days
• Replace transparent dressings on tunneled CVCs no more than once per week, until site healed
• Do not use topical antibiotic ointment or creams on insertion sites, except for dialysis catheters, due to potential to promote fungal infections and antimicrobial resistance
• Consider prophylactic antimicrobial lock solution in patients with long term catheters and history of multiple CRBSI
Skin Antisepsis

• Prepare clean skin site with a > 0.5% Chlorhexidine preparation with alcohol before CVC insertion

• Chlorhexidine not labeled for patients < 2 months of age

• No recommendation for safety or efficacy of chlorhexidine on infants < 2 months

• Mounting evidence chlorhexidine safe and effective for all age groups
Technology - Maintenance

• Dressings
• Caps
• Flushing Solutions
The limits of technology

- Basics
- Knowledge
- Practice
Nurses Caring for VADs

• Study included 36 nurses working on a colo-rectal unit
• 10 item survey of VAD management
• Greatest knowledge and comfort with:
  • Flushing PICCs
  • Using Alteplase
  • Changing Dressing
Needless Connectors

• May eliminate need for Heparin
• Possible link to bloodstream infections
  • Inadequate cleaning of surfaces
  • Configuration of device
  • Internal “dead” space traps fluid
  • Lack of training
• Knowledge of proper:
  • Cleaning
  • Flushing
  • Clamping
Flushing Push-Pause Technique

**Theory**
Rapid push-pause injection of the flush solution will create turbulent flow, effectively clearing the internal walls of the catheter and reducing the risk of occlusion.

**Evidence**
While popular in the clinical setting, studies are needed to prove the efficacy of this method.
Size Matters
Malfunctions

• Obstruction
• Leaking
• Breakage
Signs of Migration

• May be vague or significant
• Difficulty flushing
• Difficulty aspirating
• Sluggish flow
• Hearing “water”
• Pain
VAD Securement

- Know the amount of visible (external) catheter
- Numerous device options with new products being introduced regularly
Treatment vs. Removal

- Vein preservation
- Restoring catheter function is preferred over VAD replacement
- Risks associated with catheter replacement
- Cost effective
- Timely
Removal Considerations

• Are you sure this is the right step?
• What is the plan for the new catheter?
• Does removing a catheter ensure you will be able to place another one?
• Who and where?
• Difficult at time of removal
apiano@mednet.ucla.edu