Supplement Integration

This supplement to the nursing best practice guideline *Care and Maintenance to Reduce Vascular Access Complications* is the result of a scheduled review of the guideline. As part of its commitment to ensure consistency with the best available evidence, the Registered Nurses’ Association of Ontario (RNAO) has established a monitoring and review process, which involves a full review of each guideline every 3 years.

As part of the health care team, nurses caring for clients with indwelling vascular access devices have an important and continued role in providing safe infusion therapy, across the continuum of care. Therefore, they have an important role in helping clients understand and reduce their risk for complications. Importantly, though the main focus of this guideline review remains the care and maintenance of central venous access devices (CVAD), some recommendations apply to both CVAD and peripheral venous access devices (PVAD) as per the original guideline. Please note that to ensure consistency with the scope of the original guideline, this review has not addressed recommendations related to the care of clients requiring infusion therapy through the following devices: arterial lines, hemodialysis catheters, pulmonary artery lines, pheresis lines, epidural catheters, pressure monitoring devices, umbilical vein, femoral catheters, and/or intraosseous lines. Nurses working with these devices will require further practice direction from guidelines in their areas of practice.

Review Process

A panel of specialists was assembled for this review, comprised of members from the original development panels of the *Assessment and Device Selection for Vascular Access* and *Care and Maintenance to Reduce Vascular Access Complications* guidelines, as well as other recommended individuals with particular expertise in this practice area. A structured evidence review based on the scope of the original guideline was conducted to capture the relevant literature. Initial findings regarding the impact of the current evidence base on the original guideline were summarized for the review panel. The review panel members were given a mandate to review the original guideline in light of the new evidence, specifically to ensure the validity, appropriateness and safety of the guideline recommendations as published in 2005. In December 2007, the panel met to achieve consensus on the impact of this new evidence on the existing recommendations.
Review of Existing Guidelines
One individual searched an established list of websites for published guidelines and other relevant content. This list was compiled based on existing knowledge of evidence-based practice websites and recommendations from the literature. Six international guidelines on infusion therapy were critically appraised using the Appraisal of Guidelines for Research and Evaluation Instrument (AGREE, 2001). From this appraisal, two guidelines were identified to inform the review process and were circulated to all panel members:


Literature Review
Concurrent with the review of existing guidelines, a search for recent literature relevant to the scope of the guideline was conducted with guidance from the Review Chair. The search of electronic databases, including CINAHL, Medline and EMBASE, was conducted by a health sciences librarian. Articles identified and recommended by panel members were also considered. A Master’s prepared nurse completed the inclusion/exclusion review, quality appraisal and data extraction of the retrieved studies, and the summary of the literature findings. The comprehensive data tables and reference lists were provided to all panel members.

A summary of the evidence review is provided in the flow chart below.

Panel Review
After a review of the current evidence, no substantive changes were made to the recommendations; however, several inaccuracies were noted in the original publication, and will be addressed in this review document. Additional resources have also been identified and are listed below as Appendix A.

Review Findings
A review of the most recent research studies and relevant guidelines published since the development of the original guideline does not support substantive changes to the recommendations. However, the panel has identified several research gaps in the available evidence, which will be outlined below.
<table>
<thead>
<tr>
<th>Original recommendations identified by the panel for update</th>
<th>Review Findings 2008</th>
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</table>
| **3.0** Nurses will consider the following factors when performing catheter site care using aseptic technique:  
  - Catheter material (composition);  
  - Antiseptic solution; and  
  - Client’s tolerance (skin integrity, allergies, pain, sensitivity and skin reaction)  
  (Level IV) | Although the evidence supports the original recommendation, the panel would like to include an alert:  
  Aseptic technique must include choice of solution, use of friction, and adequate contact time in order to be considered an effective use of technique. Please consult your institutional policy or infection control policies for more details.  
  The panel also recognizes there has been discussion around circular vs. east-west application techniques; although evidence does not exist at present to support a recommendation for one technique over the other, this topic will be noted for future cycles of guideline review. |
| **4.0** Nurses will not use the central venous access device (CVAD) until tip placement has been confirmed.  
  (Level IV) | Although the evidence supports the original recommendation, the panel would like to include an alert:  
  Anatomical tip location must be documented by a radiologist/attending physician following insertion, and this documentation must be accessible to all the client’s health care providers throughout the continuum of care.  
  Please note: the original discussion of the evidence referred to an illustration (Appendix D of the original guideline) which is inaccurate; please refer to Appendix B below for a revised visual representation of correct tip placement. |
| **7.0** Nurses will maintain catheter patency using flushing and locking techniques.  
  (Level IV) | The panel has identified some inaccuracies in Table 2 (p. 32) of the original guideline. These have been updated below; please refer to Appendix C. |
| **11.0** Nurses will change all add-on devices at a minimum of every 72 hours.  
  (Level IV) | The current review of the evidence has resulted in the recognition of a research gap around the rates of catheter-related bloodstream infections and phlebitis related to increasing the time interval for replacement of add-on devices. As sufficient evidence does not exist at present to change the original recommendation, this topic will be noted for future cycles of guideline review. |
| **19.0** Health care organizations have access to infusion therapy nursing expertise to support optimal vascular access outcomes.  
  (Level III) | Although the evidence supports the original recommendation, the panel would like to emphasize the importance of health care organizations having access to credentialed infusion therapy nurses to support optimal vascular access outcomes. Please refer to the corresponding recommendation and discussion in the RNAO best practice guideline Assessment and Device Selection for Vascular Access (Recommendation 6). |
### Appendices

#### Appendix A: Additional Resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Vascular Access Association (CVAA)</td>
<td><a href="http://www.cvaa.info/">http://www.cvaa.info/</a></td>
</tr>
<tr>
<td>Infection Control Today</td>
<td><a href="http://www.infectioncontroltoday.com">www.infectioncontroltoday.com</a></td>
</tr>
<tr>
<td>Institute for Safe Medication Practices Canada</td>
<td><a href="http://www.ismp-canada.org">www.ismp-canada.org</a></td>
</tr>
<tr>
<td>Ontario Ministry of Health and Long-Term Care</td>
<td><a href="http://www.health.gov.on.ca">www.health.gov.on.ca</a></td>
</tr>
<tr>
<td>Safer Healthcare Now</td>
<td><a href="http://www.saferhealthcarenow.ca">www.saferhealthcarenow.ca</a></td>
</tr>
</tbody>
</table>

### Appendix B: CVAD Tip Placement

**INCORRECT PLACEMENT** (from original guideline; tip too high)

- Illustrated by: Nancy A. Bauer, BA, Bus. Admin, RN, ET (2005)

**CORRECT PLACEMENT** *(see larger scale image on page 5)*


**CORRECT PLACEMENT** *(X-RAY)*

Correct Placement

Right External Jugular
Right Subclavian Vein
Venous Entry Site
Tunneled Portion of Catheter
Cutaneous Exit Site
Dacron Cuff
Superior Vena Cava
Catheter Tip
Right Atrium
Appendix C: Flushing and Locking Interventions

Organizations may choose to modify Appendix C based on current clinical practice, device technology, and/or patient assessment.

Ensure that the catheter lumen is flushed using Sodium Chloride 0.9% prior to locking the lumen.

<table>
<thead>
<tr>
<th>VASCULAR ACCESS DEVICE</th>
<th>FLUSHING SOLUTION</th>
<th>LOCK SOLUTION</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral Short-Catheter</td>
<td>Flush and lock with 3 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or daily if not in use</td>
</tr>
<tr>
<td>Peripheral Midline-Catheter (non-valved)</td>
<td>5 – 10 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or weekly if not in use</td>
</tr>
<tr>
<td>Peripheral Midline-Catheter (valved technology)</td>
<td>Flush and lock with 10 – 20 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or weekly if not in use</td>
</tr>
<tr>
<td>Central Vascular Access Device (CVAD), non-valved (e.g. Percutaneous, Tunneled, PICC)</td>
<td>10 – 20 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or weekly if not in use</td>
</tr>
<tr>
<td>CVAD with valved technology (e.g., Groshong®, PASV®)</td>
<td>Flush and lock with 10 – 20 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or weekly if not in use</td>
</tr>
<tr>
<td>Implanted Vascular Access Devices (IVAD), non-valved</td>
<td>10 – 20 mL 0.9% sodium chloride</td>
<td>Heparin (commonly used concentrations are 10 or 100 units/mL)</td>
<td>After each access or every four weeks if not in use</td>
</tr>
<tr>
<td>IVAD with valved technology (e.g. Groshong®, PASV®)</td>
<td>10 – 20 mL 0.9% sodium chloride</td>
<td>As per manufacturers’ recommendations</td>
<td>As per manufacturers’ recommendations</td>
</tr>
</tbody>
</table>

Note: Heparin is absolutely contraindicated in patients with Heparin-induced Thrombocytopenia (HIT), consult with physician re: alternative measures. For more details about flushing and locking solutions, please refer to the manufacturer’s recommendations.
References / Bibliography:


