Addressing the Dressing: Improving Dressing Disruption in Vascular Access

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- Access Scientific
- Becton Dickinson
- Ethicon
- Eloquest Healthcare

And is a Director at Large with the Vascular Access Certification Corporation (VACC)
Background

CDC guidelines as well as INS standards emphasize the importance of a clean, dry and intact dressing for vascular access devices.

Literature suggests an increased risk of CLABSI with repeated dressing changes for disruption.

Ongoing process and outcome surveillance suggested an opportunity for improvement with this process measure.
Site care, including skin antisepsis and dressing changes are performed … immediately if the dressing becomes damp, loosened, or visibly soiled, or if moisture, drainage or blood are present under the dressing.
Change the dressing **immediately** to closely assess, cleanse and disinfect the site in the event of drainage, site tenderness, other signs of infection or if the dressing becomes loose/dislodges.
Avoid the use of tape... rolls of nonsterile tape can become contaminated with pathogenic bacteria

Admittedly this is in the section regarding engineered stabilization devices but...
Replace catheter site dressing if the dressing becomes damp, loosened or visibly soiled.
IVAD18: Transparent dressings should be changed... If they are no longer intact or if moisture collects under the dressing.

IVAD19: Gauze dressing should be changed when the dressing becomes damp, loosened or soiled.
How are we doing here?

Images obtained from Facebook Vascular Access and Infusion Specialists group and AVATAR page
Why do intact dressings matter?

Dressing disruption is a major risk factor for catheter related bloodstream infections.

"The risk of major catheter-related infection and catheter-related bloodstream infection increased by more than three-fold after the second dressing disruption and by more than ten-fold if the final dressing was disrupted"

CASCADE trial...

<table>
<thead>
<tr>
<th>Table 2 Study outcomes (n = 121)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Number of dressing changes:</td>
</tr>
<tr>
<td>- Incidence rate^{b}</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Dressing/secdev life:</td>
</tr>
<tr>
<td>- days to first change^{c}</td>
</tr>
<tr>
<td>- days^{d}</td>
</tr>
<tr>
<td>Reason for change (n = 189)^{3}</td>
</tr>
<tr>
<td>- routine</td>
</tr>
<tr>
<td>- dressing lifting</td>
</tr>
<tr>
<td>- sweating</td>
</tr>
<tr>
<td>- leakage</td>
</tr>
<tr>
<td>- bleeding</td>
</tr>
<tr>
<td>- unknown</td>
</tr>
<tr>
<td>- other</td>
</tr>
</tbody>
</table>

Number (percentage) shown unless otherwise noted.
Location, location, location..

- Where would you rather try to maintain a dressing?
  - IJ or subclavian?
  - Hand or forearm?
  - Chest or femoral?
  - Upper arm?
## Table 3. CVC dressing duration in the 4 dressing types.

<table>
<thead>
<tr>
<th>Dressing Type</th>
<th>Number of dressings observed</th>
<th>Dressing duration (hrs) median [IQR]</th>
<th>z value*</th>
<th>Number of dressings observed</th>
<th>Dressing duration (hrs) median [IQR]</th>
<th>z value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ospite IV 3000</td>
<td>310</td>
<td>43.5 [21–78]</td>
<td>−1.79</td>
<td>160</td>
<td>36.0 [15–67.5]</td>
<td>−1.21</td>
</tr>
<tr>
<td>Tegaderm</td>
<td>237</td>
<td>46.0 [22–85]</td>
<td>−0.33</td>
<td>122</td>
<td>45.5 [22–73.8]</td>
<td>1.17</td>
</tr>
<tr>
<td>IV Advanced</td>
<td>262</td>
<td>40.5 [20–85]</td>
<td>−1.12</td>
<td>143</td>
<td>32.0 [14–69.5]</td>
<td>−1.98</td>
</tr>
<tr>
<td>Sorbabview</td>
<td>116</td>
<td>68.5 [32–105]</td>
<td>4.51</td>
<td>42</td>
<td>53.0 [30–95]</td>
<td>3.39</td>
</tr>
<tr>
<td>Unrecorded</td>
<td>304</td>
<td></td>
<td></td>
<td>163</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IQR, inter quartile range; *P < 0.001 and **P = 0.002 for at least one difference between dressings.

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Finding the right dressing
Finding the right dressing, cont.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Months</th>
<th>CVC dressing evaluated</th>
<th>Other securement techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>1–4</td>
<td>Standard dressings: sterile, transparent, semi-permeable polyurethane dressings (Opsite IV 3000 and 3M Tegaderm®)</td>
<td>None</td>
</tr>
<tr>
<td>Two</td>
<td>5–8</td>
<td>3M Tegaderm® IV Advanced: sterile, transparent, semi-permeable polyurethane dressings</td>
<td>Dressing with an integrated border around the dressing. Separate Hyperfix® border applied to create a further secure ‘window’ around the edge of the dressing</td>
</tr>
<tr>
<td>Three</td>
<td>9–12</td>
<td>Sorbaview®, sterile, transparent, semi-permeable polyurethane dressings</td>
<td>Integrated two piece dressing, one part for the site with a wide border and second part with a wide supporting bridge</td>
</tr>
</tbody>
</table>
Lack of consistency

How do you define intact?

When is it OK to reinforce?

Is it OK for edges to be lifted or rolling up?
How can we make it better?

- Do you start with clean skin?
- Do you use skin prep?
- Do you let everything dry?
- Is your securement helping or hindering maintenance?
- Is additional securement or adhesive necessary?
- Is adhesive remover necessary?
It can be done!

Images obtained from Facebook Vascular Access and Infusion Specialists group, Laura Krick and Dr. Jack LeDonne
This is not just about inpatients

- Outpatient infusion and home health
  - What are patients taught?
  - How many dressings are disrupted when the patient is seen/visited?
  - Are extra visits necessary to address these dressings?
  - How does this impact reimbursement?
How do you measure the impact?

- **Partner with infection prevention**
  - How many CLABSIs/BSIs/CRBSIs had premature dressing changes? Documentation of reinforcement?

- **Use your Electronic Medical Record**
  - How many dressings are changed before Day 5? Day 7?
  - How many are reinforced at the time of removal?

- **Prevalence rounds**
  - Review dressings on all units
    - Stratify by anatomical location, line type
  - How many
    - Fully intact?
    - Lifted?
    - Reinforced?
    - Insertion site exposed?
Consider the potential adverse consequences of insufficient adhesion and/or adhesive failure, when selecting medical adhesive products for use in securing a critical device.

“Critical devices include those for which there is a risk of significant clinical impact to a patient if the device is dislodged or does not perform as expected. Examples include vascular access devices, endotracheal tubes, nasogastric feeding tubes, and indwelling urinary catheters. Proper securement of critical devices is paramount to patient safety.”
Review of 2016 infection control surveillance data revealed that 25% of bloodstream infections had documentation that dressing had been reinforced or prematurely changed.

Repeated point prevalence (direct observation) studies showed 45% of PIV dressing were reinforced, lifted or completely disrupted.

- 15% had an exposed insertion site.
Project

- Quality improvement effort approved through Infection Control Committee and Shared Governance
- Multi-disciplinary team including vascular access, infection prevention, nursing education/clinical nurse specialists with input from wound nurses and materials management
- The goal was to achieve 80% of dressings remaining full intact (all four corners) without reinforcement until device removal or 7 day dressing change
<table>
<thead>
<tr>
<th></th>
<th>Fully intact</th>
<th>Insertion site exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>55%</td>
<td>15%</td>
</tr>
<tr>
<td>Current kit plus education</td>
<td>57% (76/134)</td>
<td>15% (20/134)</td>
</tr>
<tr>
<td>Updated dressing (dressing 2)</td>
<td>9% (1/11)</td>
<td>27% (3/11)</td>
</tr>
<tr>
<td>alone *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing 1 plus gum mastic</td>
<td>93% (26/28)</td>
<td>0%</td>
</tr>
<tr>
<td>Dressing 2 plus gum mastic</td>
<td>83% (19/23)</td>
<td>0%</td>
</tr>
</tbody>
</table>

* Evaluation halted based on initial findings
<table>
<thead>
<tr>
<th>Month</th>
<th>Fully intact</th>
<th>Total observed</th>
<th>Dressing Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>August</td>
<td>543</td>
<td>695</td>
<td>78.13%</td>
</tr>
<tr>
<td>September</td>
<td>1325</td>
<td>1422</td>
<td>93.18%</td>
</tr>
<tr>
<td>October</td>
<td>1905</td>
<td>1967</td>
<td>96.85%</td>
</tr>
<tr>
<td>November</td>
<td>2439</td>
<td>2504</td>
<td>97.40%</td>
</tr>
<tr>
<td>December</td>
<td>2270</td>
<td>2330</td>
<td>97.42%</td>
</tr>
<tr>
<td>Total</td>
<td>8482</td>
<td>8918</td>
<td>95.11%</td>
</tr>
</tbody>
</table>
Bundling for success -- Peripheral lines

Insertion:
- CHG skin prep
- Sterile gloves if repalpating the site
- Alcohol caps for intraluminal protection
- Chlorhexidine impregnated sponge dressing for extraluminal protection
- Updated catheter – integrated extension set
- Bordered (securement) dressing
- Neutral connectors
- ** New addition 2017 – liquid gum mastic adhesive with dressing placement

Maintenance:
- Careful assessment – check the patient, not the box
- Remove when clinically indicated, with dressing change at 7 days (or sooner if dressing compromised)
- Re-prep when redressing the site
- Ongoing surveillance of process and outcomes
- Review any infections with floor staff in “real time” to discuss missed opportunities for prevention

Bundles matter...

- Maintaining an intact dressing protects that patient and protects everything your hospital uses *under* the dressing
Building the Case for Protected Clinical Indication

- Fewer invasive procedures
- Vein preservation
  - Reduction in materials costs
  - Fewer breaches in the skin
  - Improved patient experience
  - Increased nursing efficiency
Creating a Bundle

- Policy, Practice and Materials
  - 2011 CDC Guidelines and INS Standards of Practice
    - Insertion, care and maintenance
    - Dwell time & removal guidelines
  - Best Practices and Process Improvements
    - “No touch” after prep or use sterile gloves
    - Quality materials
    - Proven technologies
    - Replacement when clinically indicated
The Origin of Microorganisms Causing CRBSI

Entry Points of Exogenous Contamination of Vascular Devices

Role of Site Visualization

CVC Site Assessment and Care
- “The sensitivity of local inflammation for diagnosis of CVC-related BSI was dismal (0-3%)”¹
- “In general, site appearance cannot be relied on to identify catheter colonization or CVC-related BSI.”¹
- “Monitor the catheter sites visually when changing the dressing or by palpation through an intact dressing …if patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or bloodstream infection, the dressing should be removed to allow thorough examination of the site.”²

PIV Site Assessment and Care

INS 2016 Standards for identification of PIV Complications³

- **Visual Assessment**
  - Infiltration
  - Redness >1 cm from insertion site
  - Phlebitis
  - Non-intact or saturated dressing

- **Palpation**
  - Warmth
  - Palpable cord beyond the IV catheter tip

- **Subjective Patient Information**
  - Tenderness, pain or discomfort
  - Numbness or tingling

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³ Infusion Therapy Standards of Practice, Journal of Infusion Nursing. 2016, V39 (1S)
Gentle reminder...

- Any line may be your patient’s life line. How can we work to make it better?
The Right Stuff?

- **Efficacy and Durability**
  - Is the dressing going to hold?
  - Is a stabilization dressing or device needed?
  - Does the policy reflect what to do when the dressing is loose
    - (ie; avoidance of tape reinforcements )

- **Protection from bacterial re-colonization**
  - A proven BSI reduction strategy
  - A multi-faceted approach
Methodist Hospitals:
1 Year Post Implementation

- 37% Reduction in House-wide LC-BSIs
- 19% Reduction in PIV related BSIs
- 48% Reduction in PIV Kit usage
- 68% Fewer CLABSIs (compared to NHSN prediction)

Reduced IV “sticks”
Positive patient feedback
Positive staff feedback

Methodist Hospitals: 2 Year Post Implementation

- 37% Reduction in House-wide LC-BSIs sustained
- 25% Reduction in PIV related BSIs 6% further reduction
- 75% Reduction in CLABSIs (68% Fewer CLABSIs compared to NHSN prediction) sustained

DeVries, M. – Oral Abstract, AVA 2016, Orlando, FL
Emergency Room starts

- 10/25 (40%) were initiated in the Emergency Department
- 2 more were field starts (EMS)
- Of those hospital based, 43.5% were started in the ER

- This is a similar ratio to the percent of PIVs overall that are placed in the ER in our hospital
  - Suggesting this may be largely attributed to volume as much as differences in practice
  - Provides opportunity for enhanced focus for this group to see the biggest impact per inserter
- Average from insertion to infection similar between ER and inpatient starts (once one high outlier of 14 days is removed)

DeVries, M. – Oral Abstract, AVA 2016, Orlando, FL
Failed IVs

- 5/25 (20%) had 5 or more PIVs prior to the bloodstream infection
  - 4/5 (80%) of these took place prior to Day
  - Do we need to expand our definitions/awareness of “attempts” to include serial failed IVs?
  - Early identification and referral to expert team?

DeVries, M. – Oral Abstract, AVA 2016, Orlando, FL
Hospitality

“I’ve often marveled that the word “hospitality” is mostly made out of “hospital,” and yet the staff in so many hospitals seem to understand so little about hospitality.”

We hypothesized that overall satisfaction could be improved by improving the overall experience with IVs.

One year after introducing our protected clinical indication bundle we experienced:

- Increase of 23 percentile ranking improvement with top box
- 24 percentile ranking improvement with courtesy of person starting IV.
- This suggests a quantifiable association worth further study.
“On the day after surgery, the site had to be re-taped because the IV became unstable. To secure it, another nurse simply added more tape (circumferentially, I might add). The day after that, another nurse ripped all the tape off (but left the original OpSite, clinging only to my hair) and just replaced the tape. When I asked her to moisten the tape with alcohol before ripping it off, she said she was too busy to do that. Two days later, I mentioned to a fourth nurse that the IV was falling out (again). By that time, a lot of congealed blood was visible in the tubing.’

“When they started ripping the tape off, I asked them if they would please moisten the tape with an alcohol prep. One of them kept on ripping, saying he didn’t have time for that, so this time I insisted. Sure enough, the alcohol soaked through the backing on the tape, and within seconds it had softened the adhesive. The tape came right off. But then they treated me like a smart ass for making the suggestion.”