

The Pressure is On: Reducing Central Line Infection in Patients with Arterial Lines

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Disclosures

- No relevant conflict of interest

Learning Objective

1. Describe current recommendations for arterial catheters insertion and management.
2. Describe an innovative strategy for inserting and managing arterial lines that has reduced CLABSI in patients with central lines who also need an arterial line.

Arterial Catheters in ICU

- CLABSI is a significant risk for patients with central lines ¹
- Additional catheter access such as an arterial line can increase the risk for CLABSI as there are more access ports to the patient's vasculature ^{2, 3}
- Arterial catheters are often needed in ICU to closely monitor the hemodynamic and pulmonary status of unstable patients.
- Although the evidence and guidelines are clear on what needs to happen to reduce the risk of any invasive lines, there are not always known practical strategies on how implement these with arterial lines

¹ IHI, 2012

² CDC, 2011

³ Alexander, 2016

Changing Healthcare Landscape

- Value Based Purchasing (VBP) is driving the increased focus on cost, quality, and transparency of care

Issues Related to Arterial Catheters

- Observations of our arterial line practices demonstrated significance risks to the central line patient throughout the lifespan of the arterial catheter. The riskiest practices included:
 - Arterial catheter and related system elements insertion and maintenance care inconsistent between bedside practitioners
 - Arterial catheter is fully exposed to environment in a non-aseptic manner during required dressing and tubing changes
 - Access port of the arterial catheter is difficult to clean prior to access
 - Access port of the arterial catheter is exposed to patient environment when not in use

Pre-Intervention Arterial Line Care

- Physicians: Insertion with partial max barrier precautions:
 - Addition of half body drape: poor adoption, poorly designed drape
 - Addition of gown, gloves, sterile gloves: Inconsistent adoption between providers
- Nurses: Change tubing & bag, dressing change every 96 hours
 - Full opening of system including catheter hub:
 - Exposure of patient and system to environment unavoidable
 - Dressing change process variable between nurses even within a unit
 - Bags and tubings often unlabeled
 - Dressing type: variable between units
 - Line access: blood conservation device
 - Unable to keep access port clean

Arterial Line Bundle: New Care Changes Implemented

1. Addition of extension piece at time of insertion
 - Allows nurses to aseptically change arterial line tubing
 - Remains in place duration of line placement, essentially an extension of the actual catheter
2. Addition of CHG gel impregnated dressing and standardized dressing change procedure
 - Improves asepsis of site
 - Reduces variability in practice
 - Dressing change procedure using the CL dressing kit, 2 person procedure
3. Change of blood conservation device
 - Allows for access port to remain protected when device is not in use
 - Ensures cleanliness of access port when it needs to be accessed
4. Addition of female port protectors
 - Ensures all ports of conservation device and transducer are fully protected when not being accessed

Lessons Learned

- Elimination of CLABSI in patients with arterial lines
- Good adoption of the new practices by all including anesthesia
 - RN satisfier: makes tubing and dressing change of lines easier/less “messy”
- Steep learning curve with new blood conservation device
 - Diluted lab samples
 - Required several rounds of education/re-education
- Additional opportunity:
 - Improved barrier for insertion identified—approved by providers, now working on stocking units
 - Sutures at insertion site—should we be using these in the age of securement dressings and securement devices?

Recommendations

1. Addition of extension with slide clamp at time of insertion OR use of a pre-attached extension
2. Use of max barrier precautions during insertion of arterial lines
3. CHG gel dressing on site
4. Central Line dressing kit for arterial line dressing change
5. Covering of all access ports on arterial line tubing including access port
6. Adoption of ICU Medical blood conservation device (if using)
7. No blood cultures from arterial lines, RT will stick patient if needed

Learning Assessment Questions:

- Patients with central lines who also have an arterial line can develop a blood stream infection
 - True
 - False
- Answer A is the correct answer because when a patient develops a BSI it is not always known what the actual source is and all lines should be scrutinized as a potential source.
- The IHI has recommended the use of an insertion checklist during an arterial line insertion
 - True
 - False
- Answer is B. There have been no recommendations about the use of an insertion checklist for arterial line insertions by the IHI or other organizations.

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