Vascular Access Device (VAD) Management

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.*

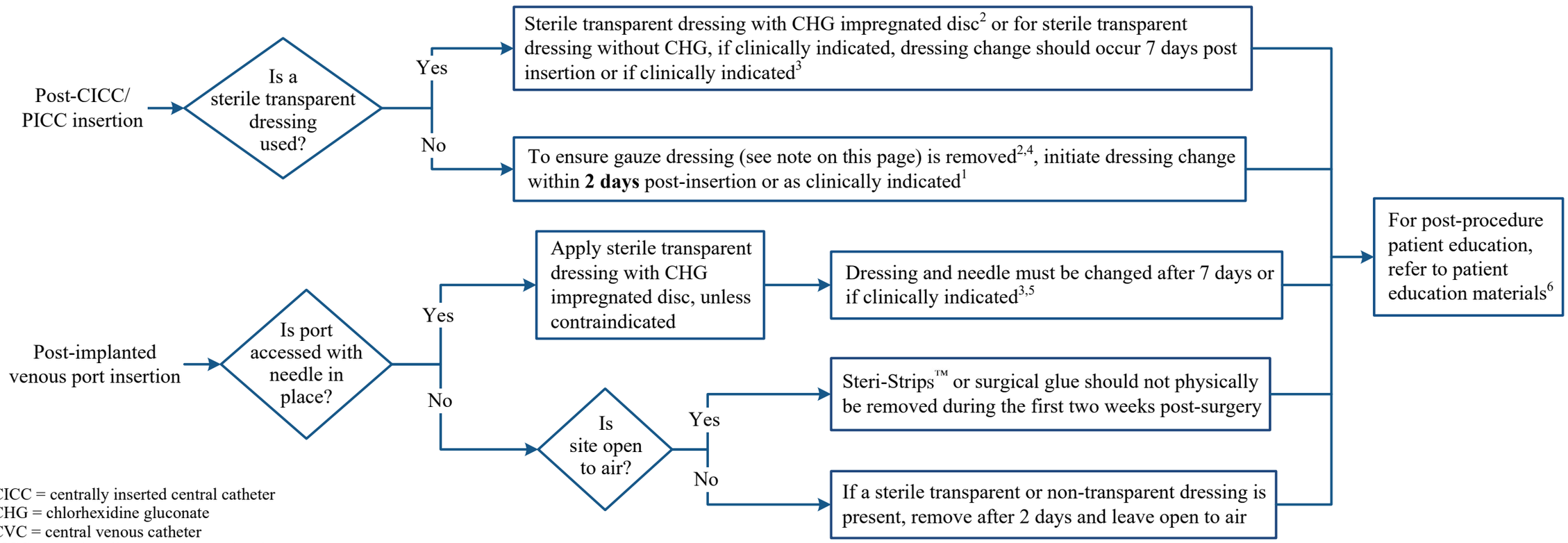
TABLE OF CONTENTS

Vascular Access Device (VAD) Management

Note: Gauze dressing is any non-transparent dressing without CHG impregnated disc or gauze and tape.

CVAD POST INSERTION DRESSING CARE[1]

MANAGEMENT



CICC = centrally inserted central catheter
CHG = chlorhexidine gluconate
CVC = central venous catheter
PICC = peripherally inserted central catheter

[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] Best practice indicates that gauze should only be used when clinically appropriate; sterile transparent dressing with CHG impregnated disc is recommended post-insertion
[3] Immediate dressing change is required when dressing becomes damp, loosened, or soiled. Refer to VAD Maintenance Care: Dressing Care on Page 3.
[4] If unable to determine if gauze was placed under a non-transparent dressing, initiate VAD Maintenance Care: Dressing Care within 2 days post-insertion or as clinically indicated (see Page 3)
[5] Needle change is only required if port has been accessed > 7 days
[6] See Central Line (CVC/PICC) Patient Education

Vascular Access Device (VAD) Management

Note: Gauze dressing is any non-transparent dressing without CHG impregnated disc or gauze and tape.

VAD MAINTENANCE CARE: DRESSING CARE[1]

DRESSING TYPE AT PRESENTATION → **MANAGEMENT**

Patient is due for dressing change

- CHG impregnated dressing **or** transparent dressing with CHG impregnated disc[2]
- Non-transparent dressing[3] with CHG impregnated disc
- Transparent dressing without CHG impregnated disc

→
- Change dressing using institutional standard dressing change process[4] at least every 7 days or as clinically indicated
- If skin or site related complications are noted, refer to Pages 9-10 for management

Note:
- For patients with CHG allergy, refer to Appendix A for Skin Prep Allergy Recommendations
  - First line: alternative bordered transparent dressing with equivalent skin prep; change every 7 days or as clinically indicated
  - Second line: non-transparent dressing with equivalent skin prep; change every 2 days or as clinically indicated

- Gauze dressing (see note on this page) →
  - Change dressing using institutional standard dressing change process[4] at least every 2 days or as clinically indicated
  - If skin or site related complications are noted, refer to Pages 9-10 for management

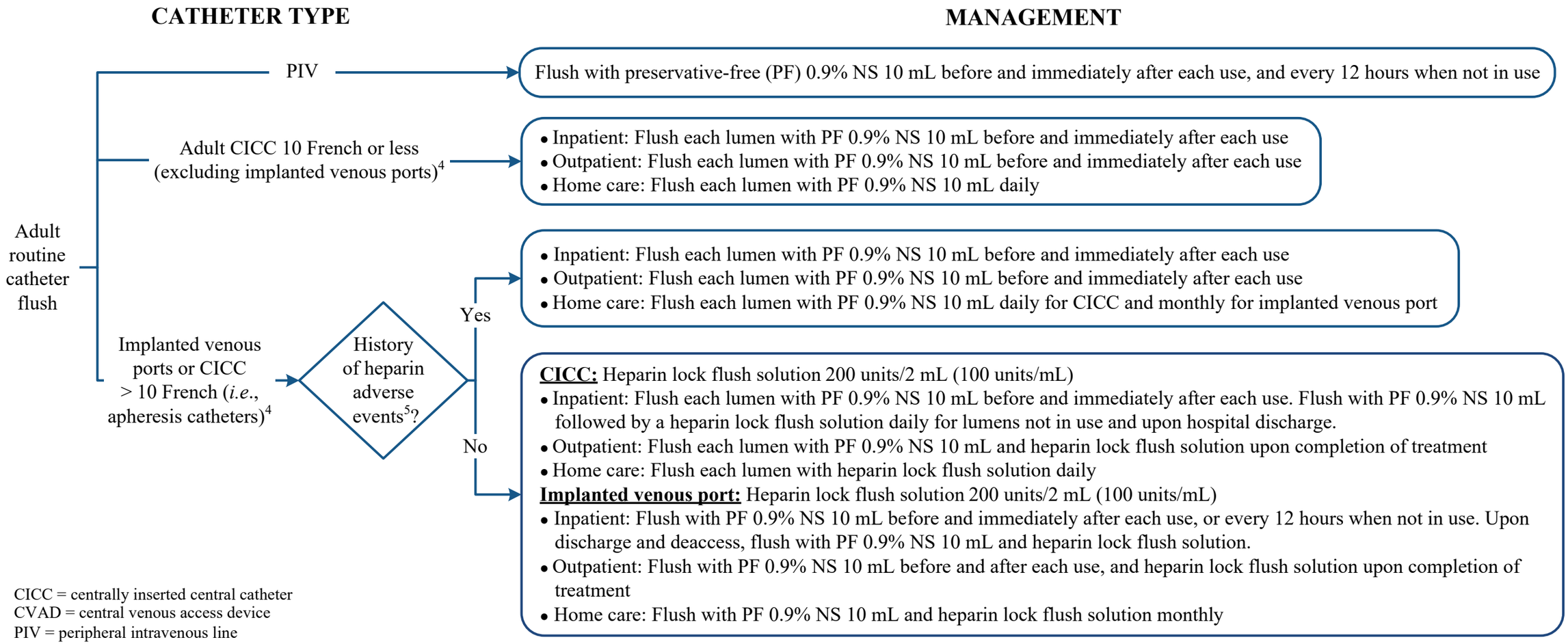
- Securement device other than sutures →
  - Patients with a securement device other than sutures (*i.e.,* SecurACath®) require dressing changes by VA&P only
  - Notify VA&P for dressing changes

CHG = chlorhexidine gluconate
VA&P = Vascular Access & Procedures

[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] Institutional standard; considered best practice and recommended as dressing of choice for standard of care
[3] Avoid non-transparent dressing in patients with implanted ports, receiving vesicants, or inability to verbalize pain or discomfort. For patients receiving a vesicant, see Extravasation Management (Vesicant and Contrast Agents) algorithm and Vascular Vesicant/Irritant Administration and Extravasation Policy (#CLN0986)
[4] Immediate dressing change is required when dressing becomes damp, loosened, or soiled (*i.e.*, dressing corners are lifted to the extent that allows access to the insertion site, or exposure of catheter wings)

Vascular Access Device (VAD) Management

VAD MAINTENANCE CARE: FLUSH MANAGEMENT - ADULT[1,2,3]

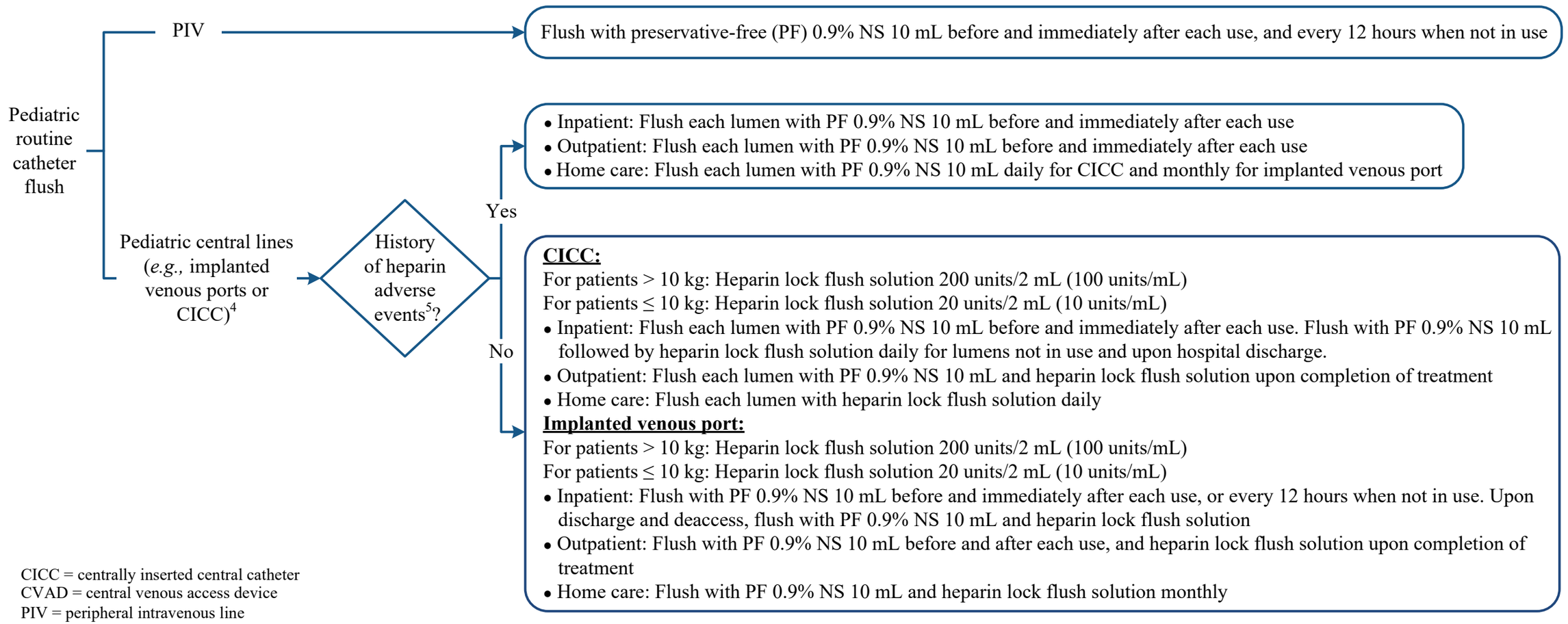


CICC = centrally inserted central catheter
CVAD = central venous access device
PIV = peripheral intravenous line

[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] For flushing/locking arterial catheters, dialysis catheters, or implanted peritoneal ports, follow specific institutional orders as directed by physician
[3] All CVADs must remain clamped when not in use with the exception of the Hickman/Groshong catheter
[4] Refer to the Vascular Access Management Therapy Plan or if indicated, to the Nursing Heparin Catheter Lock Protocol: Central Venous Access Device Patency Management (#ATT3306) and Nursing Flush Protocol: Venous Access Device Flush Management (#ATT3308)
[5] If heparin is not available/shortage, follow the steps for heparin allergy

Vascular Access Device (VAD) Management

VAD MAINTENANCE CARE: FLUSH MANAGEMENT - PEDIATRIC[1,2,3]



CICC = centrally inserted central catheter
CVAD = central venous access device
PIV = peripheral intravenous line

[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] For flushing/locking arterial catheters, dialysis catheters, or implanted peritoneal ports, follow specific institutional orders as directed by physician
[3] All CVADs must remain clamped when not in use with the exception of the Hickman/Groshong catheter
[4] Refer to the Vascular Access Management Therapy Plan or if indicated, to the Nursing Heparin Catheter Lock Protocol: Central Venous Access Device Patency Management (#ATT3306)
[5] If heparin is not available/shortage, follow the steps for heparin allergy

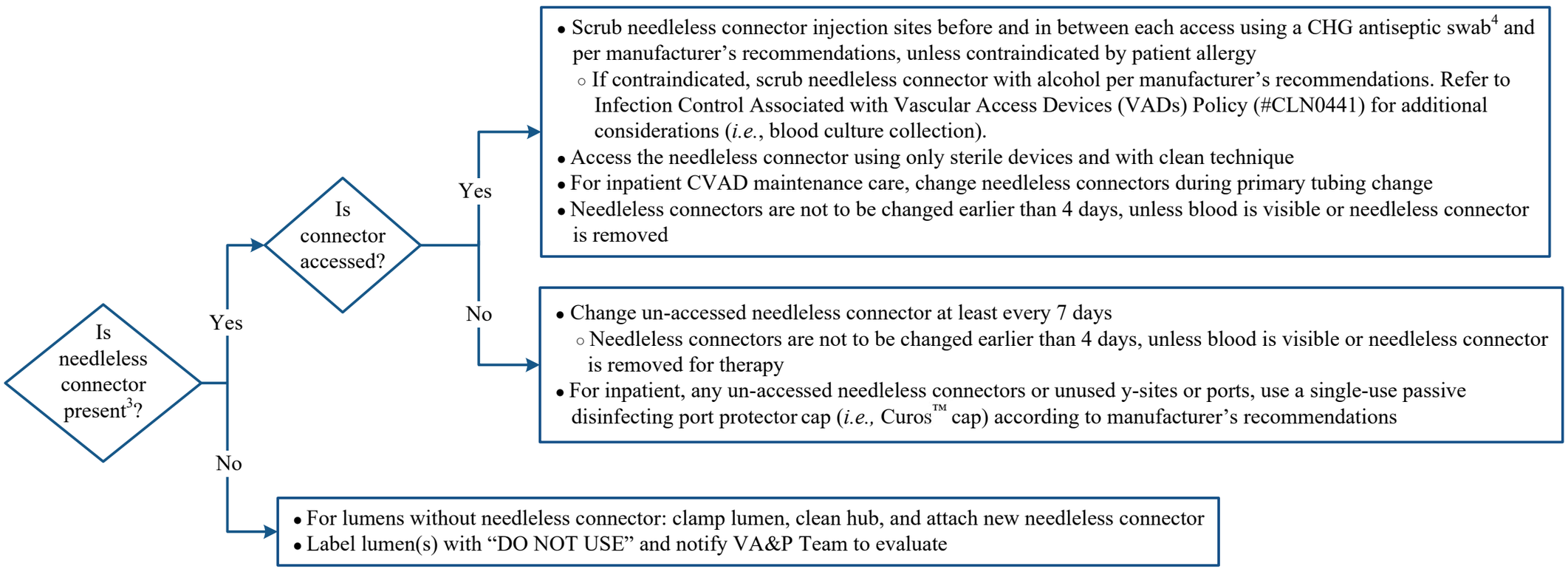
Department of Clinical Effectiveness V6
Approved by The Executive Committee of the Medical Staff on 08/20/2024

Vascular Access Device (VAD) Management

VAD MAINTENANCE CARE: NEEDLELESS CONNECTOR MANAGEMENT[1,2]

EVALUATION

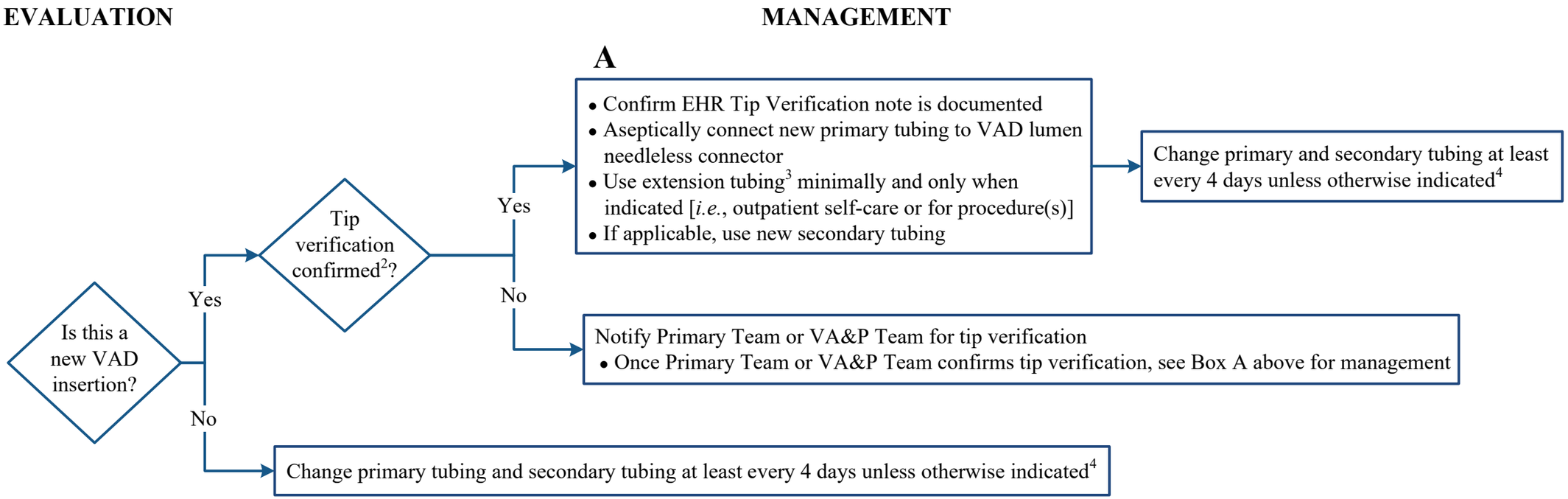
MANAGEMENT



CHG = chlorhexidine gluconate
CVAD = central venous access device
VA&P = Vascular Access & Procedures

[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] All CVADs must remain clamped when not in use with the exception of the Hickman/Groshong catheter
[3] A neutral needleless connector should be used with all vascular access devices
[4] CHG antiseptic swab is comprised of > 0.5% chlorhexidine gluconate and 70% isopropyl alcohol

VAD MAINTENANCE CARE: TUBING MANAGEMENT[1]



CVAD = central venous access device
VA&P = Vascular Access & Procedures

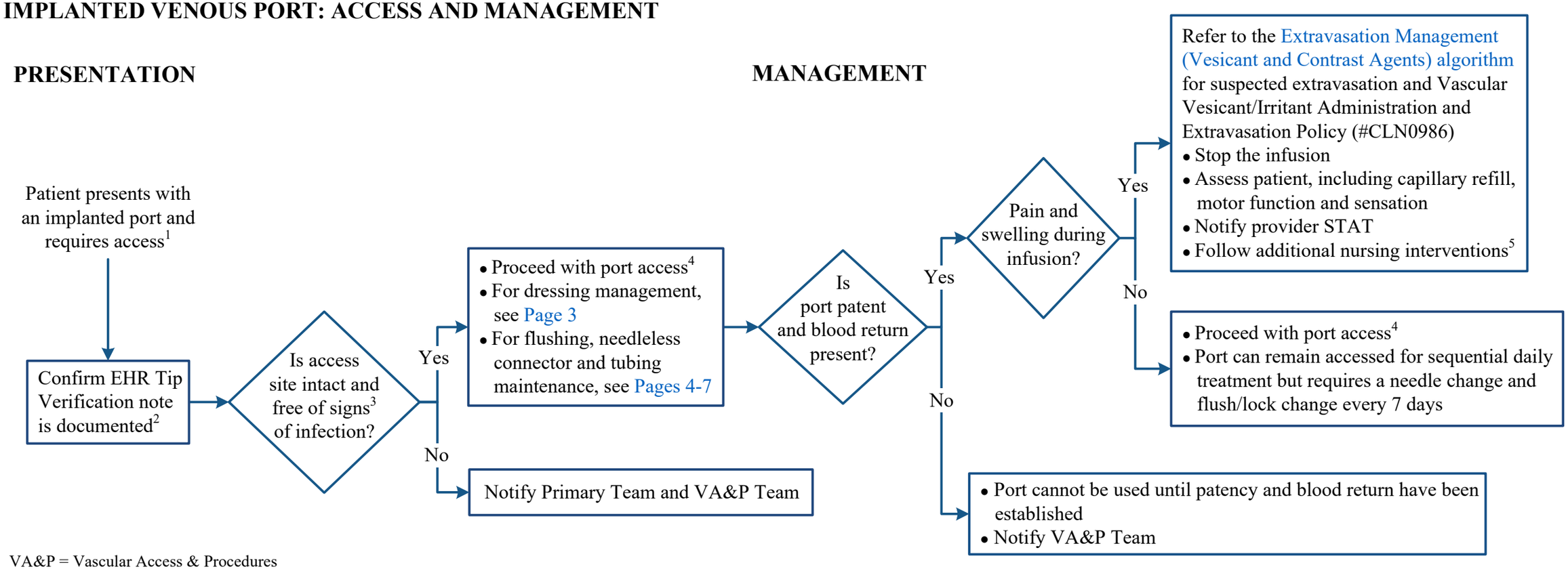
[1] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[2] Tip of the CVAD is in satisfactory position when the tip resides in the superior vena cava or upper right atrium. See Central Vascular Access Device (CVAD) Assessment and Tip Position Verification Policy (#CLN1036).
[3] Change extension tubing in the inpatient setting every 4 days during manifold change when in use. In the outpatient setting, or when not in use, change within 7 days. Change if blood is noted in the tubing or in the needleless connector.
[4] Change tubing:
- Every 24 hours if used for intermittent infusions when directly connected to VAD lumen
- Every 24 hours if used for blood products, total parenteral nutrition (TPN), or lipid emulsions
- Every 6-12 hours if used for propofol (dependent on indication and per manufacturer's recommendation)
- Every 3 days if used for interleukin-2

Vascular Access Device (VAD) Management

IMPLANTED VENOUS PORT: ACCESS AND MANAGEMENT

PRESENTATION

MANAGEMENT



VA&P = Vascular Access & Procedures

[1] Manage, access, and de-access implanted ports as clinically indicated. Refer to Peripherally Inserted Central Catheter, Implanted Venous Port, Midline (Peripheral) Catheters, and Peripheral Intravenous Vascular Access Devices: Nursing Policy (#CLN3484)

[2] Refer to Central Vascular Access Device (CVAD) Assessment and Tip Position Verification Policy (#CLN1036). If no note documented, consult Primary Team or VA&P Team for confirm and document Tip Verification.

[3] Pain, swelling, tenderness, and redness

[4] Needle selection based on:
- Appropriate gauge for therapy or testing (*i.e.,* 20 gauge is considered standard of care; some diagnostic imaging studies require a 19 gauge needle)
- Appropriate length based on reservoir palpation *(i.e.*, 3/4 inch, 1 inch, 1 ¼ inch, 1 ½ inch)
- Appropriate needle type: access power injectable ports with power rated needles

[5] **SLAPP** – **S**top infusion. Do not flush. **L**eave IV in place. **A**ssess and aspirate with 1-3 mL syringe (document description and volume aspirated). **P**ull IV/implanted port needle. **P**rovider notification.

Vascular Access Device (VAD) Management

VAD COMPLICATIONS: SKIN IMPAIRMENT

PRESENTATION

MANAGEMENT

Patient presents with skin impairment

Skin injury[1] (*i.e.*, MARSI) → Is the skin intact?

- **Yes** →
  - Consider using an alternative dressing that is non-irritating and non-sensitizing, see Appendix B
  - Ensure skin prep solution is completely dry before applying dressing
  - Ensure skin barrier is applied to area of skin where dressing is placed (do not apply at insertion site)
  - If skin injury not resolved within 1 week, notify Primary Team and VA&P Team for further evaluation
- **No** →
  - Notify VA&P Team
    - Assess and approximate size of skin injury
    - Use a non-alcohol containing antiseptic agent and an alternative dressing that is non-irritating, see Appendix A and B
  - If skin injury not resolved within 2 days, contact Primary Team and VA&P Team for further evaluation

Skin irritation[2] (*i.e.*, contact dermatitis) → Is extravasation suspected?

- **Yes** →
  - Refer to the Extravasation Management (Vesicant and Contrast Agents) algorithm for suspected extravasation and Vascular Vesicant/Irritant Administration and Extravasation Policy (#CLN0986)
  - Stop the infusion
  - Assess patient, including capillary refill, motor function and sensation
  - Notify provider STAT
  - Follow additional nursing interventions[3]
- **No** →
  - Notify VA&P Team
  - Change type of skin prep solution, see Appendix A for Skin Prep Allergy Recommendations and reassess in 2 days or sooner as clinically indicated. In the inpatient setting, VA&P Team will assess patient. In the outpatient setting, instruct patient to return to VA&P Clinic for re-assessment.
  - If skin injury not resolved, consider changing dressing type and reassess in 2 days or sooner if symptoms worsen, see Appendix B or Alternative Adhesive Dressing Recommendations
  - If no improvement, VA&P APP will make recommendations for management. Dermatology consult or referral may be warranted for persistent skin irritation.

MARSI = medical adhesive-related skin injury
VA&P = Vascular Access & Procedures

[1] Presence of skin tears, blistering, irregular shiny skin, appearance or lesions lasting > 30 minutes
[2] Redness, burning, presence of lesions, and/or pruritis
[3] **SLAPP** – **S**top infusion. Do not flush. **L**eave IV in place. **A**ssess and aspirate with 1-3 mL syringe (document description and volume aspirated). **P**ull IV/implanted port needle. **P**rovider notification.

Vascular Access Device (VAD) Management

VAD COMPLICATIONS: SITE COMPLICATION/INFECTION

EVALUATION

Are there signs of site infection[1]?

Yes

Is the patient febrile?

Yes

- Outpatient:
  - Notify Primary Team
  - Consider referral to Urgent Symptom Clinic (USC) or send patient to Acute Cancer Care Center (ACCC), or Pediatric Acute Cancer Care Center (PACCC) as clinically indicated
  - Notify VA&P Team for further evaluation
- Inpatient:
  - Notify Primary Team and VA&P Team immediately
  - Monitor for signs and symptoms of infection progression[2]

No

- Outpatient:
  - Notify VA&P Team for further evaluation. For after clinic hours and on weekends, notify Primary Team.
- Inpatient:
  - Notify Primary Team and VA&P Team
  - Continue to monitor for signs and symptoms of infection progression[2]

No

- Assess site, apply dressing[3] and notify Primary Team and VA&P Team
- If site impairment worsens or requires more than 2 dressing changes within 2 days, notify Primary Team and VA&P Team for further evaluation and intervention

VA&P = Vascular Access & Procedures

[1] Redness, warmth, induration, and/or purulent drainage
[2] Refer to Infection Control Associated with Vascular Access Devices (VADs) Policy (#CLN0441)
[3] Follow VAD Maintenance Care: Dressing Care on Page 3

Vascular Access Device (VAD) Management

VAD COMPLICATIONS: PHLEBITIS

PRESENTATION	POTENTIAL CAUSE(S)	EVALUATION/MANAGEMENT
Patient presents with suspected phlebitis[1]	Infectious	• For PICC: ◦ Notify Primary Team and VA&P Team to consider alternative vascular access and order removal of PICC ◦ Post-catheter removal assess exit for 2 days[2] • For PIV: Assess site, remove catheter immediately, and monitor site for 2 days[2] ◦ Notify Primary Team
	Mechanical	• Assess site and notify Primary Team and VA&P Team • Stabilize catheter, apply heat, elevate limb, and monitor for 24 hours[2] ◦ If signs or symptoms worsen, notify Primary Team and VA&P Team
	Post infusion (≤ 48 hours post catheter removal)	Assess site, apply heat, elevate limb, and notify Primary Team and VA&P Team. Other pharmacologic interventions may be warranted.
	Chemical (during infusion)	Stop infusion, assess site, and notify Primary Team and VA&P Team

VA&P = Vascular Access & Procedures
PICC = peripherally inserted central catheter
PIV = peripheral intravenous line

[1] Refer to The Visual Infusion Phlebitis Scale (see Appendix C)
[2] For inpatient: assess and document every shift
For outpatient: assess and document once daily

Vascular Access Device (VAD) Management

VAD COMPLICATIONS: CVAD DEVICE-RELATED

FINDINGS	MANAGEMENT
B **Severed, ruptured, or leaking catheter (CICC, PICC, implanted port)**	Assess for symptoms of embolism[1] and clamp catheter above the severed or ruptured portion (if applicable and visible) → Is patient hemodynamically stable? Yes → Notify Primary Team and VA&P Team for further interventions No → • Immediately position patients showing symptoms of air embolism onto left side in Trendelenburg and place patient on oxygen • Notify Merit Team/Code Blue (Rapid Response) Team • Notify Primary Team and VA&P Team
Ballooning catheter (CICC, PICC) *(Do not use CVAD until evaluated for safe use)*	• Stop any infusion and clamp catheter. • Assess catheter integrity if severed or ruptured. Refer to Box B above if catheter is severed, ruptured, or leaking. • Notify Primary Team for further interventions • Exchange or removal must occur immediately, consult VA&P Team for recommendations
Catheter resuture[2] (CICC, PICC)	Notify VA&P Team[2] to evaluate for re-suture if loose, tight or missing sutures are noted
CVAD tip malposition[3,4] *(Do not use CVAD until evaluated for safe use)*	Notify VA&P Team to evaluate/recommend appropriate intervention

CICC = centrally inserted central catheter
CVAD = central venous access device
PICC = peripherally inserted central catheter
VA&P = Vascular Access & Procedures

[1] Catheter embolism symptoms: changes in blood pressure, arrhythmias, cough, shortness of breath, chest pain, or weak pulse
[2] Catheter re-suture may be performed by specially trained provider
[3] Tip of the CVAD is in satisfactory position when the tip resides in the superior vena cava or upper right atrium. Refer to Central Vascular Access Device (CVAD) Assessment and Tip Position Verification Policy (#CLN1036).
[4] Obtain new chest x-ray if malposition is > 30 days from insertion confirmation x-ray

APPENDIX A: Skin Prep Allergy Recommendations

- Allergy to CHG:
  - Intact skin: Use 70% isopropyl alcohol[1] followed by povidone-iodine[2] or a combination of alcohol and iodine solution[3]
  - Non-intact skin: Use povidone-iodine[2] only
- Allergy to alcohol:
  - Use a non-alcohol containing CHG prep solution if available or povidone-iodine[2]
  - If CHG allergy, use povidone-iodine[2] only
- Allergy to povidone-iodine and CHG:
  - Use iodine povacrylex and isopropyl alcohol **or**
  - Use 70% isopropyl alcohol[1]
  - Do not use CHG impregnated dressing or disc
- Allergy to all skin prep dilutions (CHG, povidone-iodine, and alcohol):
  - Use sterile saline[4]
  - Do not use CHG impregnated dressing or disc

CHG = chlorhexidine gluconate

[1] Scrub site using friction with isopropyl alcohol for a total of 60 second, and allow to dry
[2] Scrub site with povidone-iodine (Dura-Prep™) for a total of 60 seconds or per manufacturer's recommendations, and allow to dry for 2 minutes
[3] Refer to manufacturer's recommendations
[4] High risk for infection related to sterile saline use

APPENDIX B: Alternative Adhesive Dressing Recommendations[1]

Dressing	Skin Injury	Skin Irritant	Other Considerations	Dressing Change Frequency
SorbaView® SHIELD Dressing	• Skin Intact: 1st choice dressing • Non-Intact Skin: Contact VA&P Team for usage	1st choice dressing	1st choice dressing for patients that are diaphoretic and are unable to tolerate Tegaderm™ with CHG	• Every 7 days with or without presence of Biopatch® • Every 2 days if gauze is present over insertion site with or without presence of Biopatch®
Covaderm Plus® Vascular Access Dressing[1]	• Skin Intact: Contact VA&P Team for usage • Non-Intact Skin: Contact VA&P Team for usage	3rd choice dressing	1st choice dressing if patient requires pressure dressing	• If used as pressure dressing: change every 2 days with or without presence of Biopatch® • If used due to patient irritant: change every 7 days if Biopatch® is present
Allevyn dressing[1]	• Skin Intact: 2nd Choice dressing (preferred when patient diaphoretic) • Non-Intact Skin: 1st choice dressing (preferred when patient diaphoretic)	2rd choice dressing	N/A	• Every 7 days with presence of Biopatch® • Every 2 days if no Biopatch® is present
Mepilex® Border Dressing[1]	• Skin Intact: 2nd choice dressing • Skin Non-Intact: 1st choice dressing	2rd choice dressing	N/A	• Every 7 days with presence of Biopatch® • Every 2 days if no Biopatch® is present.
DuoDERM® Extra Thin Dressing	• Skin Intact: Not recommended, contact VA&P Team • Non-Intact Skin: Not recommended, contact VA&P Team	4th choice dressing	N/A	• Every 7 days with presence of Biopatch® • Every 2 days if no Biopatch® is present (gauze must be placed over insertion site)
Kerlix™ Gauze Dressing	• Skin Intact: Contact VA&P Team for usage • Non-Intact Skin: Contact VA&P Team for usage	Contact VA&P Team	N/A	Dressing must be changed daily by VA&P Team

CHG = chlorhexidine gluconate
VA&P = Vascular Access & Procedures

[1] Perform and document assessment every 12 hours in inpatient setting

APPENDIX C: Visual Infusion Phlebitis Scale

Score	Observation
0	IV site appears healthy
1	One of the following is evident: Slight pain near IV site **or** slight redness near IV site
2	Two of the following are evident: • Pain at IV site • Erythema • Swelling
3	All of the following signs are evident: • Pain along path of cannula • Induration
4	All of the following signs are evident and extensive: • Pain along path of cannula • Erythema • Induration • Palpable venous cord
5	All of the following signs are evident and extensive: • Pain along path of cannula • Erythema • Induration • Palpable venous cord • Pyrexia

Jackson, A. (1998). Infection Control-A battle in vein: Infusion phlebitis. *Nursing Times, 94*(4), 68-71.

SUGGESTED READINGS

Alexander, M. (2016). Infusion standards: A document without borders. *Journal of Infusion Nursing, 39*(4), 181-182. https://doi.org/10.1097/NAN.0000000000000181

Alexander, M., Corrigan, A. M., Gorski, L. A., & Phillips, L. (Eds.). (2014). *Core Curriculum for Infusion Nursing*, (4th ed). Philadelphia, PA: Wolters Kluwer Health and Lippincott Williams & Wilkins.

Alexander, M., Corrigan, A., Gorski, L., Hankins, J., & Perucca, R. (Eds.). (2010). *Infusion nursing: An evidence-based approach (3rd ed).* St. Louis, MO: Saunders Elsevier.

ASWCS (Avon, Somerset and Wiltshire Cancer services) Chemotherapy Handbook, May, 2005

Bertoglio, S., van Boxtel, T., Goossens, G. A., Dougherty, L., Furtwangler, R., Lennan, E., . . . Stas, M. (2017). Improving outcomes of short peripheral vascular access in oncology and chemotherapy administration. *The Journal of Vascular Access*, *18*(2), 89-96. https://doi.org/10.5301/jva.5000668

Bhutani, G., El Ters, M., Kremers, W. K., Klunder, J. L., Taler, S. J., Williams, A. W., . . . Hogan, M. C. (2017). Evaluating safety of tunneled small bore central venous catheters in chronic kidney disease population: A quality improvement initiative. *Hemodialysis International*, *21*(2), 284-293. https://doi.org/10.1111/hdi.12484

Buetti, N., Marschall, J., Drees, M., Fakih, M. G., Hadaway, L., Maragakis, L. L., . . . Mermel, L. A. (2022). Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. *Infection Control and Hospital Epidemiology, 43*(5), 553-569. https://doi.org/10.1017/ice.2022.87

Broadhurst, D., Moureau, N., & Ullman, A. J. (2017). Management of central venous access device-associated skin impairment: An evidence-based algorithm. *Journal of Wound, Ostomy & Continence Nursing, 44*(3), 211-220. https://doi.org/10.1097/WON.0000000000000322

Camp-Sorrell, D. (Ed.). (2010). *Access device guidelines: Recommendations for nursing practice and education* (3rd ed). Pittsburgh, PA: Oncology Nursing Society.

Chopra, V., Flanders, S. A., Saint, S., Woller, S. C., O'Grady, N. P., Safdar, N., . . . Bernstein, S. J. (2015). The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results from a multispecialty panel using the RAND/UCLA appropriateness method. *Annals of Internal Medicine*, *163*(Suppl 6), S1-S39. https://doi.org/10.7326/M15-0744

DeVries, M., & Strimbu, K. (2019). Short peripheral catheter performance following adoption of clinical indication removal. *Journal of Infusion Nursing, 42*(2), 81-90. https://doi.org/10.1097/NAN.0000000000000318

El Ters, M., Schears, G. J., Taler, S. J., Williams, A. W., Albright, R. C., Jenson, B. M., . . . Hogan, M. C. (2012). Association between prior peripherally inserted central catheters and lack of functioning arteriovenous fistulas: A case-control study in hemodialysis patients. *American Journal of Kidney Diseases*, *60*(4), 601-608. https://doi.org/10.1053/j.ajkd.2012.05.007

Flynn, J. M., Rickard, C. M., Keogh, S., & Zhang, L. (2017). Alcohol caps or alcohol swabs with and without chlorhexidine: An in vitro study of 648 episodes of intravenous device needleless connector decontamination. *Infection Control & Hospital Epidemiology, 38*(5), 617-619. https://doi.org/10.1017/ice.2016.330

Continued on next page

SUGGESTED READINGS - continued

MD Anderson Institutional Policy #CLN0441 – Infection Control Associated with Vascular Access Devices (VADs) Policy

MD Anderson Institutional Policy #CLN0986 – Vascular Vesicant/Irritant Administration and Extravasation Policy

MD Anderson Institutional Policy #CLN1036 – Central Vascular Access Device (CVAD) Assessment and Tip Position Verification Policy

MD Anderson Institutional Policy #CLN3484 – Peripherally Inserted Central Catheter, Implanted Venous Port, Midline (Peripheral) Catheters, and Peripheral Intravenous Vascular Access Devices: Nursing Policy

MD Anderson Institutional Policy Attachment #ATT3306 – Nursing Heparin Lock Protocol: Central Venous Access Device Patency Management

MD Anderson Institutional Policy Attachment #ATT3308 – Nursing Flush Protocol: Venous Access Device Flush Management

Moureau, N. L., & Flynn, J. (2015). Disinfection of needleless connector hubs: Clinical evidence systematic review. *Nursing Research and Practice*, *2015*, 796762, 1-20. https://doi.org/10.1155/2015/796762

Nickel, B., Gorski, L., Kleidon, T., Kyes, A., DeVries, M., Keogh, S., . . . Hagle, M. E. (2024). Infusion therapy standards of practice, 9th Edition. *Journal of Infusion Nursing, 47*(Suppl 1), S1-S285. https://doi.org/10.1097/NAN.0000000000000532

O'Grady, N. P., Alexander, M., Burns, L. A., Dellinger, P., Garland, J., Heard, S. O., . . . the Healthcare Infection Control Practices Advisory Committee (HICPAC). (2011). Centers for Disease Control and Prevention (CDC): Guidelines for prevention of intravascular catheter-related infections. Retrieved from https://www.cdc.gov/infection-control/media/pdfs/Guideline-BSI-H.pdf

Polovich, M., Olsen, M., & LeFebvre, K. B. (Eds.). (2014). *Chemotherapy and biotherapy guidelines and recommendations for practice*, (4th ed). Pittsburgh, Pennsylvania: Oncology Nursing Society.

The Joint Commission. (2019). Preventing central line–associated bloodstream infections. With useful tools and an international perspective. Retrieved from https://www.jointcommission.org/topics/clabsi_toolkit.aspx

DEVELOPMENT CREDITS

This practice consensus statement is based on majority opinion of the Vascular Access Devices Management experts at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

Core Development Team Leads

Jennifer Acelajado, MSN, RN, AGACNP-BC, VA-BC (Vascular Access and Procedures)
Kamran Ahrar, MD (Interventional Radiology)
Issam Raad, MD (Infectious Diseases)

Workgroup Members

Hammam Ahmed, MSN, RN, VA-BC (Vascular Access and Procedures)
Cody Belgarde, BSN, RN (Leukemia)
Roxanne Canicula, MSN, RN, OCN (Vascular Access and Procedures)
Ivy Cocuzzi, MPAS, PA-C (Acute Care Procedure Team)
Joanne Dalusung, DNP, APRN, AGACNP-BC, VA-BC (Acute Care Services)
Joylyn Mae Estrella, MSN, RN, OCN, CNL (Nursing Administration)
Wendy Garcia, BS♦
Stacy Hall, MSN, RN, NE-BC (Vascular Access and Procedures)
Catherine Noche, MSN, RN, CCRN, CNL (Vascular Access and Procedures)
Mary Lou Warren, DNP, APRN, CNS-CC♦

♦ Clinical Effectiveness Development Team