
	The Johns Hopkins Hospital Interdisciplinary Clinical Practice Manual Infection Control	<i>Policy Number</i>	IFC035
		<i>Effective Date</i>	03/01/2008
		<i>Approval Date</i>	N/A
	<i>Subject</i> Vascular Access Device (VAD) Policy, Adult	<i>Page</i>	1 of 16
		<i>Supersedes</i>	08/01/2007

Keywords: Vascular access device, VAD, blood stream infection, BSI, catheter, intravenous lines, IV, central lines, peripheral intravenous line, PIV, peripherally inserted central catheter, PICC, CPN, hyperalimentation

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I. OBJECTIVES


This policy represents the minimal standard of care for all patients at JHH to reduce the risk of infectious and non-infectious complications in any adult or any child 12 years and over on an adult care unit with a peripheral or central VAD. Unit specific protocols may be more stringent than this protocol provided the minimal standards are met and the policy has been approved by Hospital Epidemiology and Infection Control (HEIC).

II. INDICATIONS FOR USE

- A. These standards apply to all adult patients with the following catheters, including, but not limited to:
1. Peripheral intravenous line (PIV)
 2. Single lumen, multi-lumen catheters; tunneled and non-tunneled, cuffed and un-cuffed.
 3. Implantable port
 4. Peripherally inserted central catheter (PICC)
 5. Arterial Catheter
 6. Dialysis or hemapheresis catheter

III. DEFINITIONS


Affiliate Staff	Within the context of this policy, nurse practitioner or physician assistant with delineated privileges to insert and manage central lines.
Assistant	The assistant monitors for safe insertion of the line, assists with supplies and equipment, and is expected to stop the procedure for any safety violations. An assistant can be a RN, LPN, Clinical Technician with specialized training (per unit standard), resident/intern or faculty physician, nurse practitioner, or physician assistant.
Defined Clinical Duties	Those who, by virtue of their delineated clinical privileges or job description, are allowed to insert and manage central lines.
High Risk Patients	<ol style="list-style-type: none"> 1. Patients with a history of previous difficulty in placing a line. 2. Body mass index > 30 or < 20 (Weights (lbs) divided by height (inches) squared (W/H² [kg/m²]). 3. History of thrombosis at intended insertion site. 4. During current attempt at line placement, supervisor (or skilled operator) failed on greater than 3 attempts.
Primary Operator	Physician and other designated personnel who perform central line insertions as part of their defined clinical duties ,who is the primary inserter
Secondary Operator	Physician and other designated personnel who perform central line insertions as part of their defined clinical duties, who is asked to assist in central line placement by the primary operator (e.g., primary operator has reached three attempts).

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Supervisor	<ol style="list-style-type: none"> For adult patients, the supervisor is a second year resident or above, or a nurse practitioner or physician assistant with documented competency and delineated clinical privileges to insert central VADs. The supervisor will supervise line placements as defined below in the Training and Competency section. For patients less than 12 years old, the supervisor will be a PICU fellow, a general pediatric surgery fellow or above.
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IV. RESPONSIBILITY

Medical and Affiliate Staff Who Insert, Remove or Manipulate Central VADs	<ol style="list-style-type: none"> Has defined clinical duties to insert central VADs (see definition above) Has completed training and has demonstrated competency prior to inserting a VAD <ol style="list-style-type: none"> Module #1: HEIC VAD Course; Prevention of Central Line Associated Bloodstream Infections (includes required test). Module #2 Central Venous Access Training: Insertion and Safety Considerations (includes required test) Module #3 Venous Access Catheters-Types and Considerations Adheres to the standards and procedures delineated in the protocol. Selects catheter and site guided by careful consideration of the patient's medical condition, treatment modalities, duration of therapy needed, patient needs and activity level, types of infusions needed and complication risks. See Appendix B for algorithm for selecting most appropriate line.
All Medical and Affiliate Staff	<ol style="list-style-type: none"> Writes an order to insert a VAD that is not being inserted by a physician, nurse practitioner or physician assistant (e.g., PICC line, peripheral VAD). Where available, utilizes the staff of the specialized Vascular Access Team for inserting VADs, and drawing blood from central VAD Adheres to the standards and procedures delineated in the protocol
Nursing Staff Who Insert VADs (including PICC lines and Peripheral lines)	<ol style="list-style-type: none"> Has completed training and has demonstrated competency prior to inserting a VAD. Adheres to the standards and procedures delineated in the protocol.
Nursing Staff (RN, LPN, Clin Tech) Who Assist with Insertions of Central VADs	<ol style="list-style-type: none"> Has completed training, Healthstream Course; Johns Hopkins - Central Vascular Access Device Insertion. Monitors for the safe insertion of the line.
Supervisor	<ol style="list-style-type: none"> Supervises central line insertion procedures as defined below in Training and Competency section When indicated, confirms documentation of procedures performed successfully for medical or affiliate staff who insert central VADs, via the e-Value program, or other acceptable documentation as defined by each residency program.

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Residency Training Program Directors	1. Ensures personnel competency and compliance with the policy. 2. Assures completion of required training modules 3. Assures communication and education of policy requirements to applicable medical staff and affiliates responsible for central line placement
Vascular Access Team (VAT)	1. Assists with insertion of central lines placed by the Line Team 2. Draw blood through central lines whenever possible in non-ICU/IMC areas 3. Inserts PICC lines in adult non-oncology patients 4. Change dressing for PICC lines secured with a securement device (e.g., StatLoc® device) 5. Declots central lines when requested 6. Changes CPN central line dressing and tubing in applicable areas (See Appendix I for more information).
Parental Enteral Support Service (PESS)	1. After consultation, determines the most appropriate line for CPN and home access 2. Schedules central line insertions for lines placed by the Line Service 3. Performs discharge planning for patients with home infusion needs for the non-oncology patients
Adult Oncology PICC Team	Responsible for PICC line placement in Adult Oncology.
Interventional Radiology Center (IRC) and Cardiovascular Interventional Lab (CVIL)	When requested, medical staff will determine need for IRC/CVIL assistance in central line placement for patients considered high risk for routine approach.
Department of Hospital Epidemiology and Infection Control (HEIC)	Determines infection prevention strategies and acts as a resource for questions concerning to infection control

V. PROCEDURE


A. TRAINING AND COMPETENCY

1. CENTRAL LINE

- a. Physicians and other designated personnel who perform femoral, subclavian, and internal jugular central lumen catheter insertions as part of their defined clinical duties must:
 - i. Complete the VAD training (<http://www.hopkinsmedicine.org/heic/index.html>)
 - ii. Have a minimum of five fully supervised procedures in locations above the diaphragm (internal jugular or subclavian), five fully supervised procedures in locations below the diaphragm (femoral) and 3 rewires of existing central VADs in any location or population.

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- If rotating through both adult and pediatric services, 5 supervised procedures are required in locations above the diaphragm (internal jugular or subclavian) and 5 below the diaphragm (femoral), are required for each population.
 - If a physician successfully performs the 5 supervised lines in one site, they can independently insert lines for that site only.
 - If a physician successfully performs 3 rewires, he/she can independently rewire a central VAD.
- b. The supervisor must be a second year resident or above or affiliate staff with documented competency and delineated clinical privileges to insert central VADs
 - i. For patients less than 12 years, the supervisor will be a PICU fellow, a general pediatric surgery fellow or above.
 - c. Procedures shall be documented by the operator and confirmed by the supervisor as having been performed successfully. This can be done via the e-Value program, or other acceptable documentation as defined by each residency program. Documentation must allow for the possibility that operators may be asked to show validation of the required competency procedures at any time.
 - d. Nurses, Physicians and other designated personnel who perform peripherally inserted central catheters (PICCs) as part of their defined clinical duties must:
 - i. Complete the VAD training (<http://www.hopkinsmedicine.org/heic/index.html>)
 - ii. Complete a PICC insertion with MST (Modified Seldinger Technique) and Ultrasound program
 - iii. Complete a minimum of five, fully supervised, successful, procedures with ultrasound.
 - e. The supervisor for PICC insertions must be a PICC certified RN or second year resident or above or affiliate staff with documented competency and delineated clinical privileges to insert PICCs.
2. PERIPHERAL LINE
- a. Nurses and other designated nursing personnel who perform peripheral line insertions must complete the Peripheral IV insertion Self-Learning packet.
 - b. Three successful insertions as outlined on the Peripheral Insertion Competency Checklist must be observed and supervised by another RN who has this delineated competency.
 - c. Successful insertions shall be documented on the Competency Checklist and maintained in the staff member's personnel file.
- B. GENERAL PRINCIPLES
1. An authorized prescriber's order is required to insert or discontinue a VAD, if VAD is not being inserted or discontinued by a physician, nurse practitioner or physician assistant.
 2. ALL VADs placed under non-sterile conditions in emergent situations shall be removed as soon as it is medically feasible.
 3. Patients with a non-tunneled VAD in place on admission shall have the site assessed and if the date of insertion is not known or the site is infiltrated or infected, it shall be removed and a new line inserted at another site within 24 hours
 4. Use of large-caliber temporary central VADs, such as introducers/sheath devices (e.g., Cordis, 14 gauge without integral extension), is limited to the ICU, IMC, ED, OR, PACU, CVIL and IRC (exception:


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dialysis or hemepheresis catheters). These catheters shall be removed/replaced prior to transfer to general care areas.

- a. Large caliber catheters are occasionally placed on the floor during emergencies before transfer to the ICU or OR.
5. Good hand hygiene with hospital-approved soap and water or waterless alcohol-based cleanser is required before VAD insertions.
6. Chlorhexidine gluconate in 70% isopropyl alcohol is the antiseptic standard for central, arterial and peripheral VAD insertions and site care.
 - a. Chlorhexidine gluconate shall be used on relatively clean skin. If necessary, clean and de-fat skin with alcohol swab or soap and water
 - b. If the patient is intolerant to chlorhexidine, 1% tincture of iodine shall be used.
 - i. Allow the antiseptic to fully dry (usually requires about 30 seconds)
 - c. Povidone iodine shall be avoided for VAD skin prep unless the patient cannot tolerate alcohol based products.
 - i. If povidone iodine must be used, the skin shall first be de-fatted with soap and water, and then dried. The povidone iodine must be allowed to stay on the skin for at least 2 minutes, to permit it to release the 1% iodine required for sterility.
7. Stopcocks:
 - a. Shall only be used when it is necessary to balance a central VAD;
 - b. Shall not be hooked together;
 - c. Shall be capped when not in use.
8. To minimize the risk of contamination, manipulation/blood drawing from the VAD system shall be kept to an absolute minimum. Injection ports, hubs, and Clave® adaptors shall be cleaned with a 70% alcohol swab before accessing the system
9. Unused ports shall be flushed, according to protocol, capped with needleless connector (Clave) or sterile cap, and clamped (where a clamp is present on the VAD).
10. All connections shall be luer locked.
11. On non-emergent lines, consultation with the CVIL/IRC shall be considered on patients who are high risk (see definition above).
12. A syringe barrel size of 10cc or greater shall be used to troubleshoot or flush any VAD to avoid excessive pressure and possible rupture of catheter or dislodgement of clot. Forced flushing with a smaller barrel size syringe shall never be used to clear a VAD.

C. SITE AND CATHETER SELECTION: For site and catheter selection guidelines see the following:

1. Appendix B Catheter Choice
2. Appendix D Peripheral Line, Care of the Patient with
3. Appendix E PICC Line, Care of the Patient with
4. Appendix F Short Term Central Venous Catheter, Care of the Patient with
5. Appendix G Tunneled Central Venous Catheter or Implanted Port, Care of the Patient with
6. Appendix H Hemodialysis Catheter, Care of the Patient with
7. Appendix I Hemepheresis Catheter, Care of the Patient with


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8. Appendix K PPN/CPN Quick Reference Guide


D. VAD INSERTION

1. CENTRAL VADS

- a. An assistant is required to be at the bedside during insertion of all central VADs (for PICC lines, see below (3)).
 - i. If the operator requires supervision for the procedure, an assistant in addition to the supervisor will be necessary. The supervisor may waive the assistant role if in their best judgment they are able to assume the role of the assistant and supervisor.
 - ii. For subclavian, femoral, or internal jugular line placement, the assistant can be a RN, LPN, Clinical Technician with specialized training (per unit standard), resident/intern or fellow or faculty physician, nurse practitioner, or physician assistant with documented competency and delineated clinical privileges.
 - iii. A dedicated assistant during PICC line placement is recommended, but not required. If required by departmental standard, the assistant can be a clinical technician or above who has completed the appropriate training.
 - iv. Medical and nursing students cannot act as assistants for VAD insertions.
- b. The assistant will help monitor for the safe insertion of the central line.
 - i. The Central Line Insertion Care Team Checklist (see Appendix C) shall be used to monitor for safety. (The PICC Team is exempt from this requirement)
 - ii. The assistant will immediately notify the operator of any deviation from the critical steps (as defined by the Checklist), stop the procedure if necessary, and assure compliance before procedure can proceed. If there are any concerns related to insertion, the attending physician shall be called by the assistant.
- c. For non-emergent line placements, obtain a second qualified operator after (3) unsuccessful sticks, as complication rates increase by 50% after this number of attempts.
- d. Sterile technique is required for central VAD insertions.
 - i. Good hand hygiene with hospital-approved soap and water or waterless alcohol-based cleanser is required before central VAD insertion.
 - ii. A surgical hand scrub is required before insertion of tunneled catheters, implanted ports, and permanent dialysis or hemepheresis catheters.
- e. Except in acute, life threatening situations, the primary operator and supervisor shall use full barriers during central VAD insertion, regardless of where in the hospital the procedure is performed. Full barrier includes:
 - i. Cap (scalp, beard, mustaches must be covered)
 - ii. Mask
 - iii. Sterile gown
 - iv. Sterile gloves
 - v. Large sterile patient drape to cover patient from head to foot
 - vi. Eye protection (e.g., face shield).

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- f. The assistant in the room will wear a cap, mask, gloves, isolation gown, and face shield or eye protection. If at any point they are at risk to cross the sterile field, the assistant shall follow the same barrier precautions described above in #e.
 - g. See General Principles #6 for antiseptic choices and use.
 - h. If equipment is available and provider is trained to use ultrasound guidance during line placement, ultrasound guidance shall be used for all non-emergent internal jugular line placements (optional for subclavian and femoral line placement).
 - i. When using ultrasound for line placement, sterile gel and sterile probe and cord cover must be used.
 - i. During insertion and rewires of a central (subclavian or internal jugular) VAD or external jugular, it is imperative that the patient be placed in Trendelenburg position (HOB less than 0 degrees) in order to prevent air embolism. If the patient's condition contradicts this position (e.g., increased ICP), the physician placing the line will make this determination and will clearly explain the risks to the patient or consent designee and document these in the medical record.
 - i. For femoral VADs and PICC insertions the patient shall be supine.
 - j. All central lines, including femoral, will be assessed for successful venous placement by transduced CVP or estimated CVP by fluid column test during insertion to prevent accidental arterial line placement.
 - i. Unused ports of multilumen central catheters shall be aspirated, flushed, according to protocol, capped, and clamped.
 - k. Confirmation of proper placement (catheter tip in distal portion of the superior vena cava or the SVC/atrial junction) by chest x-ray, fluoroscopy or CT is required for all central VADs, before using the line and before increasing fluids above 10 cc/hr.
 - i. The VAD shall be flushed and capped, or kept open with a physiologic solution at 10cc/hr or less, pending confirmation. In the case of CPN line placement, D10W may be infused at 10cc/hr until placement is confirmed
 - ii. In emergency situations or in the OR, proper placement may be judged based on hemodynamic assessment until a chest x-ray can be obtained.
 - l. Patients admitted to the hospital with central VAD access (excluding dialysis or hemopheresis catheters) must have tip location confirmed by chest x-ray, fluoroscopy or CT within 12 hours of admission.
 - i. If patient is a readmission within 7 days, has chest xray on file in EPR indicating proper placement and there are no assessment parameters indicating malposition, re-xray is not necessary.
 - m. All non-tunneled central VADs (exception PICC lines) shall be sutured securely in place.
 - n. PICCs can be secured with steri-strips or other securement devices.
2. ARTERIAL CATHETERS
- a. For radial or dorsalis pedis sites, create a generous sterile working surface using sterile drapes. Person inserting arterial line shall wear sterile gloves and mask with face shield.
 - b. Femoral or axillary arterial catheters require maximum barrier precautions as with central VADs, including large sterile drape, sterile gloves, sterile gown, cap, and mask with face shield.

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- c. Arm with a PICC shall be avoided, if possible, but may be used for arterial catheter if clinically indicated.

3. PERIPHERAL CATHETERS

- a. See Appendix D: Care of the Patient with a Peripheral Line
- b. External jugular (EJ) catheters are considered peripheral catheters but must be placed by MD, PA or Nurse Practitioner. Patient shall be placed in Trendelenberg position for insertion.


E. REMOVAL CONSIDERATIONS AND REMOVAL

1. General

- a. Only personnel who have demonstrated competency may remove a VAD following specific departmental policies.
- b. An authorized prescriber's order is required to discontinue a VAD, if VAD is not being discontinued by a physician, nurse practitioner or physician assistant.

2. CENTRAL LINES

- a. If a central VAD is accidentally removed, pressure shall be applied to the site and a physician shall be notified as soon as possible.
- b. During removal of a central (subclavian or internal jugular) VAD or external jugular VAD, it is imperative that the patient be placed in Trendelenburg position (HOB less than 0 degrees) in order to prevent air embolism.. If the patient's condition contradicts this position (e.g., increased ICP), the physician removing the line will make this determination and will clearly explain the risks to the patient or consent designee and document these risks and conversation in the medical record.
 - i. For femoral VADs and PICC removals the patient shall be supine.
- c. If there are signs of infiltration or infection at the insertion site or tunnel, or if the patient has a VAD-associated bacteremia, removing the catheter is strongly suggested.
 - i. If catheter infection is suspected, a 5 cm segment (about 2 inches) of catheter that includes the intradermal portion just below the insertion site may be sent to the microbiology lab when catheter is removed. The tip of the catheter is an inappropriate specimen because of a high likelihood of contaminated results.. Concomitant peripheral blood cultures shall be sent along with the catheter culture. Blood shall NOT be drawn through the catheter.
 - ii. Blood cultures shall be obtained if signs of a VAD-associated bacteremia (i.e., site infection or unexplained fever) are present.
 - Blood cultures shall NOT be obtained from central lines routinely. Central lines shall be used for blood cultures only if adequate blood cultures cannot be obtained peripherally (see Obtaining a Blood Culture protocol)
- d. Central VADs shall not be routinely replaced, the need for access shall be reviewed daily and the catheter shall be removed as soon as central access is no longer needed.
- e. The physician is responsible for removing femoral venous and arterial sheaths, and central lines in patients with a known bleeding diathesis (PT INR or a PTT ratio > 1.3, platelets < 50K) or if patient is on therapeutic dosing of thrombolytics/anticoagulants (including but not limited to reteplase, IV heparin, enoxaparin, lepirudin, argatroban, coumadin and IV platelet inhibitors).

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- f. The nurse may remove central VAD for patients on anticoagulants for Venous Thromboembolism (VTE) Prophylaxis. The following are considered prophylactic dosing for VTE:

Drug	Usual prophylaxis dose
Heparin	5000 units SC q 8 hrs
Enoxaparin (Lovenox)	40 mg SC daily, OR 30 mg SC BID
Fondaparinux (Arixtra)	2.5 mg SC daily
Dalteparin	2500 units SC daily OR 5000 units SC daily


- g. The physician is responsible for scheduling removal of tunneled central catheters or implanted ports by appropriate personnel in preestablished locations (i.e. IRC, OR).

3. PERIPHERAL LINES

- See Appendix D: Care of the Patient with a Peripheral Line
- External jugular (EJ) catheters are considered peripheral catheters. Patient shall be placed in Trendelenburg position for removal, unless medically contraindicated.

F. REWIRES – Central Lines

- Central VAD catheter exchange over a guidewire is an acceptable technique for:
 - Replacing a malfunctioning catheter
 - Changing a multi-lumen to a single lumen catheter
 - Exchanging a pulmonary artery catheter for a central venous catheter when invasive monitoring is no longer needed and there are no signs of line infection
 - Replacing a catheter which may be a potential site of infection.
 - If catheter infection is suspected, a 5 cm segment (about 2 inches) of catheter shall be sent to the microbiology lab. This shall be from an intradermal portion (1 inch from catheter insertions site) when catheter is removed. Concomitant peripheral blood culture shall be sent along with the catheter culture. Blood shall NOT be drawn through the catheter.
- During rewires of a central subclavian or internal jugular VAD, it is imperative that the patient be placed in trendelenburg position (HOB less than 0 degrees) in order to prevent air embolism. The patient must be in a bed or stretcher for the procedure, never a chair.
 - If the patient's condition contraindicates this position (e.g., increased ICP), the physician placing the line will make this determination and will clearly explain the risks to the patient or consent designee and document these in the medical record.
 - For femoral VADs, the patient shall be supine.
 - Refer to Removal of Central VAD Procedure in the [Lippincott Williams and Wilkins Online Procedures](#).
- During re-wires, lumens or caps shall never be cut in order to place a guidewire or to assist with sterilization.

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4. For rewires, all central VAD insertion guidelines shall be followed. An X-ray confirming proper tip location is required when rewiring large bore catheters (e.g., Cordis, Shiley, 14 gauge or larger Arrow). Smaller gauge catheter rewires (less than 14g) do not require x-ray, unless clinically indicated
5. A new set of sterile gloves shall be worn prior to handling the new catheter. This can be accomplished by double gloving in the beginning and/or using the assistant to help.
6. Whenever possible, a new administration set and fluid shall be used when a line is rewired/resited.

G. SITE and LINE ASSESSMENT

1. Patients shall be encouraged to report any changes in their catheter site or any new discomfort to their healthcare provider.
2. Check for “flash” of blood prior to infusion or flush more frequently if the patient is receiving medication that is caustic to the vein (see Vesicant Administration: Monitoring and Management of Extravasation, MDU003, <http://www.insidehopkinsmedicine.org/icpm/MDU003-vesicant.pdf>)
3. Patients with a peripheral VAD in place on admission shall have the site assessed and if the date of insertion is not known or the site is infiltrated or infected, it shall be removed and a new line inserted at another site.
4. If a localized infection is suspected at the VAD insertion site or tunnel, the physician shall be informed and a bacterial and/or fungal culture of the site obtained.
5. A nurse shall assess for signs of infiltration, phlebitis or infection; including pain, redness, swelling, induration, disruption of flow or lack of blood return on:
 - a. VAD sites not in continuous use, at least daily.
 - b. VAD sites connected to a gravity volume controller/infusion pump, at least every 8 hours
 - c. VAD sites in use but not connected to a gravity volume controller/infusion pump at least every 2 hours
 - d. VAD may be required to be assessed more frequently if dictated by other protocols.
 - e. If gauze dressing is being utilized, assess for phlebitis and infection at time of dressing change.
6. Phlebitis shall be graded based on the following criteria:

Grade	Critical Criteria
0	No Symptoms
1	Erythema at access site with or without pain
2	Pain at access site with erythema and/or edema
3	Pain at access site with erythema and/or edema Streak formation Palpable venous cord
4	Pain at access site with erythema and/or edema Streak formation, Palpable venous cord > 1 inch in length Purulent drainage


H. TUBING MANAGEMENT

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1. To minimize the risk of contamination, manipulation of the VAD system shall be kept to an absolute minimum.
2. Injection ports, hubs, and Clave® adaptors shall be cleaned with a 70% alcohol swab before accessing the system
3. Whenever possible, a new administration set and fluid shall be used when a line is rewired/resited.
4. Stopcocks shall only be used when it is necessary to balance a central VAD, and stopcocks shall not be hooked together. Stopcocks shall be capped when not in use.
5. All continuous administration sets, shall be changed and labeled no more frequently than 72 hours, with a maximum hang time of 96 hours. Parenteral nutrition tubing (see Appendix K) and blood tubing (see Blood and Blood Product Transfusion, PAT029) must be change per policy. Propofol tubing must be changed every 6 hours.
6. Intermittent administration sets, that are disconnected from primary set between infusions, shall be changed and labeled every 24 hours.
 - a. All intermittent infusion set tips shall be capped with a sterile cap when not in use. A new sterile cap shall be placed with every use. Tubing ends will not be inserted into “y” connections as a substitute for a sterile cap.
 - b. Administration sets include the path from the spike of tubing entering the fluid container to the hub of the VAD. Infusion pump cassettes, transducers, y-connectors, filters, and needleless connectors, including the Clave® are considered part of the administration set and therefore, shall be changed according to the above guideline (H.5). Catheter hub shall be cleansed with alcohol swab and allowed to dry when changing the needleless connector (Clave®).
 - c. A short extension tube may be connected to the catheter and may be considered a portion of the catheter to facilitate aseptic technique when changing administration sets.
7. All VAD administration set tubing shall be primed and inspected for the presence of air. Air shall be eliminated before tubing is connected to IV device.
8. Unused ports shall be flushed, according to protocol, capped with needleless connector (Clave®) or sterile cap, and clamped (where a clamp is present on the VAD).
9. All connections shall be luer locked.
10. If VAD tubing becomes disconnected, the connecting port shall be cleaned with a 70% alcohol swab and new tubing attached at the needleless connector.
11. An in-line filter shall be used for adult patients who have potential or proven central cardiac shunt and for medications specified by the physician or pharmacist. Refer to <http://www.hopkinspharmacy.org/pharmacists/guidelines/inlinefilter.pdf> for chart that lists the drugs that need inline filter.

I. FLUIDS AND ADDITIVES

1. All continuous central VAD fluids shall be administered by infusion pump, except in the operating room, PACU, procedure areas and in emergency situations or when rapid fluid resuscitation is needed.
2. An infusion pump is recommended for peripheral IV fluids
3. Refer to departmental guidelines for a list of specific fluids or medications that require an infusion pump.
4. Non-tunneled catheters in oncology patients require at least 10cc/hr infusion through each lumen. For all other adult patients, a 10cc/hr infusion through at least one lumen of non-tunneled line is recommended


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5. The distal port of multi-lumen central VADs shall be used for blood transfusions, colloid fluid, high volume fluid administration or CVP monitoring.
 6. VAD fluids shall be changed every 24 hours, except pressure monitoring flush solutions, which shall be changed as necessary, with a minimum of at least every 96 hours.
 7. Anyone adding medication to VAD fluids shall affix a label listing the name, concentration of the additive, date, time and his/her initials. Do not write on the plastic bag.
- J. **DECLOTTING:** Dec clotting issues are addressed in the http://www.insidehopkinsmedicine.org/icpm/MDU016-declot_VAD.pdf
- K. **DISCHARGE PLANNING**
1. Patients being discharged with a VAD shall have documented home care arrangements made prior to discharge or a continuum of care treatment plan documented.
 - a. The JHH Home Care Coordinator or Home Support Services, a branch of PESS, shall be notified prior to patient discharge, to assist with the discharge plan for home VAD Therapy.
 - b. The discharging nurse will teach the dressing/flush for the device with the plan for the home care nurse to review and reinforce the education at home.

VI. REPORTABLE CONDITIONS

- A. Hospital Epidemiology and Infection Control (HEIC) will report catheter associated blood stream infections using National Nosocomial Infections Surveillance System (NNIS) definition.

Reportable Conditions	Report to Authorized Prescriber	Complete PSN (F-8 IV Site Complications)
Absence of blood return in a central VAD unresolved after troubleshooting	+	+
Accidental removal	+	+
Breach of policy	+	+
Burning along the VAD tunnel while flushing or during infusion	+	
Complications during line placement (including but not limited to arterial puncture, suspected air embolism, pneumothorax, lost or retained wire, hematoma, inappropriate line placement)		+
Disconnect	+	+
Evidence of grade 2 or greater phlebitis	+	+
Excessive bleeding/drainage at the site	+	+
Infection	+	
Infiltration of vesicant drugs per Extravasation Policy	+	+

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Leaking, or damaged catheter or equipment	+	+
Malpositioned central lines	+	
New or significant swelling/edema	+	
Pain or rining in the ears while flushing or during infusion	+	
Persistent pain at the insertion site or in the shoulder on the same side of the VAD	+	
Resistance to flushing or infusion, distended veins on the same side as the VAD	+	
Suspected air or catheter embolism	+	+
Suspected arterial placement	+	+
Suspected blood clot	+	
Unsecured VAD, (i.e., broken sutures, not sutured correctly)	+	+

VII. DOCUMENTATION

- A. The following require a written order per an authorized prescriber:
 1. Insert or discontinue a VAD, by a non-prescriber.
 2. Type of IV fluids and rate of administration
 3. Heparin flush, if indicated
- B. Insertion shall be documented on the medical record, including gauge and type of VAD, anatomical site, date and time of insertion, number of attempts, name of operator, and name of supervisor when indicated..
- C. Competency of the operator will be documented as required by:
 1. Each residency program and shall be viewable when requested at any time.
 2. Orientation and/or skills competency checklist for nursing staff.
- D. A physician shall document confirmation of central VAD placement, including anatomical location, on the medical record.
- E. Dressing changes shall be documented on the nursing flow sheet or electronic record and on a label applied to the dressing indicating date of dressing change, initials of person changing the dressing and catheter gauge for peripheral VADs.
- F. A nurse shall document VAD site assessment with each dressing change and as indicated in protocol.
- G. VAD flushes shall be documented on the Medication Administration Record (MAR) and the nursing flow sheet.
- H. Removal of VAD and site assessment at time of removal will be documented in medical record.
- I. Reportable conditions, actions taken, and patient response shall be documented on the patient record

VIII. SUPPORTIVE INFORMATION

See Also:

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The Johns Hopkins Hospital Children's Center Pediatric Policies, Procedures and Protocols

The Johns Hopkins Hospital, Interdisciplinary Clinical Practice Manual

1. [Blood and Blood Product Transfusions, PAT029](#)
2. [Vesicant Administration: Monitoring and Management of Extravasation, MDU003](#)
3. [Hand hygiene IFC001 \[http://www.insidehopkinsmedicine.org/hpo/policies/39/122/policy_122.pdf\]\(http://www.insidehopkinsmedicine.org/hpo/policies/39/122/policy_122.pdf\)](#)
4. [Troubleshooting/Dec clotting a Central VAD MDU016](#)

The Johns Hopkins Hospital, Nursing Practice and Organizational Manual

1. [Blood Culture, Obtaining Bacterial and Fungal for the Adult Patient #307](#)
 - http://www.insidehopkinsmedicine.org/hpo/policies/41/149/policy_149.pdf
2. [IV Therapy: Central Venous Access Device, Procedure for changing dressing, #341](#)
 - http://www.insidehopkinsmedicine.org/hpo/policies/39/28/policy_28.pdf

Removal of Central VAD Procedure in the Lippincott Williams Wilkins Online Procedures at: <http://www.insidehopkinsmedicine.org/nursing/cnp/LWWskills.html>

References:


1. Camp-Sorrell, D. (Ed.). (1999). Access device guidelines: Recommendations for nursing practice and education. Pittsburgh: Oncology Nursing Press Inc.
2. Centers for Disease Control and Prevention. (2002). Guidelines for the prevention of intravascular catheter-related infections. MMRW(No.RR-10), 1-31. Retrieved online from www.cdc.gov/mmwr/PDF/rr/rr5110.pdf.
3. Infusion Nursing Society. Infusion Nursing Standards of Practice (2006) Journal of Infusion Nursing, Volume 29, Number 1S
4. Kadidal, V.V., Mayo, D.J., & Horne, M.K. (1999). Journal of Internal Medicine, 246, 325-329.
5. Lenhart, C. (2001). Preventing central venous access device occlusions with saline only flush by use of an adapter. Journal of Vascular Access Devices.
6. National Kidney Foundation Inc. (2000). Clinical practice guidelines for vascular access.
7. Rosenthal, K. (2003). Consider alternative technologies to maintain vascular access devices. Nursing Management, 34(8), 53-56.

Developers:

- Hospital Epidemiology and Infection Control Department
- Department of Nursing

Sponsor:

Medical Care Evaluation Committee

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Communication & Education:

This policy shall be communicated to the appropriate JHH personnel via the following channels:

1. Departmental Physician Advisors shall present the policy to their respective Performance Improvement Committees.
2. The applicable Residency Training Program Director will communicate requirements for the documentation of the compliance with supervision requirements to any medical staff and affiliates responsible for central line placement
3. Self-study slide presentations are mandatory for all medical and nursing personnel who insert central VADs.
4. A self-study slide presentation shall be mandatory for all nursing personnel who care for central VADs.
5. A self-study slide presentation shall be mandatory for all personnel who insert and/or supervise central VADs (<http://www.hopkinsmedicine.org/heic/index.html>)
6. Educational materials (posters, nursing web-based applications, and in-service sessions) shall be used to communicate the policy.
7. This policy will be placed in the Interdisciplinary Clinical Practice Manual on the JHH Intranet site www.insidehopkinsmedicine.org/icpm. Paper distributions will be made to the Functional Unit Nursing offices in the event of web access difficulty.
8. Placement of policy online at www.hopkinsmedicine.org/heic

Review Cycle - Three (3) years

Medical Board - Approval Date: 02/26/08; Effective Date: 03/01/08

Vice President for Nursing & Patient Services

Vice President for Medical Affairs

Date:

Date: