HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Infection Prevention and Control Department		
Document:	Multidisciplinary Policy and Procedure (MPP)		
Title:	Management of Intravascular (IV) Lines and Therapy		
Applies To:	Health Care Workers		
Preparation Date:	November 24, 2024	Index No:	IPC-MPP-065
Approval Date:	December 08, 2024	Version :	2
Effective Date:	January 08, 2025	Replacement No.:	IPC-MPP-065(1)
Review Date:	January 08, 2028	No. of Pages:	7

1. PURPOSE:

1.1 To provide guidelines regarding appropriate catheters and catheter sites, aseptic insertions, and maintenance of catheter sites.

2. DEFINITONS:

2.1 Intravascular device (IVD)/line is used as a means of direct access to the patient's vascular system for the administration of pharmaceutical agents or fluids that cannot be administered as effectively by other means. IVD is an integral part of patient care.

2.2 Central venous catheter (CVC) may be used to access the great veins for infusion of irritant solutions or to facilitate hemodynamic monitoring. Central venous lines are also used to provide prolonged venous access.

3. POLICY:

3.1 All lines provide a potential portal of entry for microorganisms to enter the vascular system and cause local or systemic infectious complications such as septic thrombophlebitis, bloodstream infections, and metastatic infections. Catheter-related infections are associated with increased morbidity, mortality, medical costs and prolonged hospitalization. The following recommendations, if followed, will reduce the occurrence of catheter-related infections.

3.2 Follow IVD care protocols and maintain a consistent, high level of aseptic technique during catheter insertion; HCWs must adhere strictly to all care protocols during follow-up care of the catheter. When adherence to aseptic technique cannot be ensured (i.e., catheters inserted during a medical emergency), the catheter will be replaced as soon as possible within 48 hours, taking into consideration the stability of the patient.

3.3 Ensure all necessary equipment is present for IV or CVC insertion by creating a checklist before the procedure.

3.4 All intravenous devices provide a potential portal of entry for microorganisms to enter the vascular system and cause local or systemic infectious complications such as septic thrombophlebitis, bloodstream infections, and metastatic infections. When feasible, it is always preferred to switch from intravenous to oral therapy as soon as patients are clinically stable.

4. PROCEDURE:

4.1 Education, Training and Staffing

4.1.1 Educate HCWs regarding indications for intravascular catheter use; proper procedures for the insertion and maintenance of intravascular catheters; and clean or surgical techniques to prevent intravascular catheter-related infections.

4.1.2 Periodically assess knowledge of and adherence to guidelines of all personnel involved in the insertion and maintenance of intravascular catheters.

4.1.3 Designate only trained personnel who demonstrate competence in the insertion and maintenance of peripheral and central intravascular catheters.

4.1.4 When possible, use simulation training for insertion and maintenance techniques.

4.1.5 Ensure appropriate nursing staff levels in intensive care units.

4.2 Healthcare Worker Safety (Standard Precautions)

4.2.1 Wear sterile gloves to avoid sharps injury and to protect hands against blood and body fluid exposure.

4.2.2 Wear a surgical mask with an eye shield or goggles to protect against any potential blood or body fluid splash onto the mucous membranes of the face.

4.2.3 Do not manipulate or recap used needles and promptly dispose of them into hospital-approved sharps containers kept near the location of the procedure.

4.3 Hand Hygiene and Aseptic Technique

4.3.1 Perform hand hygiene prior to device insertion and subsequent handling of the device or its administration, such as before and after palpating, inserting, replacing, or dressing the device.

4.3.2 Do not palpate insertion sites after application of antiseptic. Maintain aseptic technique for the insertion and care of intravascular catheters.

4.3.3 Wear clean gloves, rather than sterile gloves, for the insertion of peripheral intravascular catheters, if the access site is not touched after the application of skin antiseptics.

4.3.4 Wear sterile gloves for the insertion of arterial, central, and midline catheters.

4.3.5 Use new sterile gloves before handling the new catheter when guidewire exchanges are performed.

4.3.6 Wear either clean or sterile gloves when changing the dressing on intravascular catheters.

4.4 Maximal Sterile Barrier Precautions

4.4.1 Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and sterile full body drape, for the insertion of CVCs, PICCs, or guidewire exchange

4.4.2 Use sterile sleeve to protect pulmonary artery catheters during insertion.

4.5 Selection of Catheters and Sites Peripheral and Midline Catheter Recommendations

4.5.1 In adults, use an upper extremity site for catheter insertion. Replace a catheter inserted in a lower extremity site to an upper extremity site, as soon as possible

4.5.2 In pediatric patients, use the upper or lower extremities or the scalp (in neonates or young infant) as the catheter insertion site.

4.5.3 Select catheters on the basis of intended purpose and duration of use; known infectious and non-infectious complications (i.e., phlebitis and infiltration); and, experience of the individual catheter operators.

4.5.4 Avoid the use of steel needles for the administration of fluids and medications that might cause tissue necrosis if extravasation occurs.

4.5.5 Use a midline catheter or peripherally inserted central catheter (PICC), instead of a short peripheral catheter, when the duration of IV therapy will likely exceed six days.

4.5.6 Evaluate the catheter insertion site daily by palpation through the dressing to discern tenderness and by inspection if a transparent dressing is in use

4.5.7 Remove peripheral venous catheters if the patient develops signs of phlebitis (e.g., warmth, tenderness, erythema or palpable venous cord); infection; or malfunctioning catheter

4.5.8 Replace the catheter as soon as possible when adherence to aseptic technique cannot be ensured (i.e., within 48 hours).

c Skin Preparation

4.6.1 Prepare the skin with an antiseptic approved by the Infection Prevention and Control (IP&C) Department. A 2% chlorhexidine gluconate (CHG) preparation with alcohol can be used before central line insertion and during change of dressing.

4.6.2 If there is a contraindication to CHG an alternative antiseptic with 70% alcohol, tincture of iodine, or an iodophor can be used on patients. Follow these procedures when preparing the site:

4.6.2.1 Perform hand hygiene.

4.6.2.2 Don gloves.

4.6.2.3 If the intended insertion site is visibly soiled, clean with soap and water before applying the antiseptic (i.e., >2% CHG preparation with alcohol) using a back-and-forth motion for at least 30 seconds to remove flora that would otherwise be introduced into the vascular system.

4.6.2.4 Do not palpate the insertion site after the skin has been prepared with antiseptic unless the practitioner is employing maximum barrier precautions in a sterile field to maintain asepsis

4.6.3 Antiseptics should be allowed to dry according to the manufacturer's recommendation prior to placing the catheter.

4.7 Catheter Site Dressing Management

4.7.1 Use either sterile gauze or sterile transparent, semi-permeable dressing to cover the catheter site.

4.7.2 If the patient is diaphoretic or if the site is bleeding or oozing, use a gauze dressing until this is resolved.

4.7.3 Replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled.

4.7.4 Do not use topical antibiotic ointment or cream on insertion sites, except for dialysis catheters, because of their potential to promote fungal infections and antimicrobial resistance.

4.7.5 Do not submerge the catheter or catheter site in water. Showering should be permitted if precautions can be taken to reduce the likelihood of introducing organisms into the catheter (i.e., if the catheter and connecting device are protected with an impermeable cover during the shower).

4.7.6 Replace dressings used on short-term central venous catheter (CVC) sites every 2 days for gauze dressing.

4.7.7 Replace dressing used on short-term CVC sites at least every 7 days for transparent dressing, except for pediatric patient with risk of dislodging the catheter that may outweigh the benefit of changing the dressing.

4.7.8 Replace transparent dressings used on tunneled or implanted CVC sites no more than once a week (unless the dressing is soiled or loose), until the insertion site has healed.

4.7.9 Ensure that the catheter site care is compatible with the catheter material.

4.7.10 Use a sterile sleeve for all pulmonary artery catheters.

4.7.11 Use a chlorhexidine-impregnated sponge for temporary short-term catheters in patients older than 2 months of age if the CLABSI rate is not decreasing despite adherence to basic prevention measures, including education and training on appropriate use of CHG for skin antisepsis.

4.7.12 Monitor the catheter sites visually when changing the dressing or by palpation through an intact dressing on a regular basis, depending on the clinical situation of the individual patient. If patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or bloodstream infection, the dressings should be removed to allow thorough examination.

4.7.13 Encourage patient to report any changes in their catheter site or any new discomfort to their provider.

4.8 Central Venous Catheters (CVC)

4.8.1 Points to remember:

4.8.1.1 Insert CVCs only when indicated, remove any intravascular line when no longer needed.

4.8.1.2 Use an all-inclusive catheter kit or cart

4.8.1.3 Use single-lumen CVC unless multiple ports are essential for patient care

4.8.1.4 Always use a CVC insertion checklist such as the central line bundle to ensure adherence to infection prevention practices at the time of insertion.

4.8.1.5 CVC insertion should be observed by a nurse or physician who has received appropriate education to ensure that aseptic technique is maintained.

4.8.1.6 HCWs should be empowered to stop the procedure if breaches in aseptic technique are observed until corrective actions are taken.

4.8.2 At insertion, clean hands by using an alcohol-based waterless product or antiseptic soap and water

4.8.3 Site and catheter selection

- 4.8.3.1 Weigh the risks and benefits of placing a device at a recommended site to reduce infectious complications against the risk of mechanical complications (e.g., pneumothorax, subclavian artery puncture, thrombosis, hemothorax).
- 4.8.3.2 Avoid using the femoral vein for central venous access in adult patients.
- 4.8.3.3 Use a subclavian site rather than a jugular or a femoral site, in adult patients to minimize infection risk for non-tunneled CVC placement.
- 4.8.3.4 Avoid the subclavian site in hemodialysis patients and patients with advanced kidney disease to avoid subclavian vein stenosis.
- 4.8.3.5 Use fistula or graft in patient with chronic renal failure instead of a CVC for permanent access for dialysis.
- 4.8.3.6 Use ultrasound guidance to place CVC (if this technology is available) to reduce the number of cannulation attempts and mechanical complications. Ultrasound guidance should only be used by those fully trained in its technique.

4.8.4 After insertion, dressing the site:

- 4.8.4.1 Use a CHG containing dressing for CVCs in patients over 2 months of age, and change it every 7 days or immediately if it is soiled, loose, or damp
- 4.8.4.2 Use gauze dressing if blood is oozing from the insertion site and if patient is diaphoretic and change it every 2 days or earlier if the dressing becomes soiled, loose or damp.

4.8.5 Accessing the site:

- 4.8.5.1 Perform hand hygiene
- 4.8.5.2 Always disinfect catheter hubs before every access to the port, needleless connectors, and injection ports before accessing the catheter. Disinfection involves applying mechanical friction for no less than 15 seconds using the hospital-approved antiseptics.
- 4.8.5.3 Whenever available, use an antiseptic-containing hub/connector cap or port protector to cover connectors and use according to manufacturer's instructions.

4.8.6 Special approaches for prevention of CLABSI

- 4.8.6.1 Bathe ICU patients older than 2 months of age with a CHG preparation on a daily basis. Use with caution in premature infants or infants under 2 months of age as this product may cause irritation or chemical burns.
- 4.8.6.2 Use antiseptic- or antimicrobial–impregnated central venous catheters for adult patients.
- 4.8.6.3 Use CHG–containing sponge dressings for CVCs in patients older than 2 months of age.
- 4.8.6.4 Use antimicrobial locks for CVCs.

4.9 Replacement of CVCs, Including PICCs

- 4.9.1 Do not routinely replace CVCs, PICCs, hemodialysis catheters, or pulmonary artery catheters to prevent catheter-related infections.
- 4.9.2 Do not remove CVCs or PICCs on the basis of fever alone. Use clinical judgment regarding the appropriateness of removing the catheter if infection is evidence elsewhere or if a non-infectious cause of fever is suspected.
- 4.9.3 Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection.
- 4.9.4 Do not use guidewire exchanges to replace a non-tunneled catheter suspected of infection.
- 4.9.5 Use a guidewire exchange to replace a malfunctioning non-tunneled catheter if no evidence of infection is present.
- 4.9.6 Use new sterile gloves before handling the new catheter when guidewire exchanges are performed.

- 4.9.7 Replacement of peripheral and mid-line catheter:
  - 4.9.7.1 There is no need to replace peripheral catheters more frequently than every 72-96 hours to reduce risk of infection and phlebitis in adults.
  - 4.9.7.2 Replace peripheral catheters in children only when clinically indicated.
  - 4.9.7.3 Replace midline catheters only when there is a specific indication

4.10 Umbilical Catheters

- 4.10.1 Remove and do not replace umbilical artery catheters if any signs of catheter-related bloodstream infections (CRBSI); vascular insufficiency in the lower extremities; or thrombosis are present.
- 4.10.2 Remove and do not replace umbilical venous catheters if any signs of CRBSI or thrombosis are present.
- 4.10.3 Clean the umbilical insertion site with an antiseptic before catheter insertion. Avoid tincture of iodine because of the potential effect on the neonatal thyroid. Other iodine-containing products (i.e., povidone-iodine) can be used.
- 4.10.4 Do not use topical antibiotic ointment or cream on umbilical catheter insertion sites because of the potential to promote fungal infections and antimicrobial resistance.
- 4.10.5 Add low-dose heparin (0.25-1.0 U/ml) to the fluid infused through the umbilical arterial catheters.
- 4.10.6 Remove umbilical catheters as soon as possible when no longer needed or when any sign of vascular insufficiency to the lower extremities is observed. Optimally, umbilical artery catheters should not be left in place >5 days
- 4.10.7 Umbilical venous catheters should be removed as soon as possible when no longer needed, but can be used up to 14 days if managed aseptically.

4.11 Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

- 4.11.1 In adults, use the radial, brachial, or dorsalis pedis sites over the femoral or axillary sites of insertion to reduce the risk of infection
- 4.11.2 In children, do not use the brachial site. Use the radial, dorsalis pedis, and posterior tibial sites over the femoral or axillary sites.
- 4.11.3 Use a minimum cap, mask, sterile gloves and small sterile fenestrated drape during peripheral arterial catheter insertion.
- 4.11.4 Use a minimum cap, mask, sterile gloves and small sterile fenestrated drape during peripheral arterial catheter insertion.
- 4.11.5 Use maximal barrier precautions during axillary or femoral artery catheter insertion.
- 4.11.6 Replace arterial catheters only when there is a clinical indication.
- 4.11.7 Remove arterial catheter as soon as it is no longer needed.
- 4.11.8 Use disposable, rather than reusable transducer assemblies, when possible
- 4.11.9 Do not routinely replace arterial catheters to prevent catheter-related infections.
- 4.11.10 Replace disposable or reusable transducers at 96-hours intervals. Replace other components of the system (including the tubing, continuous flush device, and flush solution) at the time the transducer is replaced.
- 4.11.11 Keep sterile all components of the pressure monitoring system (including calibration devices and flush solution)
- 4.11.12 Minimize the number of manipulation and entries into the pressure monitoring system.
- 4.11.13 Use a closed flush system (i.e., continuous flush), rather than an open system (i.e., one that requires a syringe and stopcock), to maintain the potency of the pressure monitoring catheters.
- 4.11.14 When the pressure monitoring system is accessed through a diaphragm rather than a stopcock, scrub the diaphragm with an appropriate antiseptic before accessing the system
- 4.11.15 Do not administer dextrose-containing solutions or parenteral nutritional fluids through the pressure monitoring circuit.
- 4.11.16 Sterilize reusable transducers according to the manufacturer's instruction if the use of disposable transducer is not feasible.

4.12 Replacement of Administration Sets

4.12.1 In patients not receiving blood, blood products, or fat emulsions, replace administration sets that are continuously used, including secondary sets and add-on devices no more frequently than at 96-hour intervals.

4.12.2 Tubing sets used for the administration of blood products will be replaced every 4 hours

4.12.3 Tubing sets used for the administration of lipid emulsions will be replaced every 24 hours.

4.12.4 Tubing sets used to administer total parenteral nutrition (TPN) will be replaced within 24 hours of initiating the infusion.

4.12.5 Needle components will be changed as frequently as administration sets.

4.13 Needleless Intravascular Catheter Systems

4.13.1 Change the needleless connectors no more frequently than every 72 hours or according to manufacturers' recommendations for the purpose of reducing infection rates.

4.13.2 Ensure that all components of the system are compatible to minimize leaks and breaks in the system.

4.13.3 Minimize contamination risk by scrubbing the access port with an appropriate antiseptic and access the port only with sterile devices.

4.13.4 Use a needleless system to access IV tubing

4.13.5 When needleless systems are used, a split septum valve may be preferred over some mechanical valves due to the increased risk of infection with mechanical valves.

4.14 **Intravenous Injection Ports**

4.14.1 Disinfect the injection ports, catheter hubs, and needless connectors with an alcoholic chlorhexidine gluconate solution or **70% alcohol** before accessing the system to reduce contamination. "Nursing staff scrub the access port or hub with friction immediately prior to each use with an appropriate approved antiseptic for at least **15 seconds**."

4.15 Preparation and Quality Control of Intravenous Admixtures

4.15.1 Mix all parenteral fluids in the pharmacy only.

4.15.2 Check all containers of parenteral fluid for visible turbidity, leaks, cracks, particulate matter, and the manufacturer's expiration date before use.

4.15.3 Use single-dose vials for parenteral additives or medications whenever possible.

4.15.4 If multidose vials are used:

4.15.4.1 Note the date and time on the multidose vials once opened.

4.15.4.2 Refrigerate the multidose vial after opening if recommended by the manufacturer.

4.15.4.3 Cleanse the rubber diaphragm of the multidose vial with alcohol before inserting a device into the vial.

4.15.4.4 Use a sterile device each time a multidose vial is accessed and avoid touch contamination of the device prior to penetrating the rubber diaphragm.

4.15.4.5 Discard multidose vials when suspected or visible contamination occurs, when the manufacturer's expiration date is reached, or when the nursing policy expiration date is reached.

4.16 Documentation: Document the following information for all procedures related to IV therapy in the patient's record:

4.16.1 Date and time of insertion.

4.16.2 Type of device used and site of insertion.

4.16.3 Type of fluid administered

4.16.4 Name(s) of person(s) who inserted the device

4.16.5 Date and time of device termination or guidewire exchange.

5. MATERIALS AND EQUIPMENT:

5.1 **Forms and Records:**

5.1.1 N/A

5.2 **Materials and Equipment**

5.2.1 N/A

6. RESPONSIBILITIES:

6.1 Health Care Workers

7. APPENDICES:

7.1 N/A

8. REFERENCES:

8.1 GCC Infection Prevention and Control Manual . 3rd Edition, 2018

9. APPROVALS:

	Name	Title	Signature	Date
Prepared by:	Ms. Marilou C. Magallano	IPC Practitioner		November 24, 2024
Prepared by:	Ms. Wadha Mohd Al Shammari	IPC Coordinator		November 24, 2024
Reviewed by:	Ms. Awatif Hamoud Al Harbi	IPC Director		November 28, 2024
Reviewed by:	Mr. Sabah Turayhib Al Harbi	Nursing Director		December 02, 2024
Reviewed by:	Mr. Abdulellah Ayed Al Mutairi	QM & PS Director		December 03, 2024
Reviewed by:	Dr. Thamer Naguib	Medical Director		December 04, 2024
Approved by:	Mr. Fahad Hazam Al Shammari	Hospital Director & IPC Committee Chairman		December 08, 2024