APPLICABILITY:

The University of California San Diego Health (UC San Diego Health) policies (UCSDHPs) are organizational policies applicable to all parts of UC San Diego which report to the Vice Chancellor of Health Sciences. UCSDHPs apply to all faculty, staff, clinicians, students, contractors and volunteers at UC San Diego Health. UC San Diego Health clinical locations include (but are not limited to): UC San Diego Health Hillcrest - Hillcrest Medical Center and UC San Diego Health’s affiliated clinics and clinical practices, UC San Diego Health La Jolla - Jacobs Medical Center and Sulpizio Cardiovascular Center (SCVC).

Departmental policies and procedures are unit specific within a single department, unit, or service area.

PURPOSE:

This policy provides practice standards for peripheral intravenous catheter (PIV) insertion, maintenance, and care; intravenous (IV) therapy administration and IV blood sampling.

This policy excludes the neonatal patient population. Refer to Women & Infants Services policies & procedures.

POLICY:

I. PIVs are placed for therapeutic and/or diagnostic indications. Selected to accommodate the patient’s vascular access needs based on the prescribed therapy or treatment regimen, length of treatment, duration of dwell time, vascular integrity, and patient preference.

II. An order from medical provider is required for placement.

III. An order from medical provider is required to initiate IV fluids in lower extremity of an adult patient.

IV. Therapies appropriate for PIV catheters include: solutions with normal serum values of pH and osmolality, parenteral nutrition (PN) when dextrose concentration is 10% or lower, blood and blood products (UCSDHP 617.1).

V. Therapies not appropriate for PIVs (short and external jugular) include continuous vesicant therapy (Refer to UCSDHP 323.1), parenteral nutrition, infusates with pH less than 5 or greater than 9, and infusates with an osmolality greater than 600 mOsm/L.
VI. Therapies not appropriate for midline catheters include continuous vesicant therapy, and parenteral nutrition infusates:

A. Parenteral nutrition in a peripheral solution is preferred for midline catheters.

B. Consult pharmacy for questions regarding infusion types appropriate for midline catheters.

VII. The nurse may collaborate with the pharmacist, physician, or allied health professional to assist in selection of the most appropriate device based on projected treatment plan.

VIII. PIVs may be placed by:

A. Physician, Allied health professional, and Registered Nurses (RN) may insert peripheral short catheters after completing department/unit based orientation requirements.

B. State IV certified Licensed Vocational Nurses (LVN) after completing department/unit based orientation requirements.

C. Nuclear Medicine Technologists if state license includes Venipuncture, after competing department/unit based orientation requirements.

D. Radiologic or MRI Technologist after completing California training requirements and department/unit based orientation requirements.

IX. Who Can Perform Midline Catheter Insertion:

A. Physicians, Allied health professionals and RNs who have completed specialized training.

B. Catheter placement must be confirmed by radiography or fluoroscopic verification and documented in the electronic medical record prior to accessing the first time.

C. May be used for therapeutic procedures in accordance with approved departmental policy.

D. Placement must be confirmed by radiography or fluoroscopy verification and documentation in the electronic medical record prior to accessing the first time.

X. External Jugular Catheter:

A. Physicians, Allied health professionals and RNs who have demonstrated competency may insert an external jugular catheter.
B. The insertion, dressing and securement, care, maintenance and monitoring of an external jugular catheter are the same as those for a peripheral short catheter.

C. Dwell time of an external jugular catheter is 96 hours. If long-term venous access is required, consideration should be given to the insertion of a central venous access device.

D. Do not use external jugular catheter for contrast media or with a power injector.

E. Replace external jugular catheter to an upper extremity or other suitable site as soon as possible.

**PROCEDURE:**

I. **Site Selection:**

A. Site selection should be initiated routinely in the most distal site on a non-dominant upper extremity; subsequent cannulation should be made proximal to the previous cannulated site.

B. Areas of flexion such as the wrist or antecubital fossa are not recommended for routine IV therapy.

C. If patient has an “at-risk extremity” that should be avoided, a pink extremity restriction wristband may be placed on the affected extremity to serve as an alert to staff to avoid use of this limb if possible.

1. **At-Risk Extremities include, but are not limited to, the following:**

   i. Arteriovenous (AV) fistula is located;

   ii. Extremity effected by cerebral vascular accident, paralysis or neurological impairment;

   iii. Previous surgery such as mastectomy or axillary node surgery or extremity has surgical cast or bulky dressing or skin graft;

   iv. Extremity veins are tender, phlebitic, sclerotic, bruised or have had previous IV infiltration or pain, swelling or lymphedema already exists;

   v. Extremity has undergone vascular impairment, angiogram, or recent invasive procedure (i.e., cardiac catheterization or any interventional procedure using a brachial approach);
vi. Extremity has existing deep vein thrombosis (DVT).

D. Consider using a midline or peripherally inserted central catheter (PICC) instead of a short peripheral catheter when the duration of IV therapy is likely to exceed six (6) days.

E. Replace catheter inserted in a lower extremity to an upper extremity site as soon as possible.

II. **Device Selection:**

A. **Peripheral catheter access device will include:**

1. Needle protective safety mechanism.

2. Winged devices should be limited to short-term or single dose administration.

3. Gauges 18-24 are recommended for administration of blood or blood products.

B. Gauge 18 should be started on all preoperative patients older than age 14, unless the risk of intraoperative bleeding is minimal.

C. Critical care areas may use larger gauge catheters as required per patient condition.

III. **Site Preparation:**

A. The peripheral catheter insertion site will be cleansed with 2% tincture of chlorhexidine (CHG).

1. Use 10% povidone-iodine-ONLY if patient is allergic to CHG.

IV. **Peripheral Short Catheter Insertion:**

A. Hand hygiene: using either hand washing with soap and water or waterless alcohol-based hand gel.

1. Performed before and after palpating catheter insertion site.

2. Performed before and after insertion, replacing, accessing, repairing, or dressing a PIV catheter.

B. Verify patient’s identity with at least two (2) identifiers.

C. Provide patient with explanation and indication for the PIV insertion.
D. Assess patient for appropriate site.

E. Place patient in comfortable reclining or sitting position.

F. A local anesthetic may be used by the RN or certified LVN prior to insertion of a peripheral catheter with a physician order.
   1. 1% lidocaine without epinephrine creating a small intradermal wheal.
   2. Transdermal (Topical) Analgesic cream, such as EMLA, applied topically over the site one (1) hour before insertion.

G. Prepackaged peripheral catheter start kit is preferred or gather Chlorohexidine swab, 3/4 inch antimicrobial patch, venipuncture equipment, Securement dressing, sterile gauze, extension tubing, tape, tourniquet and label.

H. Prepare equipment and prime extension set. All PIVs require an extension set with injection/access port except those for used as a back-up IV for prostacyclin.

I. **Apply tourniquet above intended venipuncture site:**
   1. **Skin preparation:**
      i. Remove excess hair from intended insertion site with clippers or scissors (optional).
      ii. Cleanse skin using 2% chlorhexidine (CHG).
      iii. Use 10% povidone-iodine ONLY if patient is allergic to CHG.
      iv. Do not use alcohol swab on site after cleansing with CHG.
      v. Palpation of the insertion site should NOT be performed after the application of CHG. Palpate 2 fingerbreadths above insertion site after CHG preparation.

J. Stabilize vein below intended venipuncture site with non-dominant hand.

K. Insert catheter bevel-up, through skin at a 30-degree angle.

L. Observe for blood return within flashback chamber.

M. Lower angle of catheter insertion to about 15 degrees and continue to advance catheter into vein.
N. Holding stylet steady, push catheter off stylet and into vein until catheter hub is situated against the skin.

O. Release the tourniquet.

P. Occlude tip of catheter by pressing fingers of non-dominant hand over approximate vein pathway two fingerbreadths above insertion site to prevent retrograde bleeding.

Q. Remove stylet and activate safety device.

R. Attach extension tubing with neutral displacement cap; or neutral displacement cap only for PIVs intended for prostacyclin backup.

S. Check patency by flushing PIV.

T. Apply ¾ inch antimicrobial patch to insertion site.
   1. *Antimicrobial patch will not close around PIV catheter due to possible displacement of catheter.

U. Apply securement dressing.
   1. *DO NOT place tape under securement dressing

V. Label dressing with date, time, and initials.

W. Document PIV site, size, location, number of attempts, and date of insertion in EMR.

X. No more than two attempts at catheter insertion are recommended by any one nurse.
   1. If two unsuccessful attempts are made the nurse with most advanced IV skills should evaluate patient venous access.
   2. If veins cannot be cannulated successfully, the physician/allied health professional should be notified.

Y. **Tubing and Site Labeling:**
   1. All dressings will be labeled with the date, time, and initials.
   2. IV tubing will be labeled using a day of week sticker with the expiration time and date indicating when tubing is to be changed and initialed for all admitted inpatients.
3. IV tubing used in the outpatient setting or for outpatient status patients does not require labeling until the patient status changes to that of an admitted inpatient.

4. The outpatient RN is responsible for appropriately labeling the IV tubing prior to transfer to the inpatient area.

V. **Site Care and Maintenance:**

   A. Peripheral catheter site will be evaluated each shift and prior to medication administration by palpation to discern tenderness or cords and by inspection through the transparent dressing.

      1. PIVs with a ⅜ inch antimicrobial patch will have dressing changes, including antimicrobial patch, every 7 days. The catheter does not need to be re-sited provided there are no signs of complication (i.e., phlebitis, extravasation, infiltration, occlusion).

      2. PIVs placed without an antimicrobial patch will have dressing changed within 48 hours of placement. An antimicrobial patch should be applied to the site if indicated.

      3. Assessment of PIV site will be completed each shift, before, during and after medication administration and PRN.

      4. Palpate site for tenderness.

      5. Inspect for phlebitis through transparent dressing.

      6. Remove PIV with phlebitis score greater than zero (0).

      7. Patient allergic to CHG.

         i. Cleanse with 10% povidone-iodine.

         ii. Do not use an antimicrobial patch.

         iii. Change dressing every 5 days and PRN.

   B. Tubing and injection/access devices are changed every 96 hours or when integrity is impaired.

   C. Dry gauze dressings are changed every 48 hours and PRN.

   D. Draining gauze dressings are changed every 24 hours and PRN.
E. When aseptic technique may have been compromised (i.e., started under field conditions, the catheter is considered compromised and must be replaced within 24 hours).

F. If a patient is transferred from an outside facility with a peripheral catheter in place, the site must be changed within 24 hours of admission.

VI. **Documentation:**

A. Document complete PIV assessment in EMR.

B. Document PIV complications: hematoma, phlebitis, infiltration, or occlusion and solution/medication infusing in EMR.

C. **Document removal of PIV site in EMR:**
   1. Date and time removed.
   2. Phlebitis score.
   3. Reason for removal (if not phlebitis score).
   4. **Status of catheter (intact/not intact):** If not intact, notify medical provider immediately.

VII. Peripheral Short Catheter Flushing - performed to ensure and maintain patency of the catheter and to prevent mixing of medications and solutions that are incompatible.

A. Patency flushing for a peripheral catheter is done with a minimum of three (3) mls, preferably 10mL of sterile 0.9% sodium chloride for injection and identified blood return at least every shift, before and after each infusion and PRN.

B. **Routine flushing with 5-10mLs of sterile 0.9% sodium chloride for injection shall be performed after the following:**
   1. Administration of blood and blood components.
   2. Administration of incompatible medications or solutions.
   3. Administration of medication.

VIII. **Flushing Procedure:**

A. Disinfect catheter port with 70% isopropyl alcohol scrubbing for 15 seconds.
B. Connect saline-filled syringe to catheter via the neutral displacement cap and infuse full syringe volume, using push pause technique.

C. Disconnect syringe from injection/access port.

D. Never inject a portion of the saline-filled syringe, disconnect from the neutral displacement cap, and reconnect same syringe to instill the remaining volume of the syringe as this allows opportunity for contamination.

IX. **Fluid Administration:**

A. **Types administered:**

1. IV solutions that fall within or near normal serum values of pH and osmolarity.

2. Parenteral Nutrition (PN) when the final dextrose concentration is 10% or lower.


X. **Blood Sampling:**

A. Blood specimen collection from a peripheral catheter is performed only at the time of initial insertion. This procedure must be done with safety syringes and a blood transfer device, or a vacutainer.

B. Routine blood drawing from a peripheral catheter is not recommended.

XI. **Peripheral Catheter Removal:**

A. A peripheral short catheter will be removed with an order from a physician/allied health professional when therapy is completed, when contamination or complication is suspected, or when the tip location is no longer appropriate for prescribed therapy.

1. **Supplies:**

   i. Clean gloves.

   ii. Gauze or band aide.

   iii. Tape.
2. **Procedure:**
   
   i. Wash hands.
   
   ii. Don gloves.
   
   iii. Educate patient as to procedure.
   
   iv. Patient may assume sitting or reclining position.
   
   v. Discontinue administration of infusate.
   
   vi. Remove dressing from insertion site.
   
   vii. Gently remove catheter. Inspect the catheter tip.
   
   viii. Apply pressure to site with gauze for 30 seconds minimum.
   
   ix. Verify no bleeding from site and secure gauze to site with tape.
   
   x. Remove gloves and wash hands.
   
   
3. If the catheter removed is not intact, notify MD.

XII. **Complications of peripheral catheter site:**

A. Phlebitis - Routinely assess all vascular sites for signs and symptoms including pain, tenderness, erythema, warmth, induration, purulence, or palpable venous cord.

   1. Remove peripheral short catheter and document in the EMR.
   
   2. Determine possible cause and notify physician/allied health professional for midline catheter.

B. **Infiltration and extravasation:**

   1. Immediately stop all infusions when the patient complains of any type of pain, burning, or stinging at or around the insertion site, catheter tip, or entire venous pathway as this should not be considered within normal limits with any infusion.
2. In the event of extravasation refer to UCSDHP 323.1 Hazardous Drugs/Antineoplastic (Chemotherapy & Biotherapy) Agents: Handling Precautions, Staff Education and Administration Management of Infiltration/Extravasations.

3. Notify the physician/allied health professional immediately to obtain orders to treat the extravasation.

4. Event will be documented in iReport and the electronic medical record.

XIII. **Midline Catheters:**

   A. A physician/allied health professional order is required for placement of a midline catheter.

   B. **Site Selection:**

      1. Midline catheters placement may be indicated when the IV therapy is anticipated to be for a few weeks.

      2. Consider using a midline or peripherally inserted central catheter (PICC) instead of a short peripheral catheter when the duration of IV therapy will likely exceed six (6) days.

      3. The basilic and cephalic antecubital veins are preferred.

      4. An extremity with an arteriovenous (AV) fistula or graft is not recommended for midline catheter insertion.

      5. Avoid affected extremity of the patient who has undergone cerebral vascular accident, mastectomy or axillary nod removal when possible.

      6. Avoid veins that are tender, phlebitic, sclerotic, bruised or located in a previously infiltrated area.

   C. **Site Preparation:**

      1. Insertion of a midline catheter is a sterile procedure requiring the use of a mask, sterile gloves and gown, a surgical scrub and sterile drape.

   D. **Midline Catheter Insertion:**

      1. Consent for midline catheter placement must be obtained by a physician/allied health professional or specially trained RN.
2. Physician/allied health professional inserting midline catheter will adhere to maximum barrier precautions, hand hygiene; sterile gown, gloves, mask and bonnet contained in the pre-packaged PPE.

3. Personnel assisting in the insertion procedure will adhere to maximum barrier precautions.

4. Patient will be draped using a sterile full body drape.

5. All personnel within 6 feet of the procedure will don a face mask prior to and during the insertion procedure.

6. All assistive personnel will perform a time out procedure and shall remain vigilant and provide oversight to assure adherence to sterile process and visualize guide wire is removed upon completion of procedure.

7. Once the midline catheter is placed, a chlorhexidine impregnated disc, securement device and sterile dressing will be applied with current date, time and initialed.
   
   i. A gauze and transparent semipermeable membrane dressing may be applied if insertion site is oozing.

   ii. Placement of a gauze dressing under a transparent dressing is considered to be a gauze dressing and changed every 48 hours.

8. The physician/allied health professional or specially trained RN will complete a procedure note in the electronic medical record, which includes documentation of time out, maximum barrier precautions, and removal of the guide wire and tip location.

E. Site Labeling:

1. All dressings will be dated with the date of application, time, and initials.

XIV. Site Care and Maintenance:

A. Midline catheter dressings are cared for in the same manner as peripherally inserted central catheters (PICC) (See UCSDHP 393.1).

B. Sterile dressing and chlorhexidine patch will be aseptically applied at initiation of vascular access, when integrity of the dressing is compromised and/or every 7 days and upon admission and discharge from hospital.
XV. **Midline Catheter Flushing:**

A. Performed to ensure and maintain patency of the catheter and to prevent mixing of medications and solutions that are incompatible. See Peripheral Short Catheter for flushing procedure.

XVI. **Discontinuation of Midline Catheters:**

A. A midline catheter will be removed with an order from the medical provider when therapy is completed, and/or when contamination or complication is suspected.

B. Midline catheters will be replaced only when there is a specific indication.

**DEFINITIONS:**

I. **IV:** Vascular access device that is implanted under the skin that allows the delivery of fluids, medication and blood and blood products directly into the vein.

   A. **Short Peripheral Catheter:** Short-term catheter usually less than three (3) inches in length intended for IV therapy ideally lasting less than six (6) days. The tip of the short peripheral catheter terminates in a peripheral vein.

   B. **Midline Catheter:** Inserted into the veins of the upper extremities and advanced so that the catheter tip resides in the basilic, cephalic or brachial vein distal to the shoulder. The tip does not enter the central vasculature therefore midline catheters are considered peripheral and not centrally located.

   C. **External Jugular Peripheral Catheter:** External jugular vein may be used in emergency situations to obtain venous access. The tip does not enter the central vasculature therefore external jugular catheters are considered peripheral and not centrally located.

II. **Allied Health Professional:** Nurse Anesthetist, nurse-midwife, nurse practitioner, physician assistant, and psychologist practicing within their scope and credentialing.

III. **Irritant:** Any agent that causes aching, tightness, and phlebitis along the vein or at the injection site, with or without a local inflammatory reaction but does not cause tissue necrosis.

IV. **Infiltration/extravasation:** Passage or escape of intravenous drug/fluid into surrounding tissue. Tissue slough and necrosis may occur if the condition is severe.

V. **Vesicant:** Any agent that has the potential to cause blistering, severe tissue injury or tissue
necrosis when extravasated.

FORMS:

None.

REFERENCES/RESOURCES/RELATED DOCUMENTS:

Centers for Disease Control (CDC)

Infusion Nurse Standards of Practice (2011)

Infusion Nursing: An evidence-based approach (2010)

Centers for Disease (CDC) guidelines for the prevention of intravascular catheter related infections (2011)

Infusion Nurse Position Paper: The role of the RN in the insertion of external jugular peripherally inserted central catheter and external jugular peripheral catheter (2005)

ATTACHMENTS:

None.

RELATED POLICIES:

UCSDHP 323.1, “Hazardous Drugs/Antineoplastic (Chemotherapy & Biotherapy) Agents: Handling Precautions, Staff Education and Administration”

UCSDHP 392.1, “Parenteral Nutrition (PN) and Lipid / Emulsion”

UCSDHP 393.1, “Central Venous and Arterial Catheter Management and Care”

UCSDHP 615.1, “Blood Specimen Collection, Purposes of Clinical Laboratory Testing”

UCSDHP 617.1, “Blood and Blood Products Administration”

Women & Infants Services: Infant PIV

CONTACTS:

Clinical Nurse Specialist, Nursing Education
APPROVALS:

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