St. Joseph Health
St. Joseph Hospital

TITLE: Insertion of Peripherally Inserted Central Catheters (PICC) Lines	Reference: STP-987
MANUAL: Clinical	Page: 1 of 9

STANDARDIZED PROCEDURE

I. POLICY:

A. Function: To authorize the qualified Registered Nurses at St. Joseph Hospital (SJO) to insert Peripherally Inserted Central Catheters (PICC).

B. Purpose: To facilitate the insertion of a Peripherally Inserted Central Catheter in patients who require reliable venous accesses for typically 5 days or more infusion therapy of vesicants, and/or solution/medication with the osmolarity of $\geq$ 500 mOsm per liter or pH $\leq$ 5 or $\geq$ 9. If unable to successfully thread tip to Superior Vena Cava (SVC), the placement of Midline Catheter (MLC) is appropriate for patients with poor venous accesses requiring infusion therapy of non-vesicants and isotonic solutions.

C. Circumstances:

1. A physician's order is required for PICC insertion.

2. A PICC consult should be responded to within 24 hours by the assigned certified RN.

3. Confirmation is required for tip placement verification before the PICC can be used.

   a) Electrocardiogram Tip Confirmation System (ECG TCS) may be used by the RN for verification. Once the catheter is confirmed in the SVC, the RN interpreting the ECG may write orders for use and maintenance per Central Venous Catheter policy.

   b) If unable to confirm placement with ECG TCS, order chest X-Ray for Tip Confirmation. The chest X-Ray must be read by a radiologist and results reported to ordering MD. Obtain orders to use and maintain per Central Venous Catheter policy.

DATE ORIGINATED 05/12 (DATE) REVIEWED/REVISED 12/12 (DATE) DELETED _____ (DATE)

INITIATED BY:	DATE	INTERDISCIPLINARY PRACTICE COMMITTEE (if applicable)	DATE
Mitzi Caulfield, R.N.	05/12	IDPC	11/12
REVIEWED/REVISED BY: / DEPARTMENTAL APPROVAL:	DATE	POLICY AND PROCEDURE COMMITTEE (if applicable)	DATE
Mitzi Caulfield, R.N.	08/12	Policy and Procedure Committee	12/12
ADMINISTRATIVE APPROVAL:	DATE	BOARD OF TRUSTEES (if applicable)	DATE
Katie Skelton, R.N., V.P.	08/12		
MEDICAL STAFF (if applicable)	DATE	OTHER	DATE
Special Procedures Committee	10/12	Nursing Leadership Team	08/12
PHARMACY AND THERAPEUTICS (if applicable)	DATE	OTHER	DATE
Pharmacy and Therapeutics Committee	11/12	Nursing Policy and Procedure Committee	08/12

4. The Sherlock II Tip Location System (TLS) detector quickly locates the position of specially-designed, magnet-tipped PICCs during initial placement.

5. Catheter stylets provide internal reinforcement to aid in catheter placement. When used with the Sherlock Tip Position System (TPS), the Sherlock TPS stylet also provides the RN real-time feedback on the catheter tip location and orientation through the use of passive magnets and cardiac electrical single detection.

6. The Sapiens TCS

   a) is indicated for guidance and position of PICC line insertions.

   b) provides real-time catheter tip location information by using the patient's cardiac electrical activity.

   c) is indicated for use as an alternative method of chest X-ray and fluoroscopy for PICC tip placement confirmation in adult patients.

   d) Limiting but not contraindicated situations for this technique are in patients where alterations of cardiac rhythm change the presentation of the P-wave as in atrial fibrillation, atrial flutter, severe tachycardia, and pacemaker driven rhythm. In such patients, who are easily identifiable prior to PICC insertion, the use of an additional method is required to confirm catheter tip location.

II. DEFINITION OF TERMS:

A. PICC: Peripherally Inserted Central Catheter. A central vascular access device inserted peripherally from veins located at the upper extremities such as the basilic, brachial, and cephalic, with the tip terminating within the SVC, preferably in the lower 1/3 or in the area of the atriocaval junction.

B. MLC: Mid Level Catheter. A peripheral vascular access device inserted from veins located at the upper extremities with the tip terminating proximal to the axilla. The length of the MLC is not to exceed 20 cm. This type of device is ONLY appropriate for the infusion of blood products, IV fluids, and iso-osmotic medications. This device should be discontinued or replaced as soon as reasonably possible with a true central access device.

C. Sherlock ECG TCS: Electrocardiogram Tip Confirmation System. This provides the RN real-time feedback on the catheter tip location and orientation through the use of passive magnets and cardiac electrical single detection.

D. Sapiens TCS: This product is indicated for use as an alternative method of chest X-ray and fluoroscopy for PICC tip placement confirmation in adult patients.

III. PROCEDURE:

A. Prior to beginning the procedure, examine the package carefully before opening to confirm integrity and expiration date.

B. Prepare electronic systems following instruction provided.

C. Position Patient and Perform Ultrasound Pre-scan
1. Position the arm abducted at 90 degree angle for catheter placement.
2. Apply tourniquet above the anticipated insertion site.
3. Select a vein based on patient assessment and pre-scan.
4. Note the maximum vessel depth at catheter insertion site as displayed on ultrasound
5. Accurately mark planned insertion site on patient's arm.
6. Release tourniquet.

D. Determine External Measurement
1. For central placement, the recommended tip location is the lower 1/3 of SVC, close to the cavoatrial junction.
2. When possible, ensure patient has both shoulders on the bed without rotating during measurement procedure.
3. To prevent inaccuracy, measure directly on patient's skin, avoiding clothing, bedding, dressings, ECG electrodes and other medical or personal equipment.
4. NOTE: External measurements can never exactly duplicate the internal venous anatomy.
5. In cases where target vessel depth is significant, maximum vessel depth may be added to measured path to determine final external measurement.
6. Other measurement techniques may be used depending on PICC RN clinical judgment.

E. Prepare Sensor
1. Attach fin assembly to Sensor and place in Sensor holder
2. Position Sensor on Patient's chest with the top of Sensor above the sternal notch and centered on the sternum.
3. Prepare and attach external ECG electrodes to all three lead wires. Ensure electrode locations are oil-free and completely dry.
4. Remove backing and press firmly onto skin at the specified locations:
   a) Place BLACK electrode lead wire on patient's left or right shoulder
   b) Place RED electrode lead wire on lower left side inferior to the umbilicus and laterally along the mod-axillary line.
   CAUTION: Placement of red lead wire outside of this region may result in reduced ECG performance.
   c) The optional GREEN is electrode lead wire on patient's lower right side, inferior to the umbilicus and laterally along the mid-axillary line.WARNING: Place skin electrode lead wires carefully

at locations indicated above and ensure good skin-electrode contact. Failure to do so may cause unstable ECG waveforms. In such cases, use chest radiograph or fluoroscopy to confirm catheter tip location, as indicated by guidelines and clinical judgment.

F. Evaluate baseline ECG
1. In Sherlock II mode, calibrate magnetic tracking system
2. Turn on Sapiens TCS and note external waveform
3. Verify that P-wave is present, identifiable and consistent on the main screen.
4. If no persistent or regular P-wave is identified, continue with procedure utilizing magnetic tracking and external measurements followed by tip confirmation via chest radiograph or fluoroscopy.
5. Enter patient identification information into Sapiens.
6. Adjust ECG scale as needed to ensure that entire ECG waveforms are visible in the ECG window throughout the insertion procedure.

G. Prepare insertion site and sterile field.
1. Apply tourniquet above intended insertion site to distend vessel.
2. Wash hands.
3. Don hair cover, face mask, and sterile gloves.
4. Remove underdrape and (tinted) Chloraprep from tray.
5. Place underdrape beneath arm and prep skin site with CHG with friction 6 inches beyond proposed insertion site. Reapply prior to line insertion with CHG, ensuring skin prep is completely dry prior to line insertion.
6. Don sterile gown and sterile gloves.
Set-up sterile field and maximum barrier drape according to catheter instructions for use.
NOTE: Do not re-prep the patient after applying maximum barrier drape.
7. Cover the probe and cable with the sterile probe cover and place on sterile field.
8. Cover the remote control with the sterile probe cover and place on sterile field.

H. Prepare Catheter
1. Pre-flush all lumens of the catheter with sterile normal saline 0.9% 5 mL per lumen to wet hydrophilic stylet.

I. Access Vein
1. Utilizing ultrasound, locate vessel.
2. Lidocaine 1%, inject in aliquots subcutaneously around insertion point, up to 5 mL.
3. Access vein and remove needle.
4. Secure and remove guidewire.

J. Trim Catheter to Length
1. Measure the distance from the zero mark to the pre-determined catheter external measurement.
2. To ensure adequate catheter length to reach maximum P-wave amplitude, it is recommended that 2 cm be added to this measurement. Catheter length may vary based on clinician measurement technique and experience.
3. Loosen the T-lock connector/stylet assembly as one unit until the stylet is well behind the catheter cut location. Do not entirely remove the stylet from the catheter.
4. Retract the entire T-lock connector/stylet assembly locking the connector to the catheter hub. Ensure stylet tip is intact.
5. Using sterile scalpel or scissors to carefully cut the catheter.
6. Inspect cut surface to ensure there is no loose material.
7. Re-advance the T-lock connector/stylet assembly locking the connector to the catheter hub.
8. Gently retract the stylet through the locked T-lock connector until the stylet tip is contained inside the catheter.
9. Prior to insertion, ensure that the stylet tip is contained inside and within the catheter but not more than 1 cm from the trimmed end of the catheter.

K. Catheter Insertion
1. Attach catheter stylet to fin assembly
2. Palpate the fin assembly through the drape.
3. Form and pinch the drape around the fin assembly to conform the drape to the fin assembly.
4. Place the stylet connector on the bottom end of the fin assembly and slide connector forward until it is fully seated
5. Lay catheter on sterile field.
6. Uncoil catheter stylet lead.
7. In Sherlock mode, calibrate magnetic tracking system immediately prior to catheter insertion.
8. Perform micro-introduction
9. Remove guidewire and dilator from micro-introducer.
10. Insert catheter until magnetic tracking icon appear approximately 10 cm and STOP inserting catheter
11. Attach saline-filled syringe. Flush catheter with saline and wait for intravascular waveform to stabilize.
12. Verify that P-wave on the intravascular ECG waveform is present, identifiable and consistent on the main screen of the Sapiens TCS.

L. Catheter Tip Guidance and Positioning:
1. Follow Sherlock II TLS instructions for use of magnetic navigation.

a) Insert catheter until the magnetic navigation shows stylet icon consistently downward.
b) Continue to slowly advance catheter until the catheter is inserted to the external measurement determined prior to insertion
c) Press the FREEZE button on Sapiens TCS. This will save the current waveform on the right side reference screen for later comparison.
d) SLOWLY adjust catheter tip position until maximum P-wave amplitude is reached. Compare main screen waveform to reference screen waveform while closely monitoring for negative P-wave deflection
e) Warning: Do not rely on ECG signal detection for catheter tip positioning when there are not observable changes in the P-wave. In this case, rely on magnetic navigation and external measurement for tip positioning and use chest radiograph or fluoroscopy to confirm catheter tip location as indicated by institutional guidelines and clinical judgment.
f) NOTE: The P-wave may continue to increase in amplitude when initial negative deflection is noted. In this case, adjust catheter tip position to maximum P-wave amplitude with no negative deflection.
g) Advance or retract catheter from maximum P-wave to place tip in desired location. Note catheter exit site marking and document on Sapiens TCS screen.
h) To record waveforms at final catheter tip position, press FREEZE button on Sapiens TCS. Press the "print to file" button to save image. This will save baseline and final waveforms for documentation in medical record.

M. Procedure Completion:
1. Remove stylet/T-Lock assembly.
a) Hold the front portion of the fin assembly to stabilize the fin assembly and Sensor. Disconnect the stylet lead from fin assembly by pulling the connector toward the bottom the Sensor.
b) Follow catheter instructions for use to remove the stylet/T-lock assembly from the catheter
2. Aspirate and flush PICC line(s) as per Care of the Central Venous Catheters Policy. Follow catheter instructions for use.
3. Secure catheter with Statlock and confirm that exit site marking is accurate.
4. Place Biopatch at catheter insertion site.

5. Place non-occlusive dressing over Biopatch and write the date, time, initials, and external length on the patch.
   a) Remove and discard drapes in proper waste container
   b) Remove external ECG electrodes and Sensor from patient
   c) Loosen the cinch ring on the Sensor holder and take out the sensor with fin assembly
   d) Remove fin assembly.
   e) Remove remote control from remote control holder.
   f) Dispose of Sensor holder, remote control holder and fin assembly in proper waste container
   g) CAUTION: Ensure remote control is <u>not</u> discarded

N. Confirmation of Tip Location
1. Confirmation is required for tip location of PICCs placed.
2. No confirmation is needed for midlines placed.
3. Tip location may be confirmed by ECG, TCS, STAT portable chest X-ray, or fluoroscopy.

O. ECG Confirmation:
1. The Sapiens TCS provides real-time catheter tip location information by using the patient's cardiac electrical activity. The PICC may be used immediately after the procedure when the RN determines this method has been successful. Proper documentation of P-wave activity will be placed in the chart.
2. Limiting but not contraindicated situations for this technique are in patients where alterations of cardiac rhythm change the presentation of the P-wave as in atrial fibrillation, atrial flutter, severe tachycardia, and pacemaker driven rhythms. In such patients, who are easily identifiable prior to PICC insertion, the use of an additional method is required to confirm tip location.

IV. QUALIFICATION/REQUIREMENTS FOR RNs:

A. PICC/MLC placement may be performed by a RN who has completed an accredited didactic training course, and has been validated by a preceptor with at least three successful placements.
B. A preceptor is a certified PICC practitioner who has successfully placed at least 50 PICCs after his/her initial clinical validation.
C. A licensed physician or RN who has demonstrated competency and has completed the Sapiens TCS online education course, may insert the PICC.
D. EKG basic dysrrhythmia knowledge base.
E. Initial Evaluation/Skill Validation: Initial documented competency in performing the procedure by the preceptor.
F. Ongoing Evaluation: Continuing evaluation is based on quality outcomes. Skill Validation is repeated when practice changes occur.

V. DOCUMENTATION:

A. IV solutions and medications given pre-insertion or post-insertion to flush line with NS.

B. Vital signs and any significant history outside of norm, but normal for patient; Procedure notes.

C. Documentation of P-wave activity

D. Any patient teaching or follow-up to be done post-insertion.

VI. RELATED POLICIES:

A. Care of Central Venous Catheters, Clinical Manual

VII. RELATED FORMS:

A. Central Line Infection Practices Adherence Monitoring

B. PICC Line Insertion Bedside Procedural Record in Meditech

VIII. REFERENCES:

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