

PICC100: Indications and Patient Selection for PICC Lines

Study Guide

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Completion education. No accredited nursing contact hours awarded.

Course Description

Master the clinical indications and contraindications for PICC placement, patient assessment procedures, and the MAGIC criteria for appropriate vascular access selection. Learn when PICC lines are optimal and when alternative access is warranted.

How to Use This Guide

This is a condensed, high-yield reference. Skim the key terms and the quick-reference tables, confirm you can explain each high-yield point, then read the section summaries to spot any gap. Return to the on-site lesson for full detail, and attempt the post-test cold. Passing score: 90%.

Key Terms at a Glance

Term	What it means
Single-lumen PICC	One lumen for infusion;
Double-lumen PICC	Two separate lumens;
Power-injectable PICC	High-pressure rated catheter (up to 325 psi);

High-Yield Points

- **Indicated Uses** Long-term IV antibiotics: Therapy lasting >14 days (e.g., endocarditis, osteomyelitis requiring 4-6 weeks of IV therapy) Chemotherapy: Cancer treatment agents requiring central access for vesicant drug administration Total Parenteral Nutrition (TPN): High osmolarity solutions (>900 mOsm/L) requiring central venous placement Vesicant medications: Irritating drugs (vancomycin, nafcillin) best infused centrally to prevent peripheral vein damage Frequent blood draws: Patients requiring repeated labs; reduces needle sticks and preserves peripheral veins
- **Absolute and Relative Contraindications** CKD with eGFR Per KDOQI guidelines, peripheral veins must be preserved for future hemodialysis access; PICC placement risks vein thrombosis and loss of vital dialysis access Bilateral mastectomy: Vascular insufficiency post-surgery prevents safe catheter placement bilaterally Skin infection at insertion site: Risk of bacteremia and catheter-related bloodstream infection (CRBSI) Upper extremity DVT history: Increased thrombotic risk; may indicate thrombophilia Small vessel disease: Compromised vascular supply increases occlusion and ischemia risk
- **CKD & Vein Preservation Considerations** In chronic kidney disease patients with eGFR Assess both upper extremity veins before PICC insertion in any CKD patient Consider alternative central access (lower extremity PICC, femoral catheter) if available Document CKD status and renal function in pre-procedure

assessment Coordinate with nephrology/dialysis team for patients requiring future dialysis access

- Key Point MAGIC Mnemonic for Vascular Access Selection M - Malnutrition/Medication: Is patient receiving TPN or vesicant medications? Central access indicated A - Access duration: Will therapy last >14 days? PICC appropriate G - Gauge needed: Do medications require larger bore access? Consider power-injectable PICC I - Infusion type: Vesicants, irritants, or hyperosmolar solutions? Central access required C - Catheter type: What central access is most appropriate? PICC vs. midline vs. tunneled line
- PICC vs. Midline vs. CVC Indications PICC Midline CVC Therapy >14 days 4-14 day therapy Emergent access Vesicants/Irritants Non-irritant drugs Hemodialysis/CVP TPN, chemotherapy Saline flushes Multiple lumens Antibiotics >2 weeks Peripheral prep agents Rapid infusions
- When to Avoid PICC Placement: Short-term therapy (Peripheral IV or midline catheter preferred; reduces unnecessary central access Anticipated difficult weaning: Plan for transition to peripheral access; assess vein quality Patient refusal of maintenance care: PICCs require compliance with flushing, dressing changes, and activity restrictions Contraindications present: CKD, DVT history, skin infection, or bilateral mastectomy
- Zone Location Significance Zone A (target) Lower SVC / cavoatrial junction Optimal — maximal hemodilution, lowest thrombosis and occlusion risk Zone B (too shallow) Upper/mid SVC or brachiocephalic Acceptable in some cases but higher thrombosis risk; may need repositioning for vesicants/TPN Zone C (too deep) Right atrium or ventricle Unacceptable — risk of arrhythmia, myocardial irritation, perforation; must be withdrawn
- Confirm Before Use Never infuse vesicants, TPN, or hyperosmolar solutions until tip position is confirmed by chest X-ray or intracavitary ECG. A malpositioned tip turns a "central" line into a peripheral hazard.
- Central-Line Bundle The evidence-based CLABSI bundle: hand hygiene, maximal sterile barrier precautions, >0.5% CHG skin antisepsis, optimal site selection, and daily review of line necessity with prompt removal . The most reliable way to prevent a line complication is to remove the line the day it is no longer needed.
- Key Takeaways PICC placement requires comprehensive patient assessment, clear indication per MAGIC criteria, consideration of contraindications, and meticulous documentation. Always prioritize vein preservation in CKD patients and ensure informed consent before proceeding.

Quick-Reference Tables

Assessment Component	Key Considerations
Vein Mapping	Ultrasound assessment of basilic, cephalic, and brachial veins; document vein patency, size (minimum 3mm), and compressibility to rule out thrombosis
Medical History Review	Prior vascular procedures, renal disease, active infection, autoimmune conditions, radiation history
Coagulation Status	PT/INR, aPTT, platelet count; assess need for anticoagulation reversal (warfarin, DOACs)
Allergy Assessment	Chlorhexidine, iodine, local anesthetics; document and plan appropriate alternatives

PICC	Midline	CVC
Therapy >14 days	4-14 day therapy	Emergent access
Vesicants/Irritants	Non-irritant drugs	Hemodialysis/CVP
TPN, chemotherapy	Saline flushes	Multiple lumens
Antibiotics >2 weeks	Peripheral prep agents	Rapid infusions

Documentation Item	Details Required
Pre-procedure note	Indication, assessment findings, informed consent, patient education provided
Procedure note	Attempt number, insertion site, catheter specifications, visualization method, anticipated complications
Tip confirmation	Chest X-ray interpretation or IC-ECG results with tip position documented
Post-procedure note	Patient tolerance, immediate complications, dressing applied, flushing completed with documented blood return

Zone	Location	Significance
Zone A (target)	Lower SVC / cavoatrial junction	Optimal — maximal hemodilution, lowest thrombosis and occlusion risk
Zone B (too shallow)	Upper/mid SVC or brachiocephalic	Acceptable in some cases but higher thrombosis risk; may need repositioning for vesicants/TPN
Zone C (too deep)	Right atrium or ventricle	Unacceptable — risk of arrhythmia, myocardial irritation, perforation; must be withdrawn

Complication	Recognition	Prevention / action
CLABSI (bloodstream infection)	Fever, chills, hypotension, no other source	Maximal sterile barriers at insertion, CHG prep, scrub the hub, disinfecting caps, prompt removal when no longer needed
Catheter-associated thrombosis	Arm/shoulder swelling, pain, engorged veins, aching	Correct catheter-to-vein ratio ($\leq 45\%$), tip at CAJ, smallest lumen count needed; anticoagulation per provider
Occlusion	Sluggish or absent flush/blood return	Consistent push-pause flushing and positive-pressure locking; thrombolytic per protocol for thrombotic occlusion
Migration / dislodgment	Change in external length, arrhythmia, new discomfort on infusion	Secure with an engineered stabilization device; verify external length each dressing change; re-image if length changes
Phlebitis (early, mechanical)	Redness/tenderness along the upper arm in first 72h	Warm compress, monitor; usually self-limited; escalate if it progresses

Section-by-Section Summary

The key idea of each lesson section, condensed to the essentials. Use it to review fast and spot any gap before the post-test.

PICC100: Indications and Patient Selection for PICC Lines

Objectives: Master clinical indications, contraindications, patient assessment, and MAGIC criteria for optimal PICC selection

1. PICC Definition and Types

A Peripherally Inserted Central Catheter (PICC) is a long catheter inserted into the upper extremity veins with the tip terminating in the lower superior vena cava or cavoatrial junction. PICCs are classified by lumen configuration:

- Single-lumen PICC: One lumen for infusion; used for antibiotics, TPN, or chemotherapy
- Double-lumen PICC: Two separate lumens; allows simultaneous infusions of incompatible medications
- Triple-lumen PICC: Three lumens; provides maximum flexibility for complex medication regimens
- Power-injectable PICC: High-pressure rated catheter (up to 325 psi); supports rapid contrast infusion for CT imaging and bolus medications

4. Patient Assessment for PICC Placement

Comprehensive pre-insertion evaluation is critical for safe and appropriate PICC placement:

5. Informed Consent Process

Documentation of informed consent must include:

- Explanation of PICC indications, benefits, and necessity for current therapy
- Procedure description and expected duration (15-30 minutes)
- Risks: infection, thrombosis, malposition, pneumothorax (rare), nerve injury
- Alternative access options (peripheral IV, midline catheter, central line)
- Post-insertion care requirements: dressing changes, flushing protocols, activity restrictions
- Patient/surrogate signature on consent form with witness verification

8. INS 2024 Standards for PICC Placement

The Infusion Nurses Society (INS) 2024 Standards require:

- Standardized assessment tool documenting indication, patient risk factors, and vein assessment
- Ultrasound-guided insertion; peripheral approach required for safety
- Tip position verification on chest X-ray or intracavitary ECG
- Sterile technique with maximum barrier precautions (sterile gown, gloves, mask, cap)
- Documentation of catheter type, lumen count, insertion site, and tip location
- Patient education on care, signs of complications, and when to seek medical attention

PICC Device Selection & Configuration Guide

9. Pre-Procedure Patient Education

Patient preparation ensures cooperation and reduces anxiety:

- NPO status: Typically none required unless procedural sedation planned
- Expected duration: 15-30 minutes in most cases
- Positioning: Arm abducted 45-90 degrees; head turned away from insertion site
- Sensations: Pressure, cold from prep solutions, mild discomfort; local anesthesia provided
- Post-procedure: Mild soreness expected; avoid strenuous upper extremity activity for 24 hours
- Dressing and follow-up: Sterile dressing remains in place 24 hours; chest X-ray scheduled within 24 hours

10. Documentation Requirements

Complete medical record documentation includes:

11. Tip Location — Why the Cavoatrial Junction Matters

A PICC is only a central line if its tip sits centrally. The target is the lower third of the superior vena cava at the cavoatrial junction (CAJ) — where blood flow is highest and infusate is diluted instantly.

Concepts Tested on the Post-Test

Each item is a topic the post-test probes. Exact wording may differ; the underlying concept is what you must be able to reason through. If any feels unfamiliar, revisit that section above.

1. A PICC line is indicated for which of the following scenarios?
2. Which vein is considered the preferred access site for PICC insertion?
3. What is the minimum eGFR threshold before PICC placement is contraindicated in a patient with chronic kidney disease?
4. Which of the following is NOT a primary indication for PICC placement?
5. What is the primary risk of placing a PICC in a patient with a history of upper extremity DVT?
6. Which power-injectable PICC specification allows for rapid contrast bolus during CT imaging?
7. Informed consent for PICC placement must include discussion of which of the following?
8. Which of the following is a relative contraindication to PICC placement?
9. According to the MAGIC criteria, what does the 'A' represent?
10. What is the minimum vein diameter required for safe PICC insertion?
11. Which medication class is a primary indication for central line PICC placement due to vesicant properties?
12. A patient with bilateral mastectomy presents for PICC placement. What is the clinical decision?
13. Which assessment component evaluates patient's coagulation status before PICC insertion?
14. What is the expected duration of a standard PICC insertion procedure?
15. According to INS 2024 Standards, which visualization method is required for PICC insertion?
16. A patient requires TPN with osmolality of 950 mOsm/L. What type of access is most appropriate?
17. Which lumen configuration is best suited for simultaneous infusion of incompatible medications?
18. What is the primary purpose of vein mapping ultrasound before PICC insertion?
19. A patient undergoing chemotherapy for breast cancer requires vascular access for 6 weeks. What access method is most appropriate?
20. According to patient education for PICC insertion, which post-procedure activity restriction is appropriate?
21. Which of the following describes an appropriate indication for power-injectable PICC selection?
22. A patient declines participation in dressing change protocols and frequent saline flushing for PICC maintenance. What is the appropriate clinical decision?
23. Which documentation requirement must be completed within 24 hours of PICC insertion?
24. A patient with suspected chlorhexidine allergy requires PICC insertion. How should the insertion team proceed?
25. What is the primary goal of measuring catheter length before PICC insertion?