

VASCULAR ACCESS · CENTRAL LINES

Peripherally Inserted *Central Catheter*

A long-term IV catheter inserted in a peripheral arm vein with the tip terminating in the superior vena cava. Used for TPN, chemotherapy, vesicants, and prolonged antibiotic therapy — and a high-yield NCLEX topic for infection control, prioritization, and safe medication administration.

STERILE TECHNIQUE

INFECTION = #1 RISK

CXR BEFORE FIRST USE

10 ML SYRINGE MINIMUM

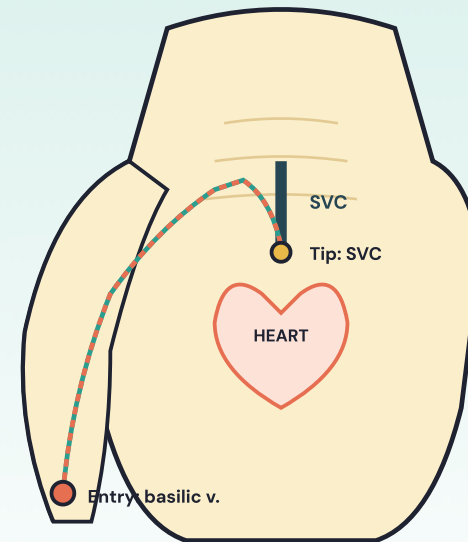
NO BP / NO STICKS THAT ARM

1 Definition & Why It Matters OVERVIEW

- ▶ **PICC = Peripherally Inserted Central Catheter.** A long, flexible catheter threaded through a peripheral vein (basilic, cephalic, or median cubital in the upper arm) until the tip rests in the **superior vena cava (SVC) at the cavoatrial junction.**
- ▶ **Considered a central line** — the tip lands in a central vessel even though entry is peripheral. This means central-line infection precautions apply.
- ▶ **Used for long-term IV therapy** (weeks to months): TPN, chemotherapy, vesicant or irritant medications, long-term antibiotics, and frequent blood draws.
- ▶ **May have 1, 2, or 3 lumens** — each lumen functions as an independent IV line. TPN gets a dedicated lumen; nothing else is piggybacked into it.
- ▶ **Inserted at bedside** by specially trained RN or PA under sterile technique; placement **must be confirmed by chest X-ray before first use.**

A Anatomy & Tip Position VISUALIZE IT

— Vein — PICC catheter



Insertion sites (preferred order): basilic > brachial > cephalic. Tip rests at the **cavoatrial junction** — confirmed by chest X-ray **before** the first dose.

2 Insertion & Path of the Catheter HOW IT WORKS

A PICC is threaded against blood flow from a peripheral arm vein into the central circulation. Each step has a complication to watch for:

- 1 Site Prep & Vein**
Sterile field, max barriers. Basilic vein preferred — largest, straightest path to SVC.
- 2 Threaded Up**
Advances through axillary → subclavian → brachiocephalic vein.
- 3 Tip in SVC**
Lands at cavoatrial junction. Too far = arrhythmia; too short = not central.
- 4 Confirm by CXR**
Mandatory before first infusion. No CXR confirmation = do not use.
- 5 Secure & Dress**
Sterile occlusive transparent dressing; document external length as the baseline.

3 Signs of Complications EARLY VS. LATE · RED FLAGS

● Early (Insertion / First 24 hr)

- Bleeding or hematoma at insertion site
- Cardiac arrhythmia (tip too far → atrium)
- **Air embolism** 🚩 — sudden chest pain, dyspnea, hypoxia, hypotension
- Pneumothorax (rare with PICC; more common with subclavian CVC)
- Catheter malposition (no CXR confirmation yet)

● Late (Days to Weeks)

- **CLABSI** 🚩 — fever, chills, redness/drainage at site, ↑ WBC
- **DVT / venous thrombosis** — arm swelling, pain, warmth, ↑ circumference
- Phlebitis — redness, tenderness, palpable cord along vein
- Catheter occlusion — unable to flush, no blood return
- Catheter migration — external length changes from baseline
- Catheter rupture — leakage, fluid in arm tissue (often from small syringes)

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Priority Nursing Interventions

ABCS · SAFETY · NCLEX
PRIORITIES

- ▶ **VERIFY tip placement by CXR** before first use — this is the very first action after insertion.
- ▶ **Use STERILE technique** for all dressing changes, cap changes, and any access. Apply a **sterile occlusive transparent dressing**.
- ▶ **Change dressing** every 7 days for transparent dressings (or sooner if loose/soiled/damp); gauze dressings every 48 hours. **COURSE NOTE: QOD**
- ▶ **Flush with 10 mL of 0.9% NS** before and after every use — using a **10 mL syringe minimum** (smaller syringes generate too much pressure and rupture the catheter).
- ▶ **SAS or SASH protocol:** *Saline → Administer med → Saline (→ Heparin if ordered).*
- ▶ **Check for blood return** before infusing any medication.
- ▶ **Measure external catheter length each shift** — change from baseline = migration; do not push it back in.
- ▶ **Measure arm circumference** at baseline and daily; ↑ size = suspect DVT.
- ▶ **Clamp the catheter** when changing tubing or caps; have client perform **Valsalva** with head turned **away** from the site.
- ▶ **Do NOT piggyback into a TPN lumen** — use a separate lumen.
- ▶ **If line breaks or is open to air:** CLAMP between break and patient → place client on **LEFT side, Trendelenburg** → notify provider (air embolism precaution).
- ▶ **NEVER on the PICC arm:** no blood pressure, no venipuncture, no peripheral IVs, no constrictive jewelry.

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NCJMM Clinical Judgment

NEXT-GEN NCLEX
FRAMEWORK

1 · RECOGNIZE CUES

Fever, chills, redness/drainage at site, swelling of PICC arm, sudden dyspnea, inability to flush, change in external length.

2 · ANALYZE CUES

Fever + site changes → CLABSI. Arm swelling + pain → DVT. Sudden chest pain/dyspnea after disconnect → air embolism.

3 · PRIORITIZE

Air embolism > CLABSI > DVT > occlusion. Airway/circulation always before infection workup.

4 · GENERATE SOLUTIONS

Stop infusion, clamp catheter, reposition (L-Trendelenburg for air), draw blood cx from line + peripheral, notify provider.

5 · TAKE ACTION

Sterile dressing, 10 mL flush, SAS/SASH, daily length + circumference checks, hand hygiene, scrub the hub 15 sec.

6 · EVALUATE

VS stable, site clean/dry/intact, easy flush with brisk blood return, equal arm circumference, afebrile, lactate & WBC trending down.

6 Pharmacology & Solutions WHAT GOES THROUGH THE LINE

Drug / Solution	Purpose	Key Nursing Considerations
0.9% Normal Saline (flush)	Maintain patency before/after every use	10 mL syringe minimum ; pulsatile (push-pause) flush; SAS protocol
Heparin (lock flush)	Prevent clot formation between uses	Per facility protocol (often 10 units/mL or 100 units/mL); always <i>after</i> NS — last step of SASH
Alteplase (Cathflo Activase)	Restore patency in occluded catheter	Instill, dwell 30–120 min, then aspirate. Do NOT forcibly flush an occluded line.
Vancomycin / antibiotics	Treat or "lock" against CLABSI	Long-term IV abx is a top reason for PICC. Trough levels for vanc; monitor renal function.
TPN / Lipids	Long-term nutrition	Dedicated lumen only — never piggyback. Accu-checks q6h. Never speed up or slow down rate.
Vesicant chemo (e.g., doxorubicin, vincristine)	Reduce extravasation risk	Central access preferred for vesicants. Verify blood return before each dose.
Blood products	Transfusion via central access	Compatible with 0.9% NS only ; warm blood when given through a central line; 2-nurse check.

7 NCLEX Test Traps ⚠ WHERE STUDENTS LOSE POINTS



Trap 1 · Using the line before the chest X-ray

A PICC is NEVER used until tip placement is confirmed by CXR. "Start the antibiotic now" right after insertion is the wrong answer — verify placement first.



Trap 2 · Using a small syringe (1, 3, or 5 mL)

Smaller syringes generate **higher** pressure, which can rupture the catheter. **10 mL minimum**, always — even when administering small volumes.



Trap 3 · Forcibly flushing an occluded line

If you can't flush, STOP. Pushing harder can rupture the catheter or dislodge a clot into the SVC. Notify provider; alteplase may be ordered.



Trap 4 · Wrong position for an open / disconnected line

Air embolism precaution = **LEFT side, Trendelenburg** (traps air in right ventricle, away from pulmonary outflow). NOT supine, NOT right side, NOT high-Fowler's.



Trap 5 · Pushing the catheter back in if it's pulled out

NEVER advance a partially dislodged PICC — it is no longer sterile. Cover the site, notify provider, and document external length.



Trap 6 · Piggybacking meds into a TPN lumen

TPN runs alone in its own lumen. Piggybacking causes precipitates, infection, and altered TPN delivery.



Trap 7 · Drawing blood / taking BP from the PICC arm

The PICC arm is OFF LIMITS for BP cuffs, blood draws, peripheral IVs, and tight clothing. Risk: thrombosis and catheter damage.



Trap 8 · Choosing "clean" technique for dressing changes

A PICC is a **central line**. Sterile technique only — gloves, mask, sterile field, chlorhexidine prep.

8 Patient & Family Education HOME & DISCHARGE TEACHING

- ▶ **Keep the dressing dry and intact.** Cover with plastic wrap or a commercial cover during showers — no submerging in baths, pools, or hot tubs.
- ▶ **Watch for and immediately report:** fever, chills, redness, swelling, drainage, pain at site, swelling of the PICC arm, or shortness of breath.
- ▶ **Protect the PICC arm:** no blood pressure cuffs, no blood draws, no IVs, no tight sleeves or jewelry on that side.
- ▶ **Avoid heavy lifting** (>10 lb) or repetitive arm exercises that flex the elbow strongly with the PICC arm.
- ▶ **Daily monitoring at home:** check the dressing for lift/drainage, look at the catheter for length changes, and feel the arm for swelling.
- ▶ **Wear a medical alert bracelet** indicating central line in place.
- ▶ **Flushing schedule:** if discharged with a PICC, flush per home health instructions; never skip flushes — clots form quickly.
- ▶ **Hand hygiene before any contact** with the catheter, dressing, or caps — this is the single most important infection prevention step.

9 Memory Boosters

MNEMONICS & PATTERN RECOGNITION

Flush like a pro: **SASH**

- S** — Saline (10 mL NS, 10 mL syringe)
- A** — Administer the medication
- S** — Saline flush again
- H** — Heparin lock (*if ordered*)

Air embolism position: **LLL**

- L** — Left side
- L** — Lying flat / Trendelenburg
- L** — Lethal if you don't act fast

The "PICC" rules: **PICC**

- P** — **Picture** first (CXR before use)
- I** — **Infection** is the #1 risk
- C** — **Clamp** when opening the system
- C** — **Check** length & arm circumference daily

Syringe rule: **10 = SAFE**

Smaller syringe = bigger pressure = burst catheter.
10 mL minimum, always.

