
CENTRAL LINES

AND PERIPHERAL LINES

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WHAT MAKES AN IV LINE A CENTRAL LINE?

THE LOCATION OF THE TIP OF THE CATHETER!!!!

“The safest Central Venous Access Device (CVAD) tip location in adults and children is the superior (upper limb) or inferior (lower limb) cavoatrial junction” (The Infusion Nurse Society, 2024).

WHY DO PATIENTS NEED CENTRAL ACCESS?

- When they have no other options for venous access
 - For frequent lab draws
 - Emergent needs – trauma patients
 - When certain medications are ordered that should not be infused in a peripheral IV
 - Vesicant medications: the medication administration record (MAR) provides a notification that a medication is a vesicant. Examples: (all pressors, some electrolytes, some antibiotics e.g. vancomycin, doxycycline, gentamycin)
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TYPES OF CENTRAL LINES:



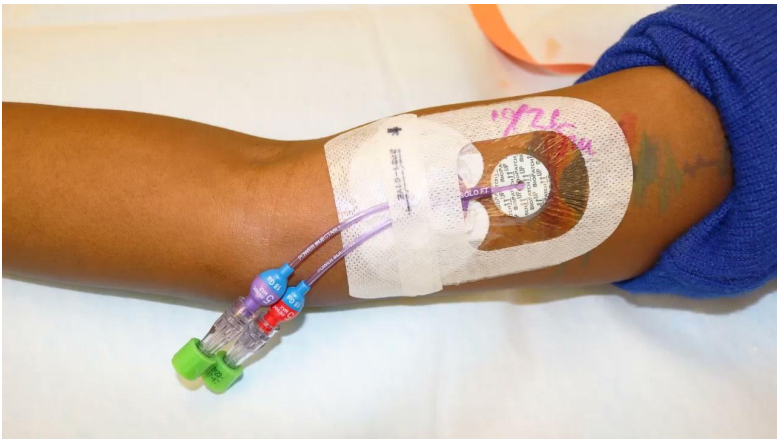
Internal Jugular



Subclavian



Implanted Port



PICC/FICC

Hemodialysis lines (DO NOT TOUCH!)



INTERNAL JUGULAR LINE:

- The most common central line that is placed emergently
- Inserted directly in the internal jugular vein
- Difficult to care for due to neck placement – particularly for men with beards
- Uncomfortable for patients
- Difficult for nurses to maintain





SUBCLAVIAN LINE

- Can be tunneled or inserted directly into the subclavian vein
- For nonemergent reliable central access when peripheral veins are not available
- May or may not be tunneled into the IJ
- Dwell time: short if nontunneled or long term if tunneled and cuffed

IMPLANTED PORT

(OFTEN REFERRED TO AS AN "IVAD")

- Tunneled into the internal jugular vein, but device is implanted in a pocket created under the skin on the chest
 - Placed at UVMMMC by IR
 - Often placed for cancer patients
 - Only accessed with a Huber needle when needed
 - May be used for any type of medication or IV fluid
 - **May not be used** for total parenteral nutrition (TPN) due to increased infection risk
 - Dwell time: indefinite
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PICC/FICC LINE

Peripherally **I**nserted **C**entral **C**atheter

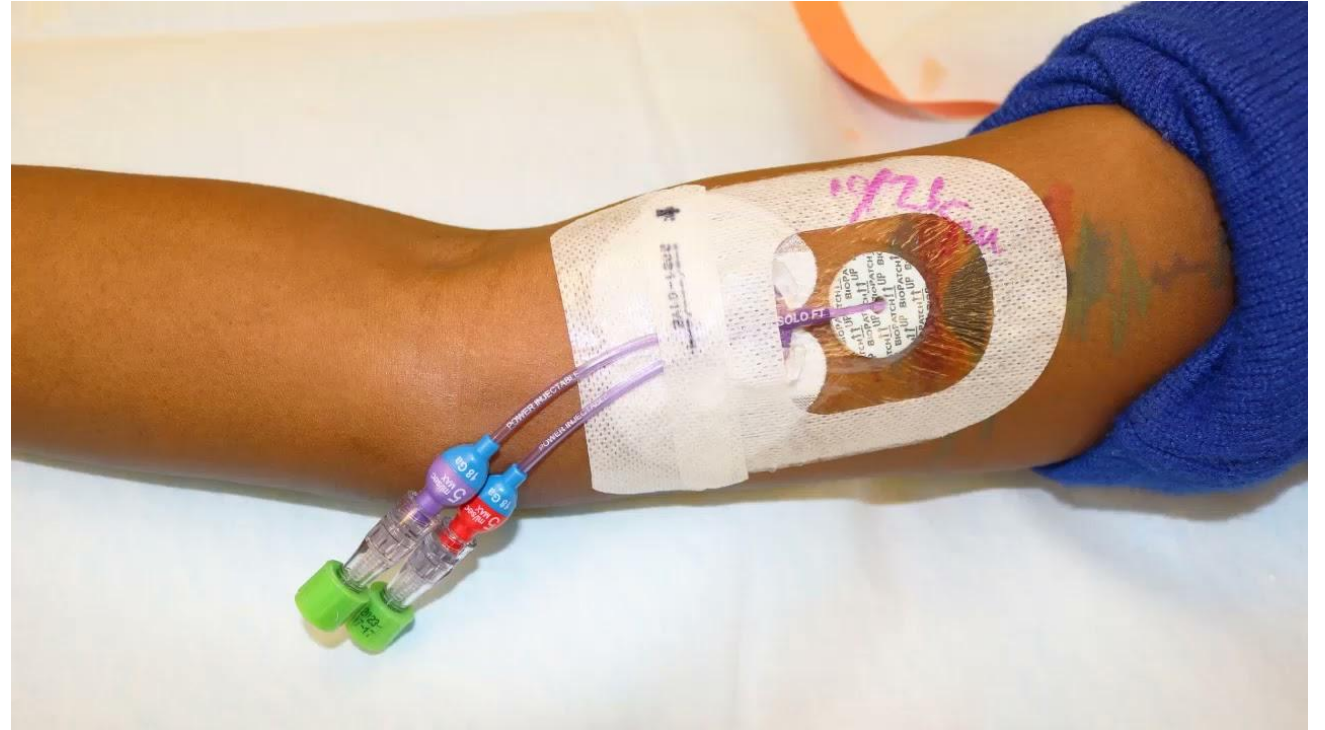
Placed in upper arm or in the upper leg

May be single, double, or triple lumen

May be used for all types of medications

The only central line patients are D/C'd with

Dwell time: indefinite, most often 4-8 weeks



HEMODIALYSIS

SPECIFICALLY FOR DIALYSIS PURPOSES
ONLY

NO OTHER USES ARE ACCEPTABLE
WITHOUT AUTHORIZATION FROM
NEPHROLOGIST

ONLY ACCESSED BY DIALYSIS NURSES

MAINTAINED BY DIALYSIS NURSES ONLY



Review

Which central catheter is most likely to be placed emergently?

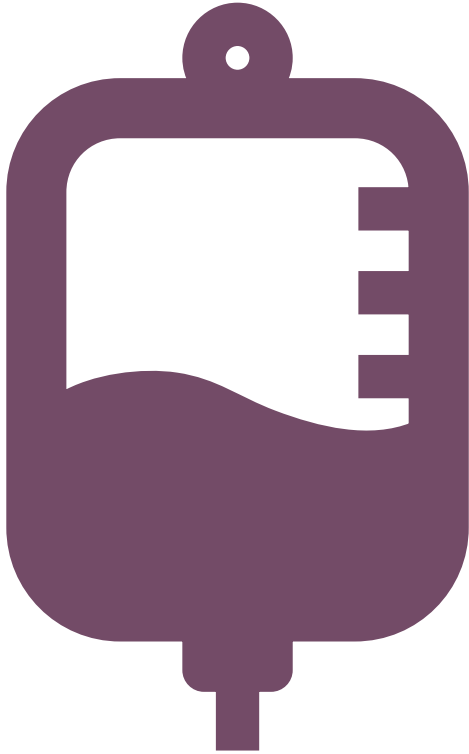
Which central catheter is used most often for cancer patients?

Which catheter has the highest risk for a pneumothorax?

Which catheter do you need permission from nephrology to access?

What kind of central line do nurses place most often?

CARE AND MAINTENANCE OF ALL IV LINES:



- All intravenous access devices have TWO VALVES. When the line is not in use both valves should be closed for the safety of the patient.
- **TYPES OF VALVES:**
- Needleless connectors: The needleless connector is passively closed when not infusing
- External clamps: Need to be manually closed after infusions.
- Internal valves: Open only with pressure from infusion

ASSESSMENT OF CENTRAL LINES AND PERIPHERAL IV LINES

DRESSING SHOULD ALWAYS BE C/D/I (CLEAN, DRY, INTACT)
CHANGE DRESSING IF NOT C/D/I

BOTH CL AND PIVS SHOULD BE:

EASY TO FLUSH
WITHOUT PATIENT REPORT OF PAIN
NO SWELLING, REDNESS, OR IRRITATION
NO S/S OF IV FAILURE (REDNESS, SWELLING, PAIN)
BLOOD RETURN NECESSARY WITH CENTRAL LINES



**BLOOD RETURN FROM CENTRAL
CATHETERS IS EXPECTED AND
NECESSARY FOR USE!**

ALL LUMENS AT ALL TIMES

**WITHOUT A BRISK BLOOD RETURN THERE
IS AN INCREASED RISK OF THROMBUS
AND INFECTION (THE INFUSION NURSE
SOCIETY, 2024)**

CENTRAL LINE DRESSING CHANGES:

CHANGED WEEKLY (OR AS CLINICALLY INDICATED IF DRESSING IS NOT CLEAN/DRY/INTACT)

STERILE PROCEDURE








PERFORMED ONLY BY NURSES W/ DEMONSTRATED COMPETENCY

PERIPHERAL LINE DRESSING CHANGES

- Per facility policy (UVMMC is now weekly or more often if clinically indicated)
 - Includes a complete removal of the dressing, aseptic, no-touch technique for cleaning the skin, and replacing the dressing, without dislodging the line!
 - This is a bedside nurse expectation
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IV CATHETER GAUGE

@nursebossessentials

SIZE	COLOR	USES
14G		TRAUMA, RAPID INFUSION
16G		TRAUMA, SURGERY
18G		BLOOD TRANSFUSIONS
20G		IV FLUIDS AND MEDICATIONS
22G		IV FLUIDS, SMALL VEINS
24G		FRAGILE VEINS, PEDIATRICS
26G		NEONATES

@nursebossessentials

COMPARISON BETWEEN FRENCH AND GAUGES

DIAMETER MEASUREMENTS IN FRENCH: CATHETER NOMENCLATURE			DIAMETER MEASUREMENTS IN GAUGES: NEEDLE NOMENCLATURE		
FR	External diameter in mm	Circumference in mm	G	External diameter in mm	Internal diameter in mm
1.7	0.566	1.779	24	0.559	0.292
2.1	0.700	2.198	22	0.711	0.394
2.7	0.900	2.826	20	0.902	0.584
3.8	1.260	3.970	18	1.270	0.838
5.0	1.660	5.230	16	1.651	1.194
6.3	2.100	6.594	14	2.108	1.600

COMPLICATIONS OF INTRAVENOUS LINES



Peripheral Lines: Phlebitis, infection, dislodgment, failure leading to infiltration or extravasation



Central Lines: failure to return blood, malposition if the tip is not in the lower superior vena cava, infection due to poor care and maintenance, thrombus

PERIPHERAL CATHETER FAILURE

Infiltration:



During an infusion, the medication does not infuse into the vein but leaks into the surrounding tissue



Can be due to IV failure or dislodgment



Treatment: remove the line, elevate the arm, check to make sure the infusate was not an irritant or vesicant

Extravasation (this is a serious complication)

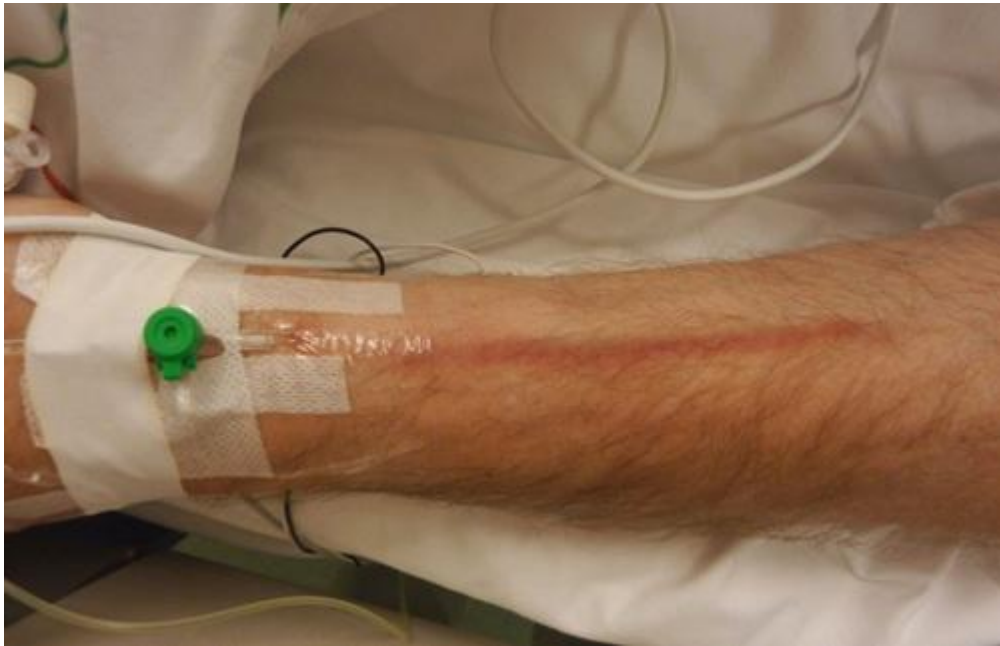
- During an infusion, a medication that is an irritant or a vesicant does not infuse into the vein but leaks into the surrounding tissue
 - Irritants and vesicants can cause tissue damage and, in some cases, lead to the need for further intervention to repair the damage (Barton, 2024)
 - PIV failures involving vesicants and irritants must be treated with additional medication
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WHAT MEDICATIONS CAN GO INTO A CENTRAL LINE?

WHAT MEDICATIONS CAN GO INTO A PERIPHERAL LINE?



- ✓ All types of medications can be infused through a central line, but not all medications can be infused through peripheral lines
- ✓ Medications that are classified as **vesicants or irritants should not infuse through a peripheral line due to the risk of tissue damage if the line fails**. These include some types of chemotherapy, some types of electrolytes (e.g. potassium is an irritant, calcium gluconate is a vesicant), some types of antibiotics (ampicillin, vancomycin), pressors (medications to keep blood pressure up in critically ill patients), and cardiac medications (amiodarone)
- ✓ If you are infusing any of these medications into a peripheral line, please assess the lines more frequently and discuss a central access option to the physician



Phlebitis is essentially an angry vein.

If you are able, stop the infusion, remove the IV, elevate the arm with a warm pack, and give pain relief if needed.

Pediatric extravasation:
All extravasations need to be treated to limit the damage.
These injuries can cause lasting damage.



IV extravasation can result in painful and long-lasting injuries for patients.

Please always be aware of what medications you are infusing.

If you are giving any of the higher risk medications, please assess the line more frequently, so you will know right away if the IV line is failing and be able to take the appropriate action.

What is the appropriate action if an IV is failing...
or if you think it might be failing?

References

Barton, A. (2024). Addressing and mitigating the high costs of extravasation and infiltration to patients and healthcare organisations. *British Journal of Nursing*, 33(21), S4–S14. <https://doi.org/10.12968/bjon.2024.0270>

The Infusion Nurse Society. (2024). Infusion therapy standards of practice. <https://www.ins1.org/publications/infusion-therapy-standards-of-practice/>.
