

DO YOUR VASCULAR ACCESS PRACTICES
REFLECT CURRENT STANDARDS?

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EMMY



ALBERTA HEALTH SERVICES STATEMENT

“Our standards of care
should not result in this type
of complication for any of
our patients.”



CASE STUDY



- A 48-year-old female admitted with chest pain. Patient complained about pain at PIV site. Upon PIV removal, patient had redness and edema. Patient discharged home.
- ER visit with ICU admission 5 days after discharge with Sepsis. Consult placed to Vascular Access for PICC placement. Line removed per ID after 6 weeks of OP antibiotic treatment.
- ER visit with ICU readmission with Sepsis 9 days after PICC removal. Vascular access placed second PICC for another 6 weeks of OP antibiotics.

WE CAN DO BETTER



- Most common invasive procedure is the PIV with many placed in the ED
- Is this a life-saving medication or solution?
- Is a PIV the best vascular access?
- Does your facility have a vascular access specialist?
- Unfortunately, it is accepted practice that patients tolerate multiple sticks before access is obtained
- Vascular access is not adequately covered in nursing and medical schools. DIVAs!

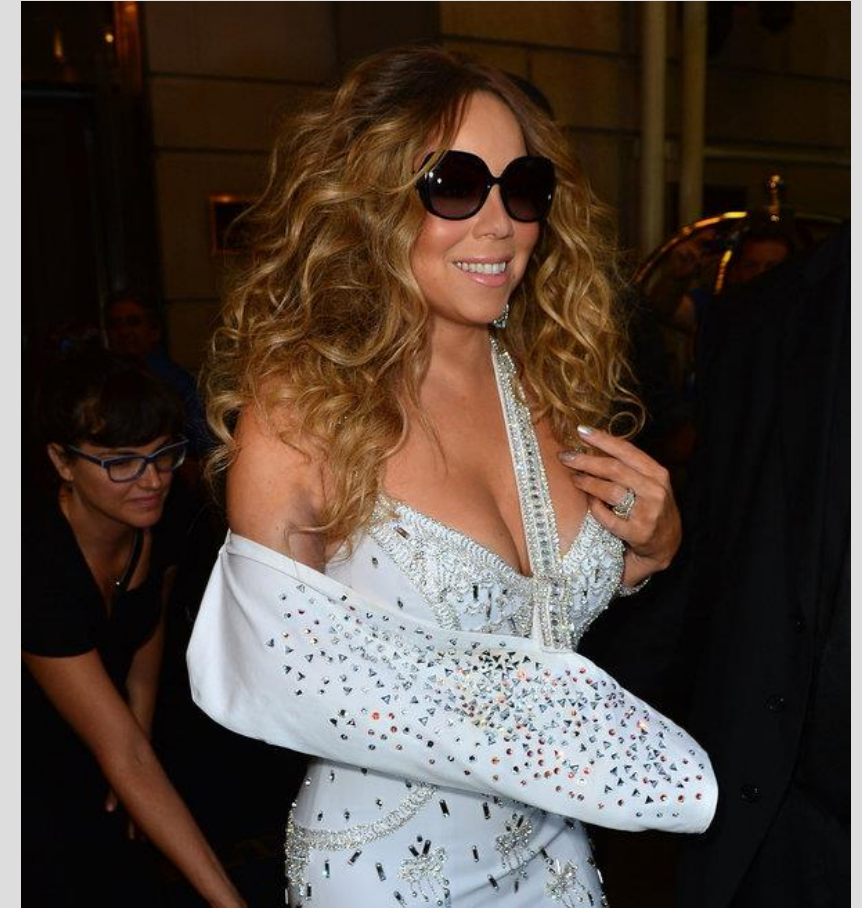
STANDARDS FOR PIV INSERTION

How many attempts are acceptable?

Do you document each attempt?



DIVA: a person who exudes great style and personality with confidence and expresses their own style and not letting others influence who they are or want to be...



- Difficult IV Access (DIVA)

COMPREHENSIVE-DIFFICULT IV ACCESS (C-DIVA) SCORE

Score	Visual Appearance	Palpable Appearance	History of Difficult Access	Extenuating Factors
0	Many visual veins	Many palpable veins	No difficulty	None
1	Few visible veins	Few palpable veins	Some reported difficulty	Pediatric, Severity, Urgent needs
2	No visible veins	No palpable veins	Severe difficulty as evidenced by previous central lines or PICC's	Comorbidities, Emergency conditions

Score	Risk	Action
0-3	Low	Obtain IV access
4-5	Medium	Obtain access with competent practitioner; consider VAS consult
6+	High	Consider emergency intervention (CVC, IO); consult VAS immediately

Derived from A-DIVA score by Van Loon, Puijn, Houterman, & Bouwman

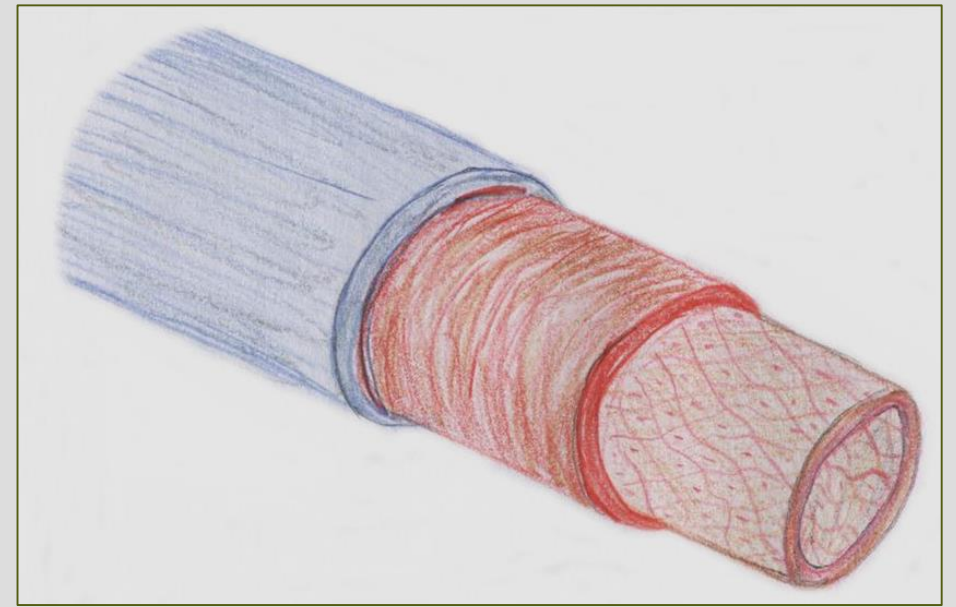
VEIN TRAUMA

Tunica Intima - endothelial cells, phlebitis & platelet aggregation, thrombus

Tunica Media - nerves, dilatation & constriction –smooth muscle

Tunica Adventitia - contains vein

Use smallest gauge to accommodate prescribed therapy



VEIN TRAUMA



WHO SHOULD GET A PIV?

Osmolarity is less than 900 mOsm/L

Duration of therapy (less than 6 days)

Available vascular access sites

Intermittent vesicant therapy

- Irritant - Inadvertent administration of a non-vesicant medication or fluid into the surrounding tissue
- INS Guidelines is to assess at least every 4 hours



- Vesicant - Inadvertent administration of vesicant medication or fluid into the surrounding tissue
- INS Guidelines is to assess minimally every hour

NONCYTOTOXIC VESICANT LIST

It is important to recognize that large infiltrations of non-vesicant medications or solutions may also be associated with severe tissue damage.



NONCYTOTOXIC VESICANT LIST

The first step in reducing the risk of extravasation is to identify and recognize medications and solutions that are associated with tissue damage when the solution escapes from the vascular pathway.

RED LIST Well-recognized vesicants with multiple citations and reports of tissue damage upon extravasation	YELLOW LIST Vesicants associated with fewer published reports of extravasation; published drug information and infusate characteristics indicate caution and potential for tissue damage
Calcium chloride	Acyclovir
Calcium gluconate	Amiodarone
Contrast media - nonionic	Arginine
Dextrose concentration $\geq 12.5\%$	Dextrose concentration $\geq 10\%$ to 12.5%
Dobutamine	Mannitol $\geq 20\%$
Dopamine	Nafcillin
Epinephrine	Pentamidine
Norepinephrine	Pentobarbital sodium
Parenteral nutrition solutions exceeding 900 mOsm/L	Phenobarbital sodium
Phenylephrine	Potassium ≥ 60 mEq/L
Phenytoin	Vancomycin hydrochloride
Promethazine	
Sodium bicarbonate	
Sodium chloride $\geq 3\%$	
Vasopressin	

WHO IS AT RISK FOR AN INFILTRATION OR EXTRAVASATION?

- Peripheral sites in the hand, wrist, foot, ankle, cubital fossa and upper arm veins
- Infusions of antibiotics or corticosteroids
- Current infection
- Altered mental status, agitation, sedation
- Impaired circulation issues - diabetes, lymphedema, lupus, peripheral neuropathy, PVD
- Difficult access - obesity, multiple venipunctures, PIV's placed after first insertion
- Medications that alter pain sensation
- PIV's indwelling for longer than 24 hours
- Use of deep veins with insufficient catheter length (lack of training)
- Length of injection or infusion time for vesicant medication
- When infusion pump continues to alarm



PREVENTABLE

INFILTRATION



EXTRAVASATION





PREVENTABLE



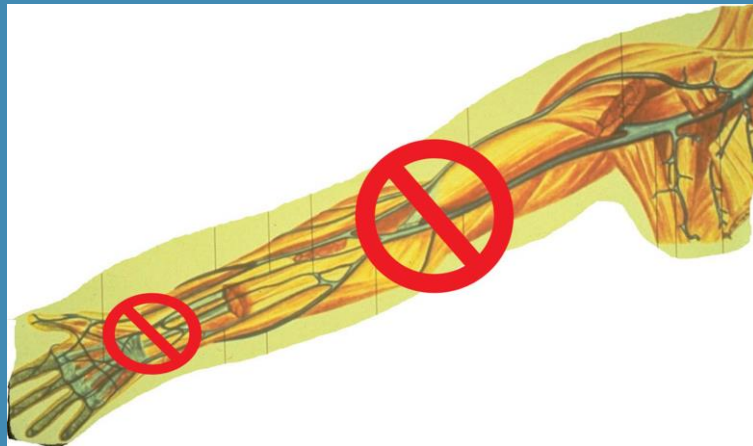
THE FOREARM IS THE BEST LOCATION FOR A PIV

Increase dwell time

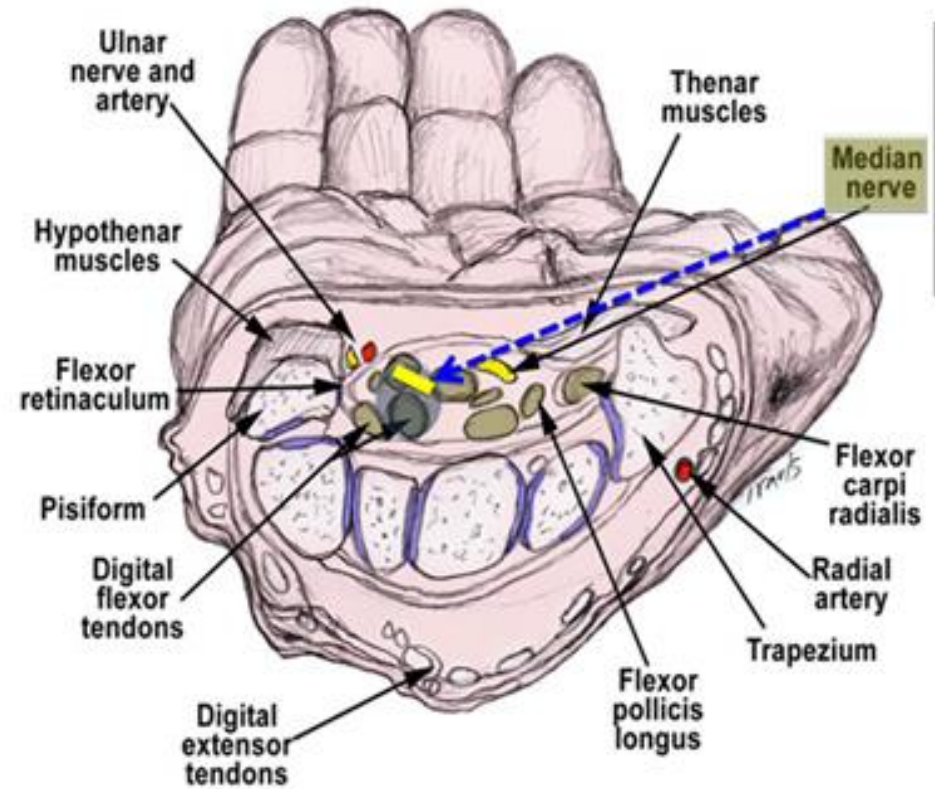
Decrease pain with insertion

Prevent accidental removal

Decrease risk of occlusions



Antecubital area has high failure rate



A



B

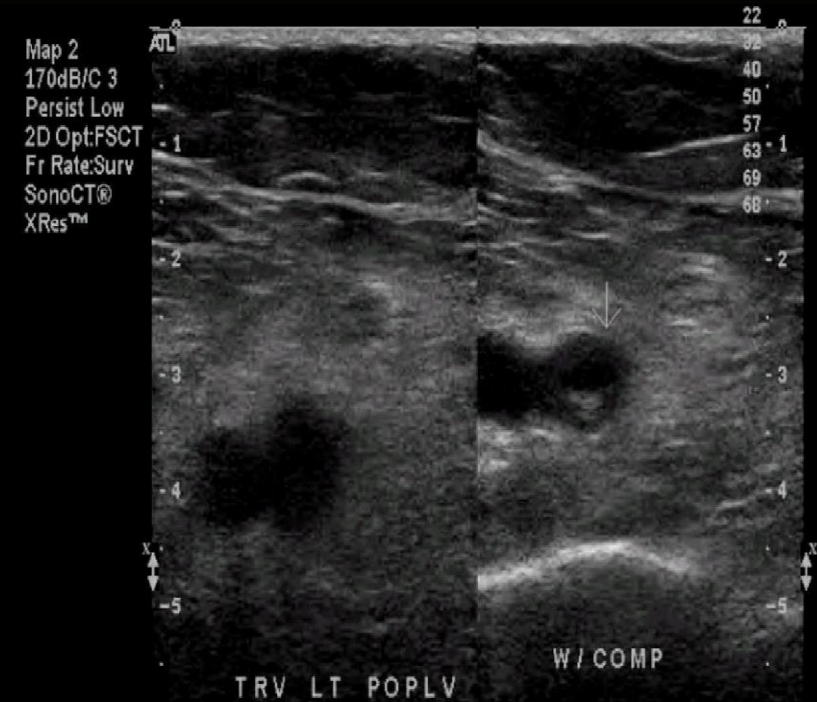
THE RISK OF FLEXION



NON COMPRESSIBLE THROMBUS FROM PIV



Abnormal Compression



ULTRASOUND PERIPHERAL INTRAVENOUS (USG-PIV)

Specially trained clinicians

Forearm vessels visible with ultrasound

Cephalic is superficial

Avoid basilic and brachial veins (midline recommended)

Need at least 50% of catheter within the vessel



CONTRAINDICATIONS FOR PIV PLACEMENT

Lymph node removal

Fistula or graft

End Stage Renal Disease (ESRD) - Use hand
veins in non-fistula arm

Hemiparesis

Previous infiltration / phlebitis / trauma

Emergent?



PIV MAINTENANCE STANDARDS

Clinically indicated verses routine rotation

Pain at site/flushing/medication infusion with or without palpation

Redness, swelling, infiltration, leaking of fluid from puncture site

Resistance with flushing

Remove if no longer needed

Dressing WNL?

- Change dressing including securement device if loose, soiled or compromised



DRESSING DISRUPTION AND TAPE USE

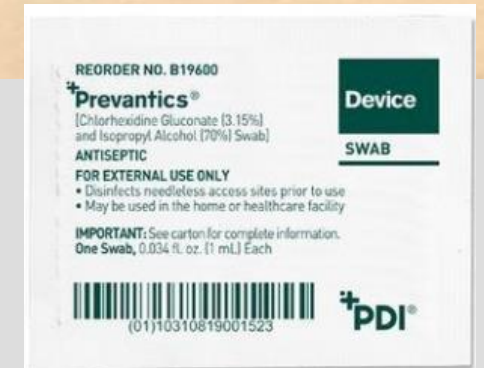


PIV MAINTENANCE STANDARDS

Flush before and after use to maintain patency

Use a separate syringe for each lumen/luer
access

Antiseptic cleaning wipes and disinfectant
caps are single use only



DECREASE INFECTION RISK

Hand hygiene before glove application

Hand hygiene after glove removal

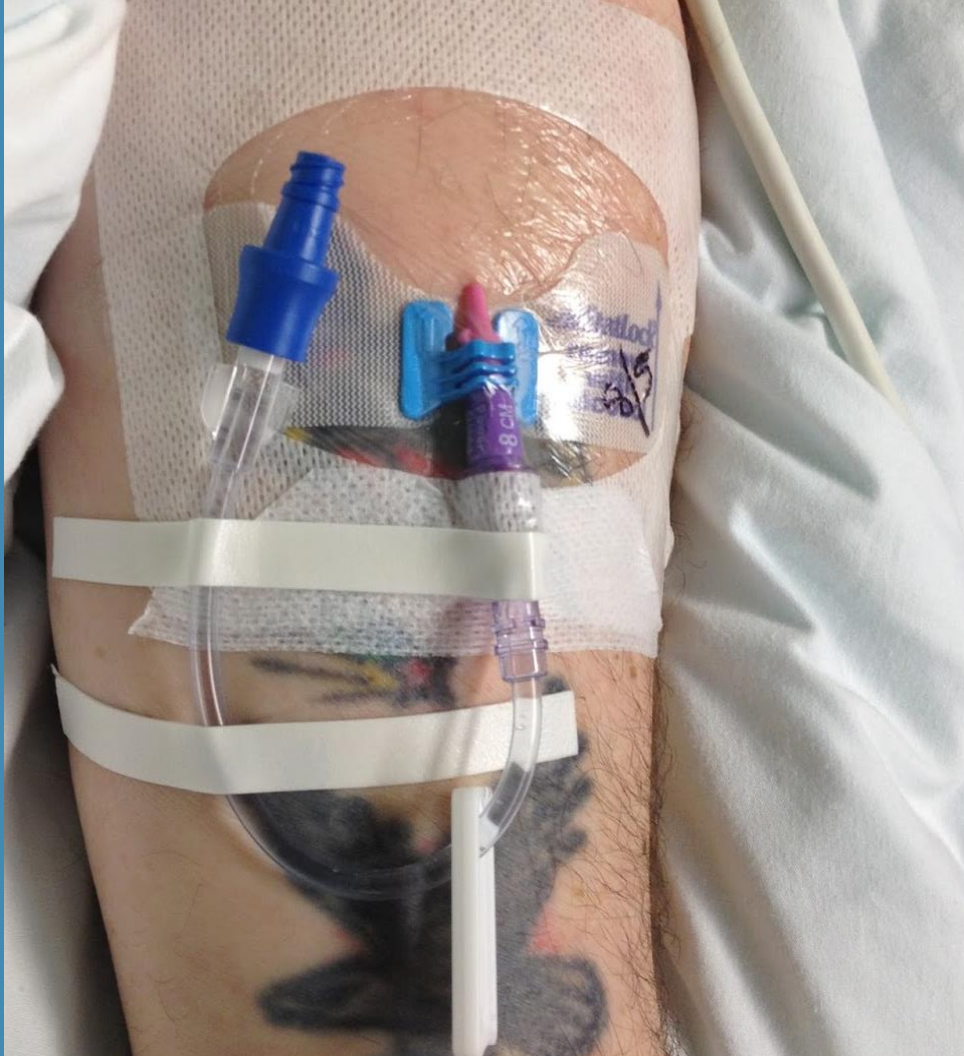
Wear clean gloves when working with vascular access devices

Recommend removal of PIV with central line

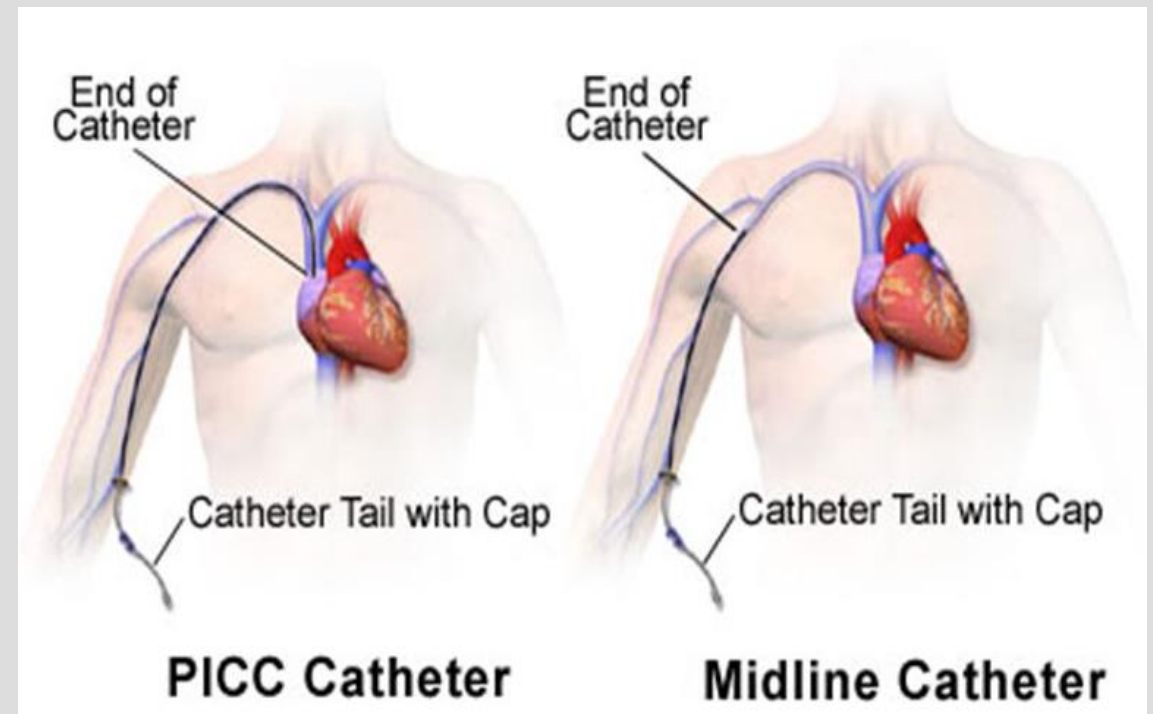
SLH Vascular Access Team places USG-PIVs under sterile conditions



MIDLINE



- NOT central: 8 or 10 cm in length (3-4 inches)
- Dwell time: 29 days
- Dressing changes: Weekly / PRN
- Phlebotomy: Intermittent
- Power injectable
- Sterile procedure (max barrier)
- Frequent assessments



INFUSION NURSE SOCIETY MIDLINE GUIDELINES

Consider infusate characteristics

Duration of treatment

Medication well tolerated by peripheral veins

Don't use for continuous vesicant therapy or TPN

Use caution with intermittent vesicants

Use caution because of undetected extravasations

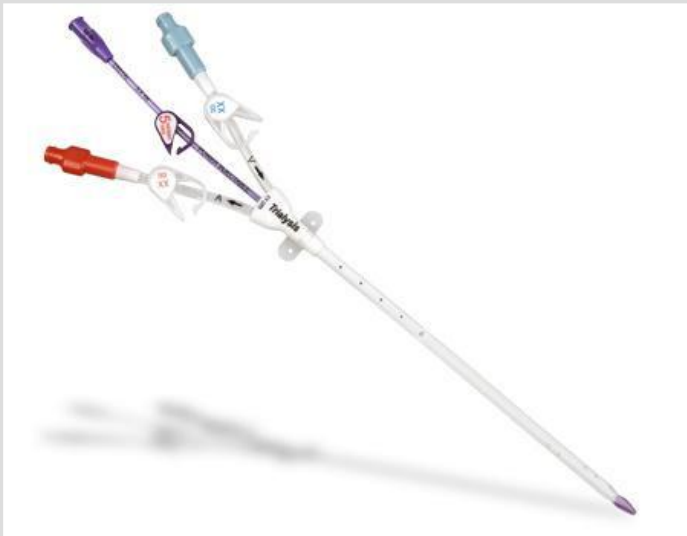
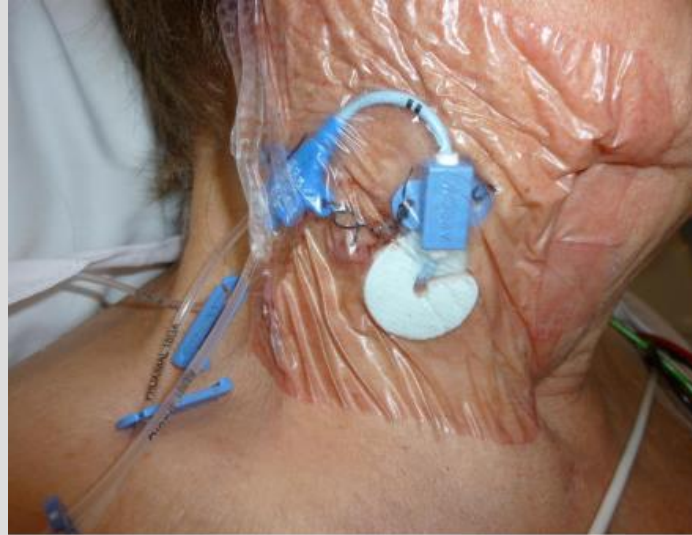
Avoid midline placements when patients have ESRD





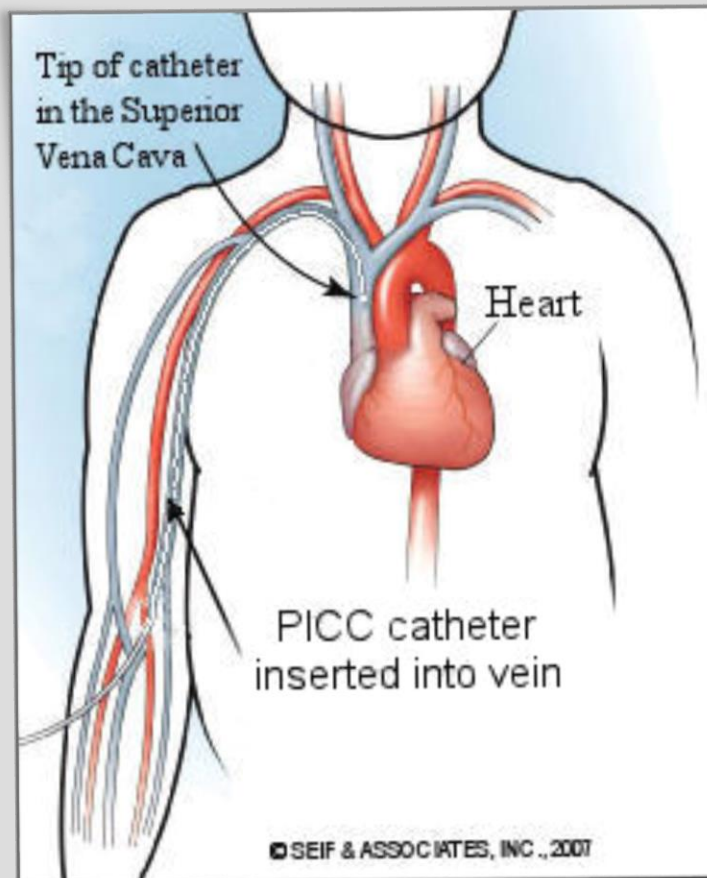


WHAT DO ALL THESE LINES HAVE IN COMMON?

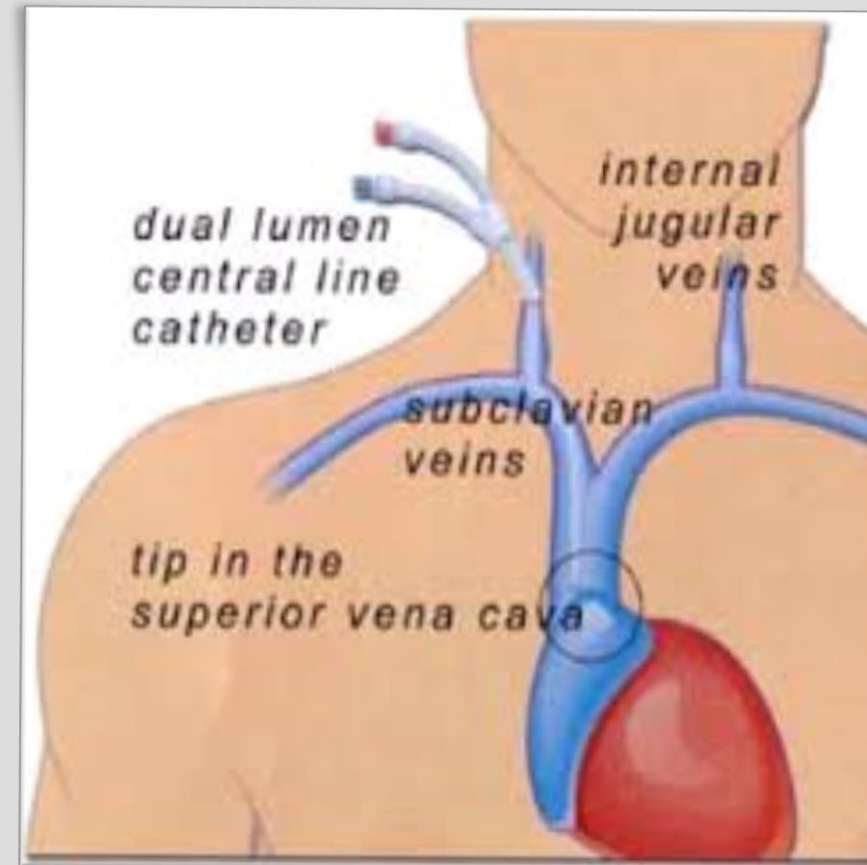


PERIPHERALLY INSERTED CENTRAL CATHETER (PICC) VERSES CENTRAL VENOUS CATHETER (CVC)

PICC



CVC



WHO SHOULD GET A CENTRAL LINE?

Clinically unstable patient with multiple infusates
(Noncytotoxic Vesicant List)

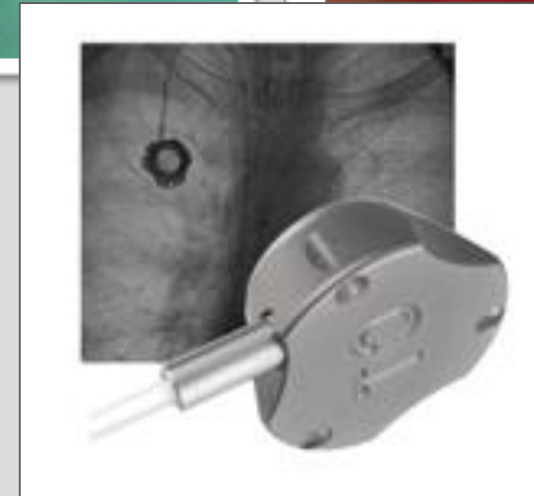
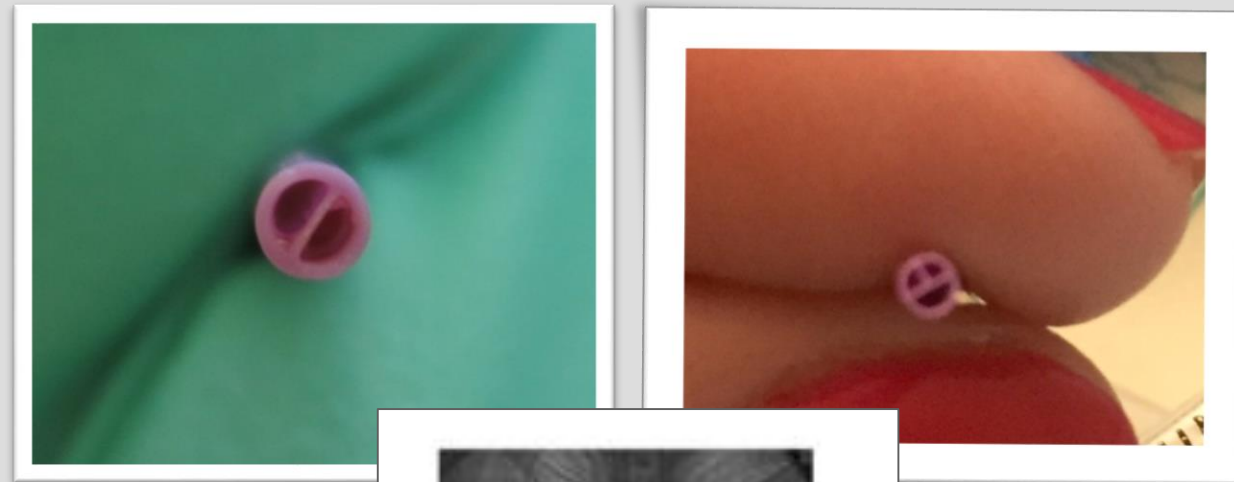
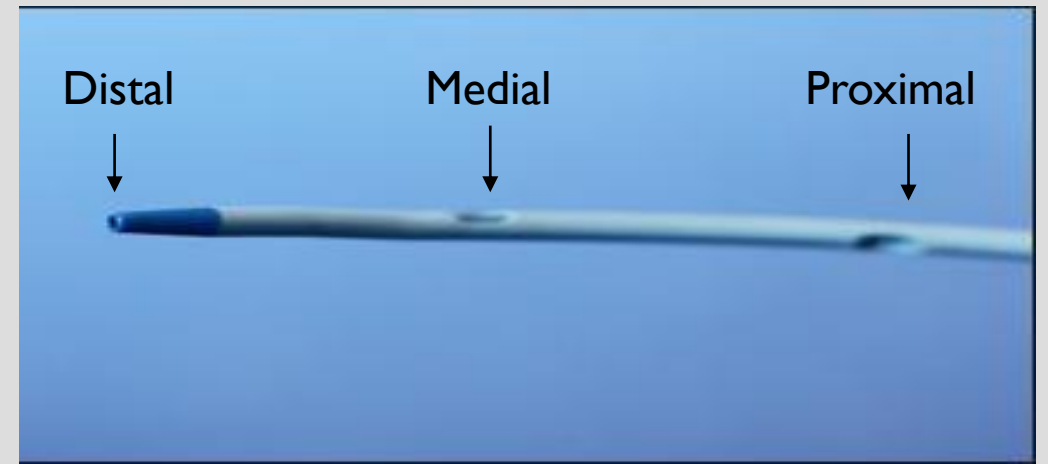
Invasive hemodynamic monitoring

Continuous infusion therapy (parental nutrition,
fluids & electrolytes, meds, blood products)

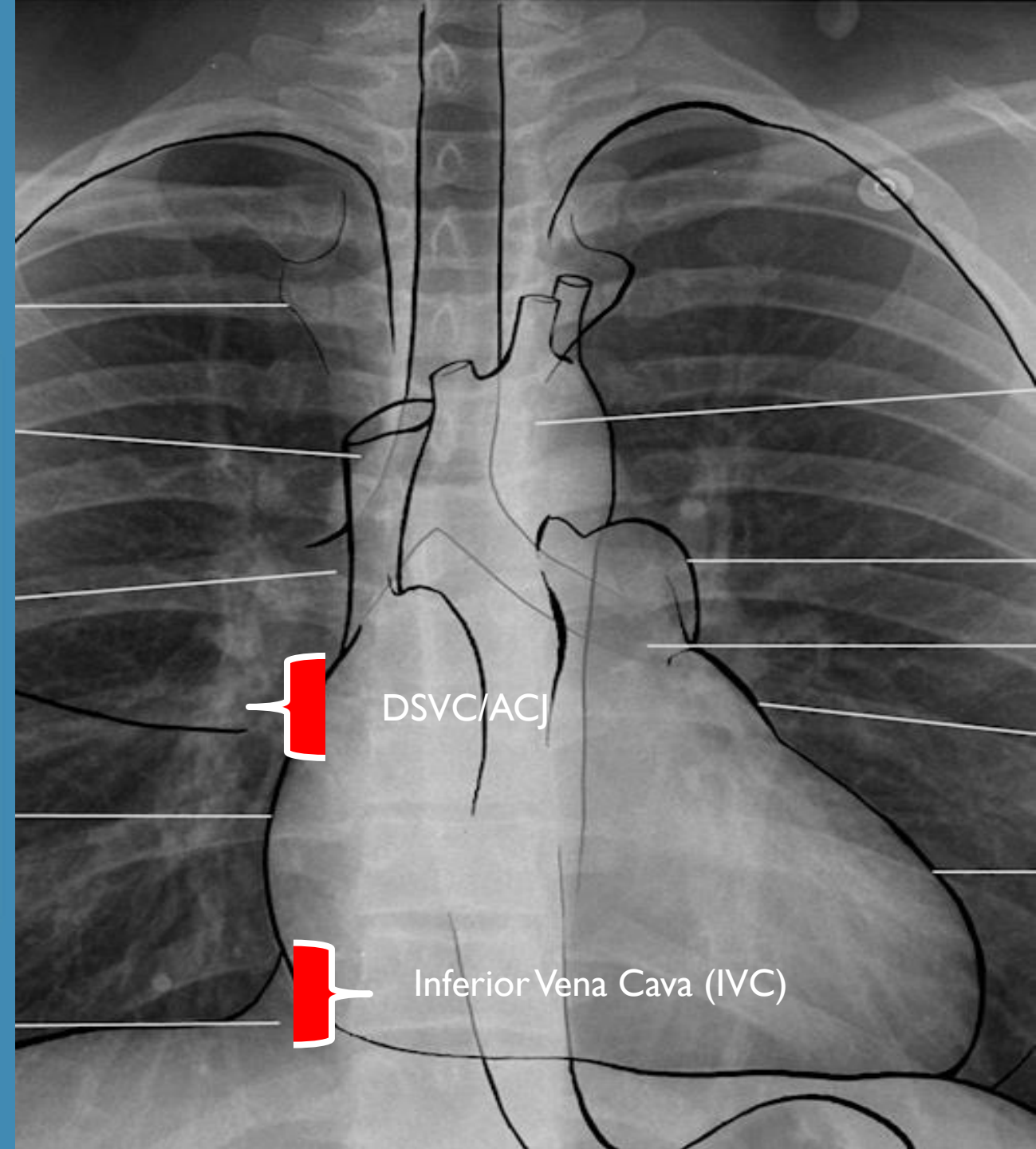
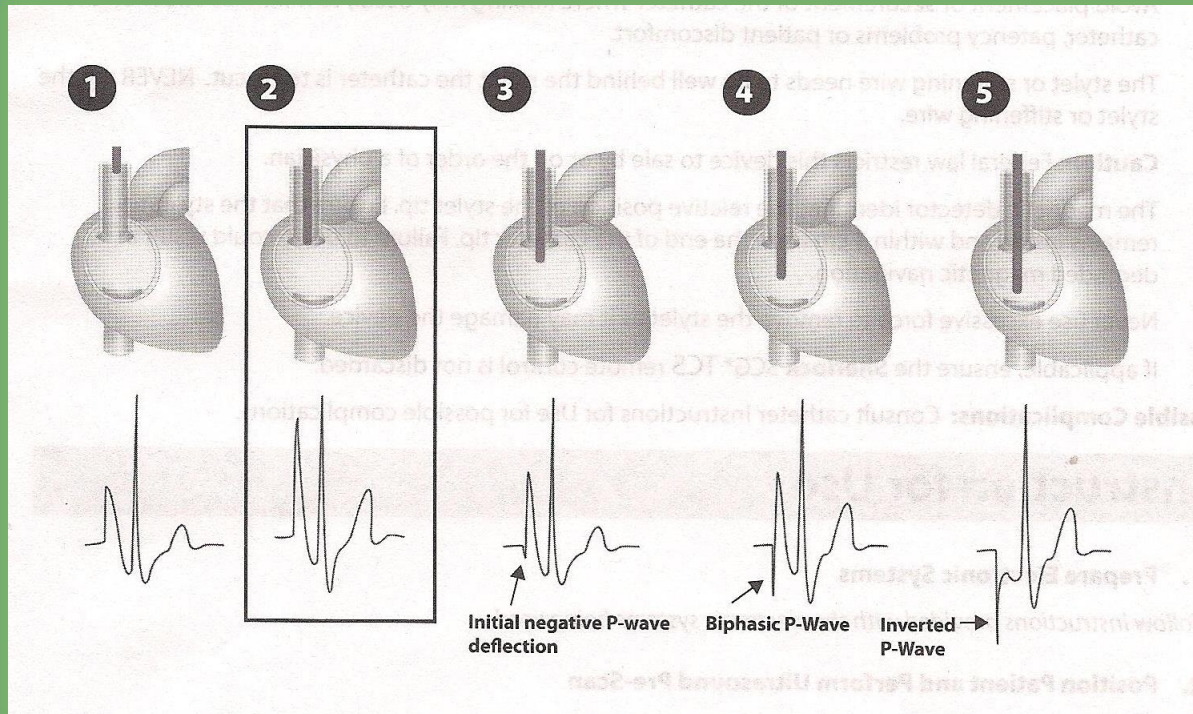
Long term intermittent infusion therapy
(Antibiotics)

Failed or difficult access including USG-PIV

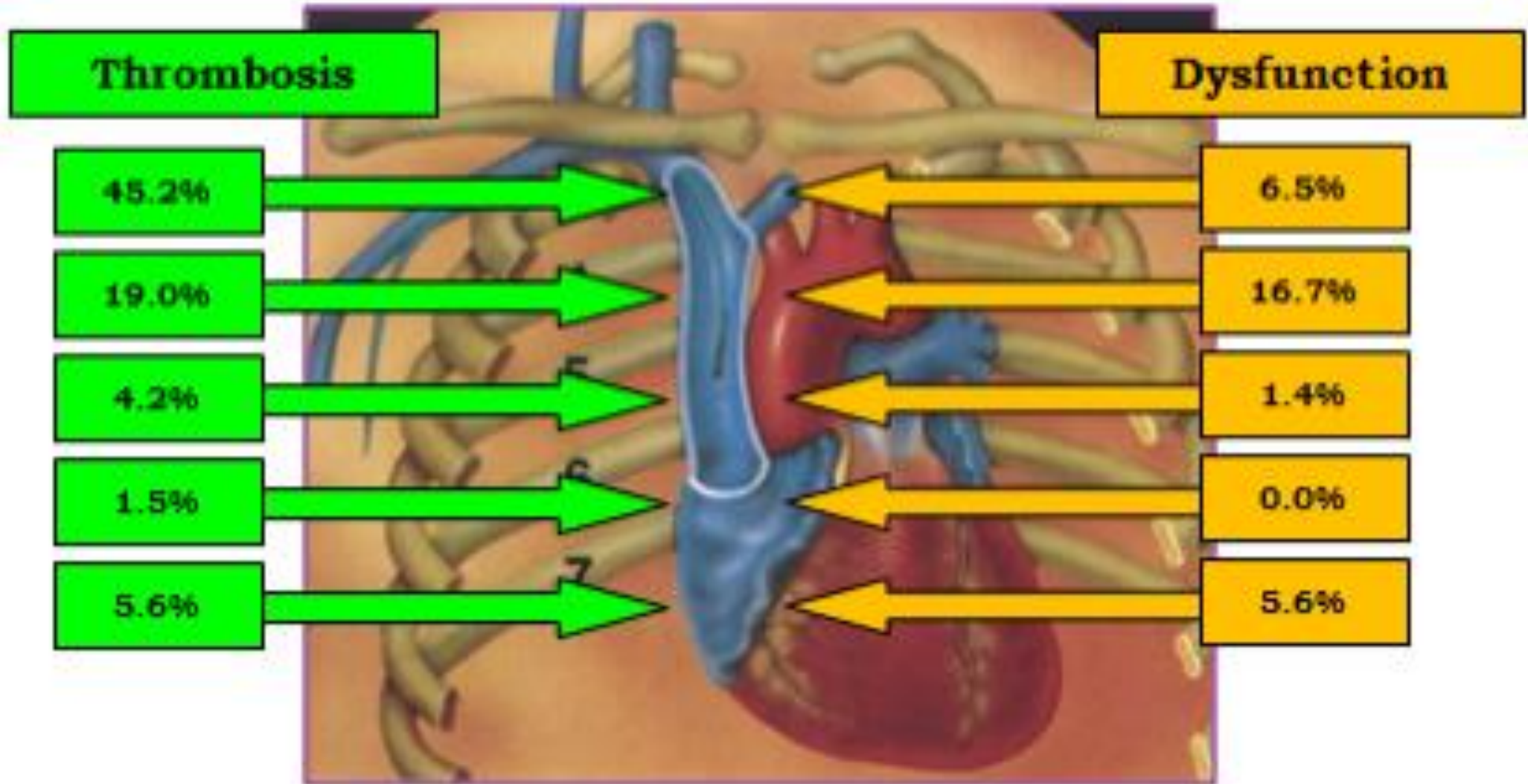
Episodic chemotherapy more than 3 months



DISTAL SUPERIOR VENA CAVA (DSVC) ATRIAL CAVAL JUNCTION (ACJ)



CVC TIP LOCATION AND THROMBOSIS RISK



YOUR ASSESSMENT DETERMINES CVC TIP LOCATION

Zero is Zero

Each mark on the catheter is a centimeter

External length (cm) is the insertion site of the catheter

Antimicrobial patch covers about 1 cm

Compare external length to original documented length

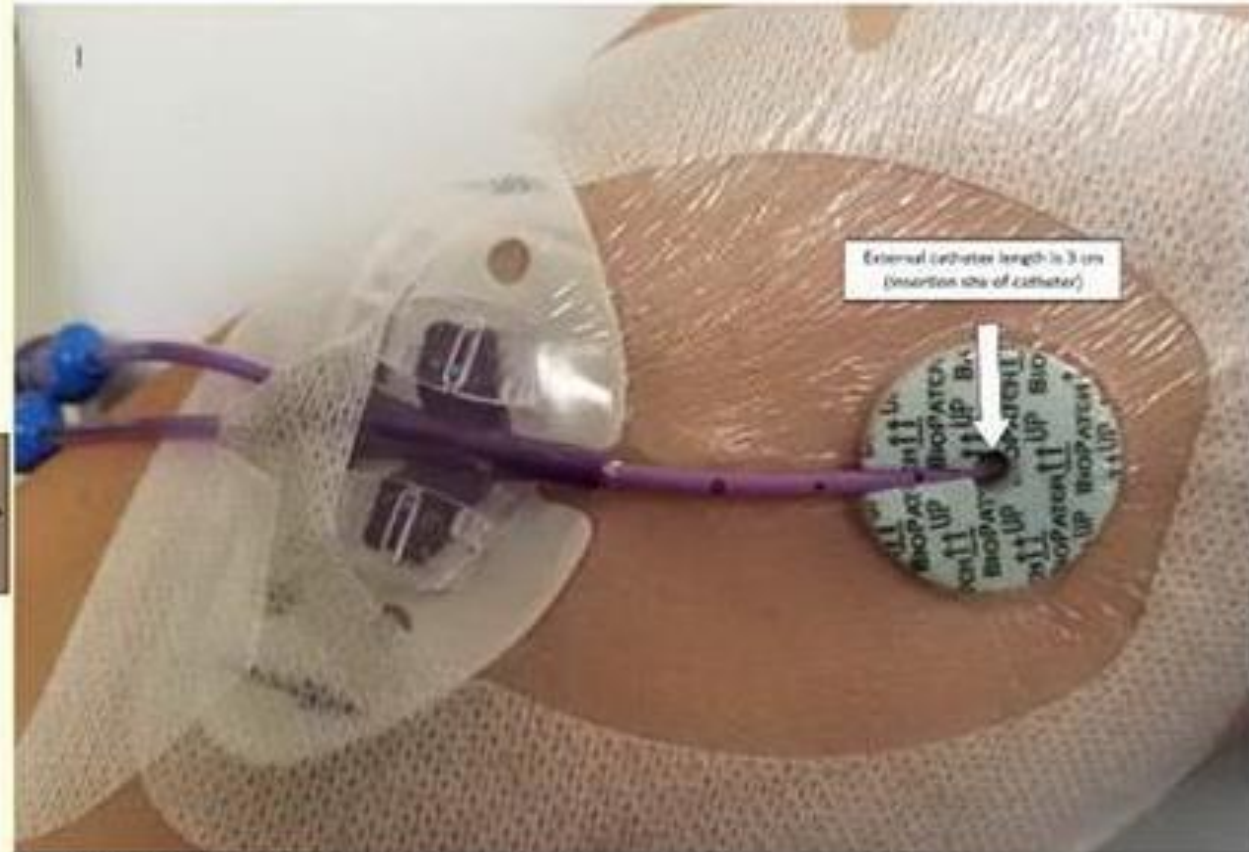
Do not “push catheter back” into position (policy link)

10/18/16 1130

External Catheter Length (cm)

Comment (F6)

View Information



- Zero is zero
- Each mark on catheter is a centimeter
- External catheter length (cm) is the insertion site of the catheter
- Antimicrobial patch covers about 1 cm

In this example, the external catheter length is 3 cm. On daily assessment, compare external length at insertion site to external length documented in EPIC from original catheter placement. Notify Vascular Access Team or medical provider if external length exceeds 3 cm from original placement. Do not “push catheter back” into position.

Click >[HERE](#)< to see the policy on Intravenous Access Device Care and Maintenance Guideline

SHIFT ASSESSMENT/BEDSIDE REPORT

PICC Triple Lumen 12/05/17 Right Brachial

Line Properties	Placement Date/Time: 12/05/17 1803 Lot Number: rebu2235 Size (Fr): 5 F		
Line Necessity	Receiving high risk d...	Receiving high risk d...	Receiving high risk d...
Site Assessment	WDL;Dressing in Place	WDL;Dressing in Place	WDL;Dressing in Place
External Catheter Length (cm)	4	4	4
Lumen 1 Color	Red	Red	Red
Lumen 1 Status	Infusing	Infusing	Infusing
Lumen 1 Patency		Flushes without resis...	Flushes without resis...
Lumen 2 Color	White	White	White
Lumen 2 Status	Normal saline locke...	Normal saline locke...	Normal saline locke...
Lumen 2 Patency	Brisk blood return (3...	Brisk blood return (3...	Brisk blood return (3...
Lumen 3 Color	Gray	Gray	Gray
Lumen 3 Status	Normal saline locke...	Normal saline locke...	Normal saline locke...
Lumen 3 Patency	Brisk blood return (3...	Brisk blood return (3...	Brisk blood return (3...
Dressing Type	Antimicrobial;Sterile;...	Antimicrobial;Sterile;...	Antimicrobial;Sterile;...
Dressing Status	Checked;Intact	Checked;Intact	Checked;Intact
Dressing Intervention			
Next Dressing Change Due	12/19/2017	12/19/2017	12/19/2017
Needleless Connector Change Date Due	12/16/2017	12/16/2017	12/16/2017
Needleless Connector Changed	No	No	No
Declotting		N/A	N/A

PICC CONTRAINDICATIONS

Lymph node removal

Hemiparesis

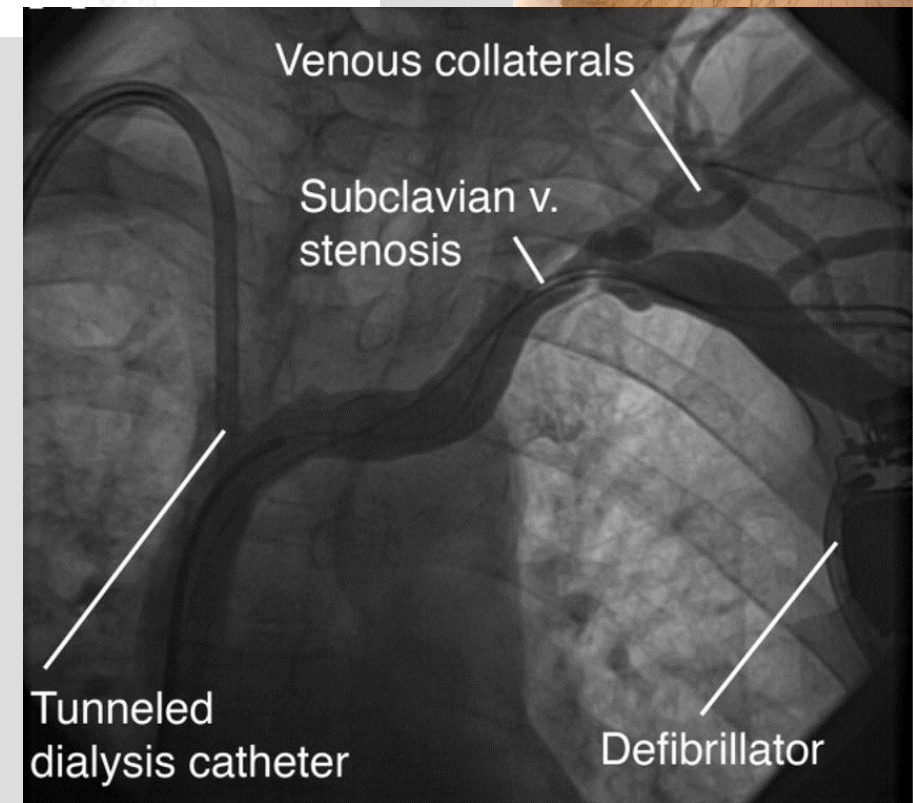
Previous infiltration/phlebitis

Infection (pending blood cultures) CVC?

Venous thrombus or failed bedside PICC attempts

Pacemaker or defibrillator

Fistula or graft (ESRD)



KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE (KDOQI)

The gold standard for vascular access in hemodialysis patients is the arteriovenous fistula (AVF)

Arteriovenous grafts (AVG) made of synthetic or biological material are acceptable

Short and long-term tunneled dialysis catheters (TDC) should be avoided, if possible

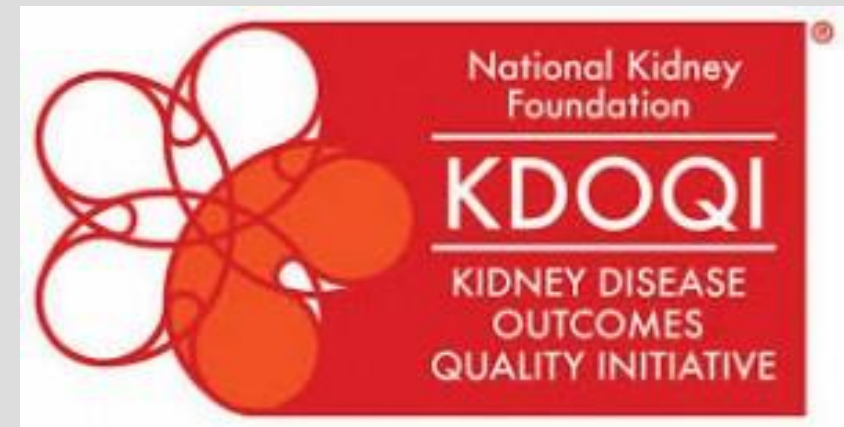
Acute vs Chronic renal disease

GFR < 60

Creatinine > 2.0

Age and acuity of patient

If the patient has HD access, can they give medication after dialysis?



Avoid subclavian vein because risk of central stenosis

Avoid PICC or midline

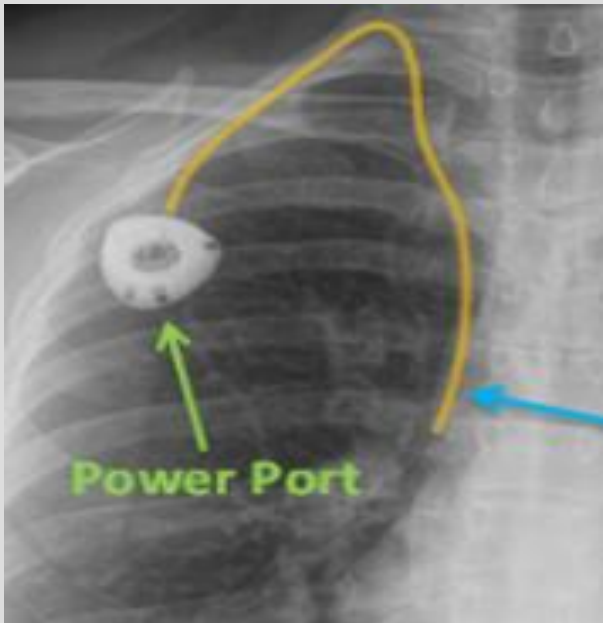
Consider alternative access: PIV in hand or IJ

Renal clearance if PICC still requested

IMPLANTABLE VASCULAR ACCESS DEVICE (IVAD)

IN USE

- Access with non-coring needle
- Must have power injectable port with power injectable needle infusion set for power injection
- No resistance with flushing and brisk blood return



NOT IN USE

- Access monthly
- Brisk blood return
- Flushes easily
- Pack with 5ml of the 10unit/ml Heparin upon de-access



TUNNELED LINE

Dacron cuff

Weekly/PRN dressing changes until site engrafted
(6-8 weeks)

Remove suture 6-8 weeks

Cuff exposed? Replace line

NOT an emergency



CHANGE IMMEDIATELY IF DRESSING BECOMES...

Damp

Loosened

Visibly soiled

Moisture under dressing

Drainage

Blood present

Chlorhexidine 30-seconds scrub and dry



DRESSING MAINTENANCE



CVC MAINTENANCE STANDARDS

CVC location - IJ verses subclavian

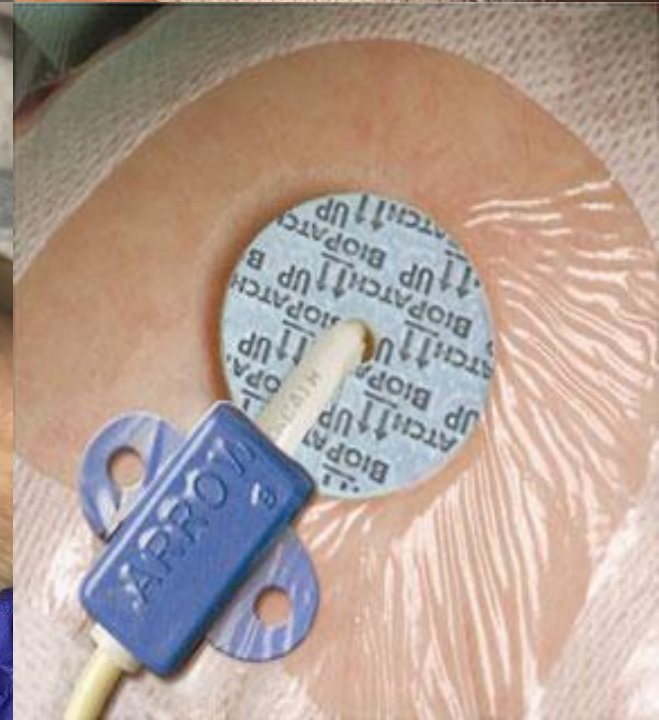
Avoid sutures, recommend stabilization device
(stat-lock)

Do not insert catheter to hub

Remove CVC when no longer needed

Avoid PIVs after CVC placement if possible

New tubing recommended after CVC placement



CVC MAINTENANCE STANDARDS

Flush and aspirate for blood return prior to infusions

Flush after infusions to clear blood and medication to prevent occlusions

Flush using a single 10 cc syringe

Use a pulsatile flushing method

All lumens must be patent. If not, treat early
(3mls in 3 seconds, with the color and consistency of whole blood)

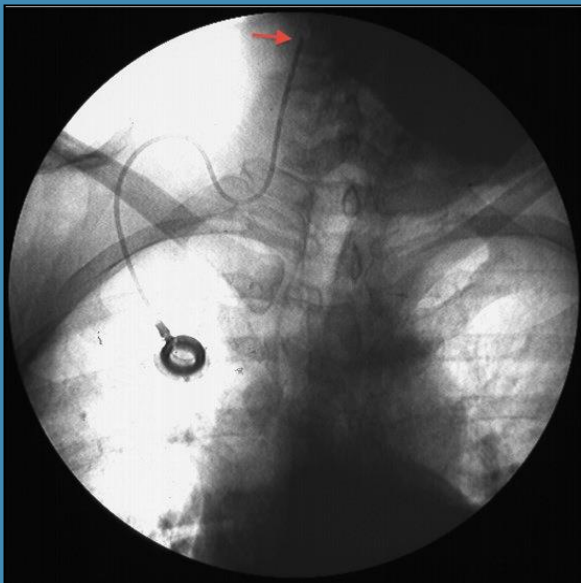
Troubleshoot



CENTRAL VENOUS CATHETER OCCLUSION

Is the occlusion non-thrombotic?
(NOT blood related)

Is the occlusion thrombotic?
(Blood related)



Always check for a non-thrombotic occlusion

- Check clamps and inspect catheter for kinks
- PICC: compare external centimeter length to external length when catheter was originally placed
- CVC: catheter retraction or tight suture
- IVAD: needle dislodgement
- Check PCXR for catheter tip location (if available)
- Incompatible medications infusing together
- Lipid residue
- Needleless connector debris
- Do sterile dressing change to check for catheter kink

THROMBOTIC OCCLUSIONS (BLOOD RELATED)

Suspect thrombotic occlusion with visible blood in catheter or add on device, inability to aspirate blood, or sluggish flow

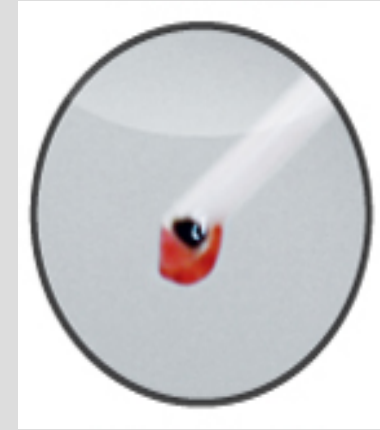
Use thrombolytic agent: Cathflo (Alteplase)

Adult concentration: 2mg in 2ml with Sterile Water

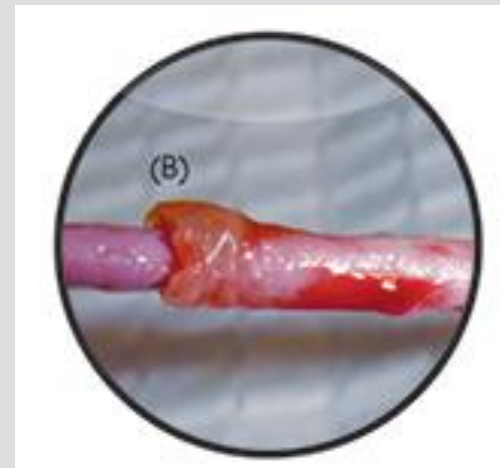
Do not shake – swirl until dissolved

If catheter function is not restored in 2 hours a second dose may be instilled

- Partial occlusion - the ability to infuse but not withdraw fluids or the presence of sluggish flow



- Complete occlusion - Inability to infuse or aspirate



INFECTION PREVENTION

A: Airborne Exposure

B: IV Solution

C: Needleless Connector

D: Catheter Hub

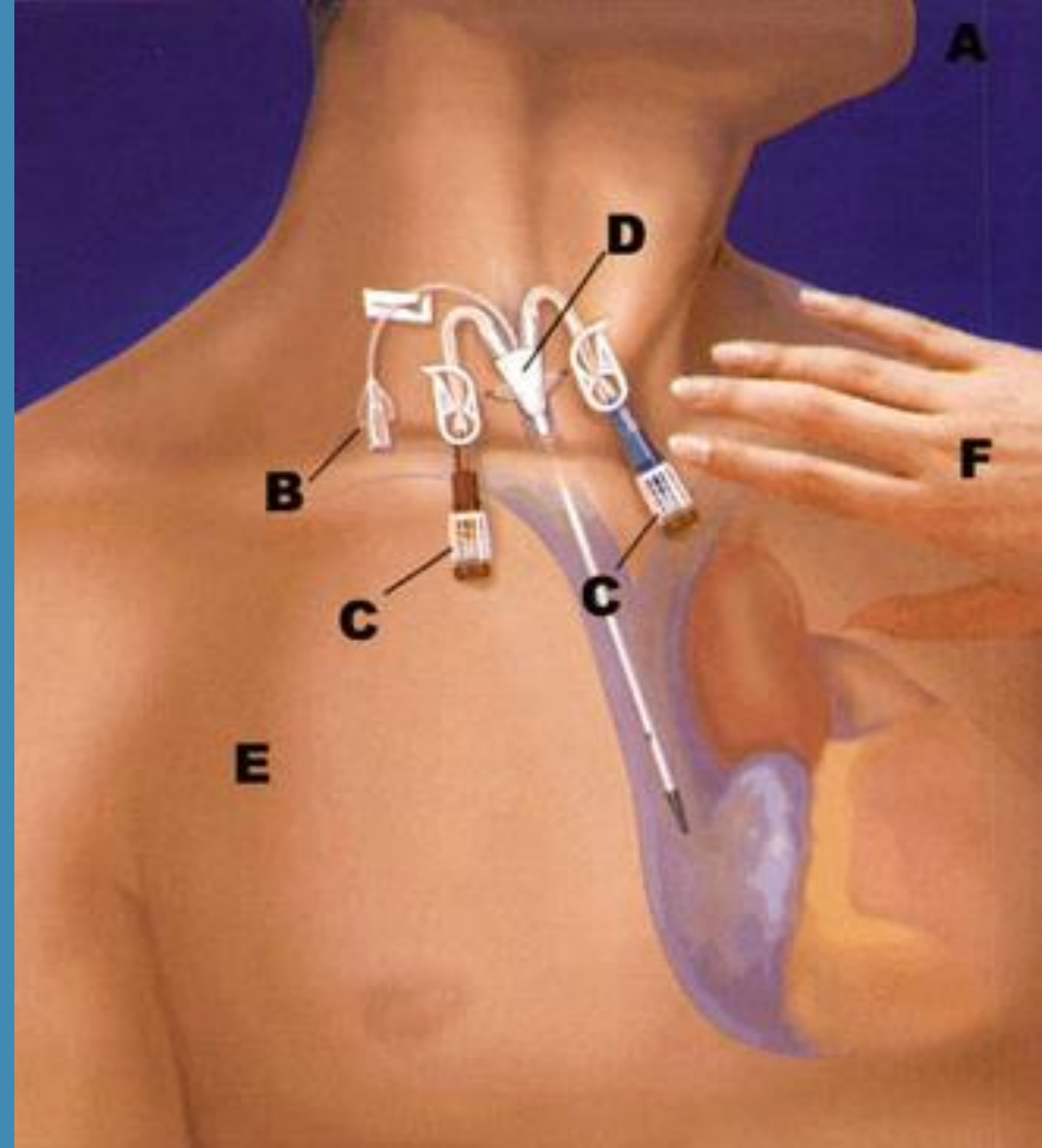
E: Skin of Patient

F: Skin of Caregiver

Count your access points including any PIVs

Dressing integrity (skin barrier)

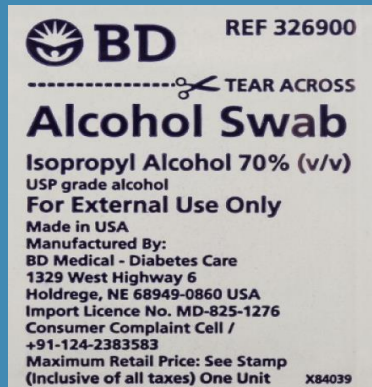
We must rethink “just in case” vascular access



DISINFECT EVERY NEEDLELESS CONNECTOR/LUER LOCK

Alcohol swab

15-second scrub and allow to air dry



Chlorohexidine and Alcohol (Prevantics swab)

5-second scrub and allow to dry for 5 seconds



ONE-IN-FOUR WILL DIE AFTER CLABSI DIAGNOSIS

Hand hygiene before clean gloves

Hand hygiene before sterile gloves

Everyone in room must have hat and mask

Insertor must have sterile gown, hat, and mask

Large sterile drape is used

Chlorohexidine scrub for 30 seconds and allow to dry

I SAVE That Line!

Follow these important principles when inserting, using, and maintaining any vascular access device.

I

MPLEMENT INSERTION, CARE, AND MAINTENANCE BUNDLES

to minimize the risk of intraluminal and extraluminal contamination

S

CRUPULOUS HAND HYGIENE

is necessary before and after contact with any vascular access device

A

LWAYS DISINFECT EVERY NEEDLELESS CONNECTOR

prior to each access for solution and medication administration, flushing, or tubing changes

V

Ein PRESERVATION

is achieved by assessing for best device and site selection to reduce the risk for complications, such as thrombus formation and infection

E

NSURE PATENCY

by flushing all lumens following institution policy. If lack of blood return or sluggish flow is encountered, take measures to restore patency



"KEEP PATIENTS FREE OF INFECTION!"

For more information, contact the Association for Vascular Access (AVA) at www.avainfo.org or call 1-801-792-9079 or 1-877-924-AVA1 (2821)

WE CAN DO BETTER!

Rethink your own practice

Be accountable

Be a patient advocate

50 people die every day in American hospitals because of complications resulting from their vascular access devices.



REFERENCES

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