INTERNAL JUGULAR CENTRAL VENOUS LINE PLACEMENT

BEFORE YOU BEGIN

Check Labs: Transfusion Recommendations for Central Venous Catheter Placement:

Give blood products if INR > 2.5 or Platelets < 40

Summary of where guidelines come from:

- There is very limited evidence to support the use of transfusions to decrease risk of bleeding complications
- 2012 study (in community hospital) showed no bleeding issues in 66 & 6 patients with INR's of 1.5-2.9 & > 3.0, respectively. These patients did NOT get any transfusions.
- 1992 study shows no complications in liver transplant patients NOT getting FFP or platelets for central line placement
- In one study platelets < 50 were only predictor of bleeding but this risk was very low (3/88) with no morbidity to the patients
- No variation in catheter types/sizes suggest greater risk or need for transfusions (actually some studies show that there is no correlation or risk)

Other considerations:

- Consider effects of qualitative platelet defects (renal disease or Von Willebrand's Disease)
- INR is more commonly used for assessing coagulation cascade however aPTT can also be checked and if elevated without explanation consider looking for inhibitor
- While these limited studies have not clearly shown a clear benefit to transfusions prior to central line placement, studies have shown increased risk of pulmonary complications in those who get prophylactic transfusions

Gather supplies:

- 1. Central Line Kit (for trialysis lines lengths needed include 13cm, 16cm, 20/24cm can be used for right internal jugular, left internal jugular and femoral, respectively)
- 2. Sonosite sterile probe cover (if using Site-Rite make sure to get the proper cover)
- 3. Ultrasound machine
- 4. Sterile gloves
- 5. Chlorhexidine wipes (at least 3)
- 6. Consent form
- 7. Lidocaine (if not in kit)
- 8. Extra cap, gown and mask (kit has one) if needed
- 9. Caps, flushes and dressing (can get from nurses)

Ultrasound: IJ vein on the right to find optimal location, if no good location is found ultrasound the left IJ vein. If neither side has a good site for placement call for help from the ICU.

Technique Step-by-step:

- 1. Obtain consent (discuss risks such as pneumothorax, bleeding and infection versus indication for procedure).
- 2. Place the patient approx 15-20 degree in Trendelenburg (to enlarge vein and decrease risk of air embolus to brain)

- 3. Before proceeding, be sure to take a non-sterile look at the vein you plan to canalize. Make sure you position the ultrasound machine such that you can comfortably view during the procedure.
 - a. For jugular vein placement: the ideal place to look is just lateral to the sternal head of the sternocleidomastoid and above the clavicle.
 - b. The vein should have no pulsatile flow and should be compressible. If patient is awake, ask him or her to cough of perform valsalva to visualize the vein enlarge.
 - c. Mark the location by using a cap of a pen to make a small indentation with gentle pressure.
 - d. Tip: Do not place too close to the clavicle as being too low can increase the risk of pneumothorax.
 - e. Use one chlorhexidine wipe at this time.
- 4. Before you are sterile, open the kit, ultrasound probe cover and chlorhexidine. Drop them into the sterile area over kit.
- 5. Wash hands, put on cap/mask/gown. Use the mask with an eye protector.
- 6. Place the drape over the patient (follow the arrows). If the patient is claustrophobic, you can provide them with oxygen or try to "tent" up the drape over their face. Position the opening over the area you plan to place the line.
- 7. Put gel in ultrasound sheath. Place the ultrasound probe in the sterile sheath. Click in the needle-guide. (Tip: Use the forceps bring two sides of the drape together over the ultrasound probe chord to keep it from falling off the table.)
- 8. Check your kit. Make sure to take the caps off the catheter to allow the wire to come through).
- 9. Use the chlorhexidine to clean at least 2-3 times in a circular motion starting from the middle.
- 10. Visualize the jugular vein. (Tip: You can turn the ultrasound probe 90 degrees to view the vein in long access. This will also help you appreciate direction of the vein which should be towards ipsilateral nipple.)
- 11. Use the 25 gauge needle to inject lidocaine. (This only needs to be placed under the superficial skin but should be placed over a relatively wide area to you don't miss this location when using the finder-needle.)
- 12. Place the finder needle in the needle-guide and visualize the vein in the center of your screen. Again, confirm you are seeing the vein. The artery should also be on your screen and just lateral.
 - a. For jugular vein placement, the direction of your finder-needle should be towards the ipsilateral nipple.
- 13. With short "jabs" push the finder-needle past the thick superficial skin. Once you get past the superficial skin, after each "jab", pull back on the syringe until blood enters.
 - a. ALWAYS keep your eyes on the ultrasound screen. Watch for the needle tip or the movement of the surround subcutaneous tissue.
 - b. Tip: It is not uncommon to go past the vein. If you feel you have gone deep enough and still don't have blood returning, then become to come back slowly with the finder-needle while you aspirate with the syringe.
- 14. Once you have blood return, remove the ultrasound probe. Use one hand that is securely resting on the patient to hold the needle while the other hand removed the syringe.
- 15. Glide the wire through the finder-needle. If you note resistance, remove the wire, reattach the syringe and see if blood still comes back.
 - a. If blood comes back, then repeat attempt to place wire.

- b. If no blood comes back, DO NOT advance the wire. You can either slowly pull back while looking for blood return or reattach the ultrasound probe and attempt again attempt to either advance or pull back.
- 16. Once you are gliding in the wire without resistance, be sure not to place the wire too far. This may cause ventricular irritation and precipitate ventricular tachycardia. (If this does happen, remain calm and pull the wire back immediately.)
- 17. Once wire is placed in, remove the finder-needle.
 - a. NEVER TAKE YOUR HAND OFF THE WIRE WHILE IN THE PATIENT!
- 18. IMPORTANT: You must now check that the wire is located in the vein and not the artery.
 - a. Replace the ultrasound probe and look for a wire in the vein. Once this is seen, again confirm the lumen with the wire is in fact the vein by compression. You also again look longitudinally to see the wire traverse the vein. Again compress.
 - b. Optional: You can slide the CVP catheter (located in kit) over the wire. Next remove the wire and attach a tube with fluid to measure the CVP. You could also send blood for a blood gas to confirm placement.
- 19. Once you have confirmed that you are in the vein. You will use the scalpel to cut the superficial skin. The scalpel cut should be approx 0.5cm and the sharp edge should point away from the artery.
- 20. Dilate the superficial tissue. (Depending on the type of line you are placing, you may need to dilate multiple times.) Tip: Be ready with gauze you may have a lot of blood coming out once you remove the dilator.
- 21. Insert the catheter over the wire. Always hold onto the wire and do not place the catheter under the skin until you have the other end coming out of the catheter port. Once the wire is coming out of the port, grab hold of it and advance the catheter.
- 22. For most patients, you can advance the catheter all the way. You may want to leave the catheter out 1-2 cm for small patients. (You can alway pull the catheter back later but you can NEVER advance again once the sterile barrier is broken.)
- 23. With the help of your assistant or a nurse, flush each of the ports as soon as possible and place caps.
- 24. Suture the catheter in place. There are three areas you can suture on the port. It is recommended that you suture in at least two of them.
- 25. Find all needles and dispose of them. Remove the drape. The nurse can help with the dressing.

After the procedure:

Order an X-ray: to evaluate line placement and pneumothorax

a. Ideal location for the tip of the catheter should be at or slightly above the carina to reduce risk of atrial arrhythmias or small risk of myocardial wall erosion. (Schuster M, Nave H, Piepenbrock S, Pabst R, Panning B. The carina as a landmark in central venous catheter placement. Br J Anaesth. 2000 Aug;85(2):192-4.).

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