Types of Central Venous Access Devices

1. Peripherally Inserted Central Catheter (PICC)
   - Inserted in the antecubital fossa and advanced to the subclavian vein or superior vena cava.
   - Used for intermediate duration of therapy (7 days to 6 months), but may be used as long as there are no complications.
   - Advantages: less risk of pneumothorax, hemothorax, air embolism, cost effective, less risk of infiltration and phlebitis.
   - Complications: migration (measure external length q shift), infection, clotting off, leaking, breaking (keep hemostats available).
   - Size 24 – 16 gauge, 16 – 26 inches. May be double lumen.
   - Uses: infuse fluids, parenteral nutrition (TPN), blood (if large gauge), medications, e.g. long-term antibiotics.
   - In Ohio, RNs must be PICC certified in order to insert this type of IV.

2. Central Venous Catheters (CVC)
   A. Tunneled
      - Surgically inserted through a tunnel made through the subcutaneous tissue between the clavicle and nipple. Catheter tip is inserted into the jugular or other large vein and advanced to the right atrium. Held in place by a Dacron cuff.
      - Advantage: tunnel creates space between the end of the catheter and the actual vein which decreases the risk of infection. Good for long-term therapy. Convenient and easily hidden from view. A transparent dressing may be used over the insertion site until completely healed.

   B. Percutaneous (a.k.a. “subclavian central line”, “triple lumen”, “Hickman”)
      - Inserted directly into the jugular or subclavian vein.
      - Frequently used for TPN.
      - Pneumothorax and hemothorax can occur during insertion.
      - Watch for s/s of infection at site.
      - Hickman, Broviac, and Groshong are types of catheters named for inventors.
      - May have multiple lumens.

   C. Implanted Infusion Ports
      - Surgically implanted infusion port placed below the clavicle (infraclavicular fossa), catheter threaded into right atrium through large vein.
      - Accessed via non-coring “Huber” needle through the skin. May need to use topical anesthetic prior to accessing port.
      - Port is heparinized every 4 weeks when not in use.
      - Used for medications, chemotherapy, TPN, blood.
      - Easy to maintain for home-based therapy.

Complications with PICCs and CVCs
   - Monitor diligently for sepsis d/t: long term placement of catheters; clients often critically ill and may be malnourished or immunosuppressed; TPN and lipids provide excellent medium for growth of microorganisms.
   - Monitor veins having PICCs for phlebitis.
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- **Air embolism** can be lethal. Place client in **left** Trendelenburg, give 100% O2 by mask. Notify physician.

**Parenteral Nutrition (a.k.a TPN or Hyperal)**
- Hyperosmolar solutions require large vein access to prevent sclerosis of vein.
- Used in clients who cannot obtain nutrition through the GI tract for more than 5 days d/t impaired absorption capacity or non-functioning GI tract.
- Promotes weight maintenance or gain and wound healing.
- Comprised of amino acids (proteins), dextrose (carbohydrates), fat emulsions or lipids (fatty acids), vitamins, minerals, trace elements, electrolytes. See Techniques pgs. 532, Table 19-3 for description. May also include other non-nutritive additives such as insulin and heparin.
- Always compare label to physician’s order.
- Use a 0.22 micron filter with TPN solution to trap bacteria and particles that can form in the solution. Use a 1.2 micron filter when running TPN with lipids. Plain lipids may be run without a filter.
- Always run TPN on a pump to prevent changes in flow rate. Change tubing and solution every 24 hours.
- Monitor blood glucose as ordered. Lab test for albumin levels may be ordered.
- Peripheral parenteral nutrition (PPN) will contain no more than 10% dextrose. Lipids may be added. Used to prevent nutritional complications rather than correct them. Phlebitis is a frequent complication. Not for long-term use.

**Central Line Procedures**

**Infusion via Implanted Port**
- You will always refer to agency policy for # mls required for flushing port and whether or not a mask is required.
- Wash hands. Palpate port and septum.
- Open sterile supplies. Apply sterile gloves.
- Clean port area with chloroprep.
- With assistance from another nurse, fill sterile 10 ml syringe with NS or use a pre-filled sterile syringe.
- Prime saline lock and Huber needle with NS. Clamp.
- Palpate septum and insert Huber needle at a 90 degree angle.
- Unclamp. Aspirate to confirm placement. Flush with 10 mls NS ending with positive pressure. Clamp.
- Support needle with folded 2x2 gauze pad if necessary and cover with tegaderm to stabilize needle.
- Connect IV tubing to saline lock and unclamp. Start infusion and regulate.
- After infusion is complete, flush port with 10 mls NS and 5 mls heparin, using positive pressure.
- Disconnect Huber needle from septum.
- Cover site with band-aid or dry sterile dressing.

**Blood Draw, Flush, and Cap Change (from subclavian triple lumen catheter)**
- You will always refer to agency policy for # mls required for flushing lumens and the cap change policy. In this scenario, we have an order to draw labs AND it is time to change the caps on all 3 lumens.
- Always use at least a 10 ml syringe. Anything smaller exerts too high psi and could rupture catheter.
- Prepare 4 syringes with 10 mls NS in each. Prepare 3 syringes with 5 mls heparin in each. Label each syringe.
- Gather appropriate blood tubes and vaccutaner or 10 ml syringes for blood collection.
- Prime 3 new injection caps with NS. Set aside in sterile packages.
- Apply clean gloves.
Set all IV infusions for at least 2 minutes prior to blood draw. Check that brown port is clamped. Clean connection between tubing hub and cap with alcohol, remove injection cap, attach syringe, unclamp, aspirate to confirm placement, and flush port with 10 mls NS. In same syringe, aspirate at least 5mls discard blood. Clamp. Unclamp and aspirate blood for specimen into syringe or blood tube. Clamp. Check that all ports are clamped. Change caps. Using positive pressure, flush all ports with NS and heparin to maintain patency after a blood draw.

Dressing Change
- Apply clean gloves and mask. Ask client to turn head away from site or apply mask if he/she has infectious respiratory condition.
- Remove old dressing in the direction that the catheter was inserted to prevent pulling out catheter.
- Wash hands, open sterile supplies, and apply sterile gloves.
- Clean site with chloroprep and clean down the tubing about 3 inches. Allow to dry 2 minutes.
- Cover with transparent dressing (opsite, tegaderm). Label with date, time and initials.