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CENTRAL VENOUS CATHETERS

Indications:
• Measurement of CVP
• Venous access for infusion of vasopressors, parenteral nutrition, phebilitic agents (eg labetalol, hypertonic saline, electrolytes)
• Central venous access for
  - Transvenous pacing
  - CRRT
  - Pulmonary artery catheterization
  - ECMO

Sites:
• Subclavian vein:
  - Preferred site due to lowest risk of CRBSI
  - Relative contraindication: coagulopathy
• Internal jugular vein
• Femoral vein;
  - Unable to lie in trendelenburg position, eg dyspnea, high ICP
  - Usually the spare area in Burn patients
  - Unfavorable for mobilization of patients. Risk of lower limb DVT.

Catheter types:
• Non-impregnated catheters are most commonly used
• Lumens vary from 1 to 4. 3-lumen catheters most commonly used in this ICU
• CVVH catheters – refer to chapter on renal replacement therapy
• PAC sheath for rapid infusions, PAC catheters
• Sheath for pacing wires

Insertion:
• Recommend to use ultrasound imaging
• LA in awake patients
• Strict aseptic technique:
  - Proper hand disinfection with chlorhexidine hand scrub
  - Sterile barrier: full gown, glove, cap, mask and large sterile drapes.
  - Skin prep with 2% chlorhexidine in alcohol over large area of skin
• Flush all lumens with sterile saline. Seldinger technique. Check the integrity of guidewire after removal

• Suture
• Dressing: transparent, semi-permeable. This unit uses transparent, semi-permeable dressing eg Tegaderm®. Dry gauze dressing if catheter site oozing
• Fill in post procedure form. Check CXR for tip position and complications

Maintenance:
• Daily inspection of insertion site, no optimal time for changing of CVC line. **CVCs should be removed as soon as it is not clinically indicated**. *Note: even if the insertion site looks clean, there is no guarantee that the catheter is not infected
• Catheters should be changed when
  • Suspect systemic infection - new, unexplained fever; unexplained rise in WCC; positive blood culture with likely organisms (S. epidermidis, candida spp)
  • Local infection – inflammation or pus at the insertion site
• Guidewire exchanges not encouraged

Complications:
• At insertion
  • Arterial puncture
  • Pneumothorax, hemothorax, chylothorax, retroperitoneal hematoma (femoral line)
• Passage of guidewire/catheter:
  • Arrhythmias
  • Perforation of SVC, RA, tamponade
  • Severed guidewire – in instance of guidewire obstruction inside introducer needle, pull out guidewire and introducer needle simultaneously in one piece. Do not withdraw guidewire through introducer needle as this may cause cutting of the wire
  • Unable to withdraw guidewire through catheter
  • Venous air embolism
• CVC in-situ:
  • Catheter infection: subclavian: lowest risk. Risks of IJV and femoral are similar
  • Venous thrombosis
  • Catheter embolism
  • Knotting