Central Line Placement Privileges at NWH

In order to obtain privileges at NWH to insert central lines, providers must:

- Complete this module and pass the test at the end
- Complete a hands-on training and check-out in the Sim Center

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Objectives

- To update physicians on new guidelines for central line placement reflecting the current standard of care
- To standardize procedure throughout hospital
- To decrease complications

New Central Line Placement Guidelines

- Sterile Procedures
  - — Hand Hygiene
  - — Maximum barrier precautions
  - — Chlorhexidine prep
- Time-out
- Ultrasound Guidance
- Nursing Involvement

CODE BLUE or other emergent situations: Although similar practices are advisable for CVC placement under CODE BLUE conditions, this certification process is not intended to directly address placement of a CVC in a code situation. *ANY CENTRAL LINE PLACED DURING A CODE/EMERGENCY WILL BE REPLACED WITHIN 24 HRS.*

Indications for Placement

- A documented indication is required.
  - Short-term IV access and blood draws are not an acceptable indication
- Appropriate indications include:
  - Infusion of certain medications (e.g. vasopressors, some chemotherapies and antimicrobials)
  - CVP monitoring
  - Shock

Contraindications

- **Absolute**
  - DVT within the vein
  - Lymphedema
- **Relative contraindications**
  - Severe coagulopathy that cannot be corrected
  - Inability to tolerate Trendelenburg position
  - Single functioning lung (should use side of nonfunctioning lung)
  - Lymphadenopathy

Which catheter is appropriate?

- **PICC** – Prolonged antibiotics (> 4 weeks) or other medications in patient who does not need central venous pressure monitoring
- **Triple lumen** – CVP monitoring needed
- **Cordis** – Rapid infusion/resuscitation and if planned right heart catheter
- Other:
  - **Midlines:** Not a central line. Great if therapy needed for up to 4 weeks. Vanco OK for up to 5 days. Lab draws OK.
  - **Intraosseous access**: Alternative during code or emergency

Site Selection

Site	Benefits	Disadvantages
Subclavian	· Smallest risk of infection · Easiest to dress and care for · Greatest patient comfort	· Higher risk for: • pneumothorax • vein perforation causing hemothorax • cardiac tamponade · Difficult to visualize vein for ultrasound guidance.
Jugular	· Clear landmarks · Easy ultrasound guidance · Risk of pneumothorax may be less than with subclavian site	· Limits neck mobility · Difficult to keep sterile dressing in place · Should not be used in patients with a tracheostomy · CVC movement with neck rotation · Proximity to carotid artery
Femoral	· Area accessible during code · Easy ultrasound guidance	· Greatest risk of infection · Greatest risk of thrombosis · Difficult area to keep sterile, especially in an ambulatory patient · Femoral lines are considered the last choice for non-emergent CVC placement and need to be changed within 24 hours to a different location unless there is no other option for central access

Note: In patients with compromised renal function who might require dialysis in the future, it is recommended that CVCs should be placed in the jugular in order to avoid subclavian stenosis.

Patient Positioning

- Trendelenburg just before needle insertion
- Do NOT use shoulder roll
  - MRI studies of subclavian and jugular venous systems show no benefit
  - It flattens the subclavian vein bringing the pleura closer to the vein
  - It may increase risk of pneumothorax and arterial puncture

Sterile Precautions

- Full-body draping is now required - small drapes are NO longer acceptable
- Chlorhexidine scrub using back and forth motion
  - 30-60 seconds
  - One swab from sterile kit or two from central line cart
- Limit who comes into room
- Everyone wears head covering and mask with eye shield (*even* if wearing glasses)

Important Points

- Observe bundle
  - Proper handwashing
  - Time-out to identify patient, labs reviewed, indication, site, catheter selection, consent in chart
  - Chlorhexidine prep
  - Maximum barrier precautions
- Attempts – 3 maximum punctures. If fail, move to new site or change physicians.

Insertion

Ultrasound

Ultrasound guidance is standard of care for internal jugular and recommended for femoral

- Use ultrasound for site selection – rule out DVT and verify anatomy first
- Select vascular probe (wide, flat probe)
- Match dot on screen to dot on probe
- Use sterile ultrasound probe cover

Manometry Recommended

- A pressure manometry device is available and should be used by physicians who place lines infrequently and considered for subclavians
- The device is placed between the needle and the syringe.
- The device provides continuous pressure readings throughout the procedure.

Manometry Use

Steps for using the Compass device:

- Calibrate device by pressing blue button until “00 mm Hg” appears
- While the needle is being advanced with aspiration of the syringe, the pressure will read “-199 mm Hg”
- Once the needle is in the vein, stabilize the plunger of the syringe and check pressure
- Once venous position is confirmed, advance guidewire through sideport of Compass device
- **After catheter placement, disconnect Compass from needle and attach to catheter to double-check pressure.**

Catheter Placement

- Telemetry is required to watch for arrhythmias
- Align bevel with lines on syringe

Skin Incision

- Consider giving additional local anesthesia to the skin and subcutaneous tissue prior to dilation.
- Make a skin nick using an #11 blade
- Pass the blade along the wire, blade pointed away from you
- Open the skin all the way through the dermis.
- To enlarge the skin incision, do NOT drive the blade deeper, instead flick it away
- Incision should be large enough; the wire moves freely

Catheter Placement: Next Steps

- Advance wire gently to approximately 15cm
- Advance dilator slowly in twisting motion while verifying that wire remains loosely mobile
- Do not hub dilator; advance enough to dilate just into the vein

Securing the central line

- Suture white device at skin and place blue over white - Please don't forget this!

  Reason: If line needs to be pulled back after CXR, can pull off blue, pull the line back and reattach blue to white w/o needing to re-suture.
- Suture or stat lock the remaining sites
- Cover with large Tegaderm
- Document central line tip position – goal is atrial-caval junction

Early/Intermediate Complications

- Arrhythmia
- Pneumothorax
- Hemothorax
- Hematoma
- Air embolism
- Arterial damage
- Stroke
- SVC perforation

Late Complications

- Thrombotic occlusion
- Infection
- DVT
- SVC or atrial wall perforation

What to do if artery is cannulated

- If introducer needle or wire, remove and apply pressure for 5-10 minutes and select different site for central line
- If dilator or catheter placed, leave in place and call vascular surgery. If dilator in place put wire back in but maintain good control of wire

What to do if air embolism suspected

- Call a code
- Give IV fluids through peripheral IVs to support BP
- Occlude air source but leave catheter in place
- Intubate
- Turn left side down and keep in Trendelenburg to keep residual air in right atrium from passing into right ventricle
- Advance catheter into atrium and suction as much air out of distal port as possible