CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTIONS (CLABSI)

A Step-by-Step Approach

Evidence Based Recommendations for the Prevention of CLABSI
An estimated 41,000 central line-associated bloodstream infections (CLABSI) occur in U.S. hospitals each year.

These infections are usually serious infections typically causing a prolongation of hospital stay and increased cost and risk of mortality.

Experts estimate 30,000 patients per year lose their lives to these infections.
CLABSI FACTS

- Estimated cost per infection ranges from $6,000 - $29,000

- Estimated total cost in the United States ranges from $0.6 billion - $2.7 billion annually

- Many experts believe that CLABSI is entirely preventable.

- Many strategies have been successfully implemented to aide in the prevention of CLABSI.
Central Line Insertion

Central Line Bundle is a way of implementing evidence-based practices known to reduce the risk of CLABSI.
**Bundle Components Include:**

- **Optimal catheter site** selection with avoidance of the femoral vein in adult patients
- **Hand hygiene**
- **Chlorhexidine antiseptic** pre and post insertion
- **Maximum sterile barrier** precautions at insertion
- **Aseptic technique** at line access and dressing changes
- **Daily review** of line necessity and prompt removal of the line
OPTIMAL LINE SELECTION

- **SUBCLAVIAN**: Associated with the lowest risk of infection
- **JUGULAR**
- **FEMORAL**: Associated with the highest infection risk. (Should only be used when other sites are unavailable, undesirable, or in an emergency, life saving situation) and should be discontinued per physician order within 24 hours
- **ARM**

Use a sterile transducer cover when utilizing ultrasound devices
HAND HYGIENE/CHLORHEXIDINE PREP

- Wash or Alcohol foam before and after palpating catheter insertion sites
- Immediately before donning sterile gown at insertion apply the Chlorhexidine (CHG) skin prep before draping using a back and forth gentle friction for a MINIMUM of 30 seconds over the immediate puncture site

THEN...

- Work in the same manner outward for about 3” in all directions.
- DO NOT take the applicator back over the puncture site once you leave it.
- Allow to dry... Do NOT wipe or blot
Maximal Barrier Precautions

- Mask with eye protection, cap, sterile gown and gloves always worn by the inserter/s and any other staff
- Mask and cap worn by all persons in the room within 3 feet of the sterile field at time of insertion
- A full body drape (head to toe)
- Sterile field maintained
INSERTION

- Obtain signed consent
- Verify patient identity (Two Patient Identifiers)
- Equipment set up
  - Line insertion tray, central line kit, dressing change kit
  - Prepare patient i.e. Shave patient with clippers (DO NOT USE A RAZOR) if hair removal is necessary prior to chlorhexidine skin prep, lay flat, adjust current lines/equipment, attach monitoring devices, pre VS
- When all members of the insertion team are present perform TIME OUT
- Physician or designee will prep site
Maintain sterile barrier during insertion!!!!

All participants are **EMPOWERED to STOP**
the procedure if any of the steps are not followed!!
Checklist completed by any staff member assisting with procedure

- **NOT** a permanent part of record
  - Quality Assurance Document

- Give completed checklist to UD

- UD to forward to Intensivist Coordinator
Post - Insertion

- Maintain sterility
- Clean any drainage with appropriate antiseptic
- Apply a hospital approved central line CHG impregnated patch (per hospital policy)
- Apply Sorbaview clear dressing (contained in dressing kit) and securely tape catheter and pigtails
- Document site, type of catheter, condition of site i.e. redness or drainage, and patient tolerance.
- Complete and sign documentation sticker and place on a progress note.
CVAD Care and Maintenance

- Assess site and document every 4 hours and with each dressing change

- Flush Standard
  - Routine flush: 10 ml NS
  - After blood draws: 10ml NS
  - After blood draw PICC: 20ml NS
  - After TPN: 20ml NS

- The poster on the next slide is available on every unit
Appendix A: Flushing Standard for All Adult CVAD Lines

Routine Flush: 10ml Normal Saline (NS)
After Blood Draw: 10ml Normal Saline
After Blood Draw PICC Line: 20ml Normal Saline
After TPN: 20ml Normal Saline

In addition to above: Instruction for line specific Heparin Flush: Dilute Heparin 10units/ml (Adult)
Definition: CHG dressing is a chlorhexidine gluconate dressing

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Flush</th>
<th>Flush Frequency</th>
<th>Blood Draw Disposed Amount</th>
<th>Tubing/Cap Change</th>
<th>Dressing Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnutrition, catheter/introducer</td>
<td>NS as above</td>
<td>每 shift and/or after each use</td>
<td>5 ml discard</td>
<td>Every 96 hours</td>
<td>Every 7 days using CHG dressing</td>
</tr>
<tr>
<td>Subclavian, Jugular, Femoral</td>
<td>NS as above</td>
<td>每 shift and/or after each use</td>
<td>5 ml discard</td>
<td>Every 96 hours</td>
<td>Every 7 days using CHG dressing</td>
</tr>
<tr>
<td>Hickman</td>
<td>5 ml of NS followed by 2.5 ml dilute Heparin 100units/ml</td>
<td>每 day and/or after each use</td>
<td>5 ml discard</td>
<td>Every 96 hours if in use or Change cap every 7 days if not in use</td>
<td>Every 7 days using CHG dressing</td>
</tr>
<tr>
<td>Lifeline, Power Port</td>
<td>NS as above followed by 5 ml dilute Heparin 100units/ml</td>
<td>每 month</td>
<td>2 ml discard</td>
<td>Every 96 hours if in use</td>
<td>Change nonoccluding needle every 7 days and apply CHG dressing</td>
</tr>
<tr>
<td>PICC (ASIV) (positive pressure)</td>
<td>NS as above</td>
<td>Weekly and/or after each use</td>
<td>5 ml discard</td>
<td>Every 96 hours if in use</td>
<td>Every 7 days using CHG dressing</td>
</tr>
<tr>
<td>Groshong</td>
<td>NS as above</td>
<td>Weekly and/or after each use</td>
<td>5 ml discard</td>
<td>Every 96 hours if in use</td>
<td>Every 7 days using CHG dressing</td>
</tr>
</tbody>
</table>

SPECIAL INSTRUCTIONS

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Flush</th>
<th>Flush Frequency</th>
<th>Blood Draw Disposed Amount</th>
<th>Tubing/Cap Change</th>
<th>Dressing Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPN with all CVADs</td>
<td>Flush with NS 20ml before attaching new tubing or drawing blood</td>
<td>Every 24 hours when changing tubing</td>
<td>See above</td>
<td>Every 34 hours at 2200 with TPN bag change</td>
<td>See above</td>
</tr>
<tr>
<td>CMO units drawn from CVAD</td>
<td>Obtain physician order for use of heparinized catheter for this lab test</td>
<td>Flush with 20 ml NS using 20ml lab draw</td>
<td>If order is changed, withdraw 8-10 ml discard first</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutropenic or Environmental Precautions</td>
<td>Change tubing and cap every 48 hours</td>
<td>Change central line dressing every 7 days using CHG dressing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix B: Flushing Standard for All Pediatric CVAD Lines

Intermittent Flushes

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Infant(1-12 months)</th>
<th>1-2 years</th>
<th>3 years and Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripherals (PRN adapter)</td>
<td>10ml Normal Saline ONLY after medications</td>
<td>10ml Normal Saline ONLY after medications</td>
<td></td>
</tr>
<tr>
<td>CVAD - External Central Line - Implanted, tunneled or PICC</td>
<td>10ml Normal Saline after medications</td>
<td>10ml Normal Saline after medications</td>
<td></td>
</tr>
<tr>
<td>Implanted Port</td>
<td>10ml Normal Saline after medications</td>
<td>10ml Normal Saline after medications</td>
<td></td>
</tr>
</tbody>
</table>

PRN Flushes

<table>
<thead>
<tr>
<th>Type of Line</th>
<th>Infant(1-12 months)</th>
<th>1-2 years</th>
<th>3 years and Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripherals (PRN adapter)</td>
<td>10ml Normal Saline ONLY after medications</td>
<td>10ml Normal Saline ONLY after medications</td>
<td></td>
</tr>
<tr>
<td>CVAD - External Central Line - Implanted, tunneled or PICC</td>
<td>10ml Normal Saline every day</td>
<td>10ml Normal Saline every day</td>
<td></td>
</tr>
<tr>
<td>Implanted Port</td>
<td>10ml Normal Saline every day</td>
<td>10ml Normal Saline every day</td>
<td></td>
</tr>
</tbody>
</table>


Revised: June 2008
Reviewed: July 2010
# CVAD Care and Maintenance

## Tubing Change

<table>
<thead>
<tr>
<th></th>
<th>24 hrs</th>
<th>48 hrs</th>
<th>96hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPN with all CVAD’s</td>
<td>Neutropenic or Environmental Precautions</td>
<td>Multilumen catheter/introducers; subclavian, jugular, and femoral</td>
<td>Hickman</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lifeport, Power Port</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PICC (PASV positive pressure)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Groshong</td>
</tr>
</tbody>
</table>
Needless Connector Cap Change

- Every 7 days (for Central Venous Access Devices, Hickman, LifePort, PICCs, and Groshong)
- TPN, every 24 hrs
- Propofol every 12 hours with tubing changes

- Change initial “white” PICC caps to the needleless connector caps after PICC insertion according to hospital protocol (in 24 hours) if not performed by IV team
DRESSING CHANGES

- The CVAD dressing change is a STERILE procedure including a mask for the nurse and patient.
- Change dressing every **7 days** and if soiled, wet, or non-occlusive:
  - IV team will complete all weekly dressing changes except on 6S and in the Infusion Center.
  - Nursing should change soiled, wet, or non-occlusive dressings during hours that IV Team is not available.
- Dressing changes to be performed using the central line dressing change kit (stocked on every unit).
- Change initial PICC dressing **24hrs** after insertion – done by IV team everywhere except 6S and Infusion Center.
Cleansing the Site

- Using a CHG stick, swab the exit site back and forth, up and down, for at least 30 seconds
- Clean off the catheterer with a swab stick by starting at the exit site and cleaning 2-3 inches out toward the end of the catheterer
- Lay the catheterer back on the skin
- Allow CHG to dry for at least 30 seconds before applying the antimicrobial sponge (BIOPATCH) included in the dressing change kit
After cleansing the site with the CHG swab stick, apply the antimicrobial patch.

Antimicrobial patches have been shown to decrease the incidence of CLABSI by 44%.

Correct application:
- Foam side of patch next to patient skin and blue grid facing up (Blue to the Sky).
- Patch must provide 360 degree coverage of insertion site. Do not place patch on top of catheter insertion site. It must be placed around the insertion site.
- Position the patch slit 5 degrees to either side of the catheter.
- Slit sides should be touching.

Blue to the Sky
Blood should not be withdrawn from hemodialysis catheters or lines with continuous medications that should not be interrupted (i.e. vasoactive drugs)

- Obtain physician order to withdraw blood for blood cultures and specimens for coagulation studies if heparin is used to flush the line
- If infusing, turn fluids off for 1 minute before obtaining blood sample
- Use **proximal port** if possible for lab draws when using a multi-lumen catheter
- Flush prior to all blood draws and withdraw waste except when obtaining blood cultures
**Blood Sampling from CVAD**

- Order of the draw for multiple specimens:
  1. Blood culture
  2. Coagulation studies (*blue* tube)
  3. Serum tube (*red* tube)
  4. Heparin tube (*green* tube)
  5. EDTA tube (*purple* tube)
  6. Glycolytic inhibitor (*gray* tube)

No need to change cap after blood draws unless visible blood in cap after the flush.
CUROS

Is basically alcohol in a cap!

- A foam pad saturated with 70% isopropyl alcohol and it twists onto a needleless connectors to keep them clean and covered when not in use.
Curos Cap Usage - On all Central Lines

Patients with both peripheral IV and a central line, must have caps on all open ports because bacteria from a peripheral IV can cause an infection in a central line

- Make sure that all visible blood and soil is removed with an alcohol pad prior to placing a Curos cap
- Place the Curos on top of all needleless connectors of adapted lumens and all y-sites
- Curos are single use only and can be left in place for up to 7 days

New IV Tubing/ Connectors/Caps

- Place new Curos on all open y-sites when IV tubing is changed
- Replace needleless connector and Curos when changing central line dressings
Curos

Must be on for at least 3 minutes to achieve optimal effectiveness

- Eliminating the need to scrub the hub with an alcohol pad
- Remove Curos and discard before giving an IV med
  - If giving more than one medication, you will need to scrub the hub with an alcohol pad in between meds
- Place a new Curos on site when finished
- Remove all Curos caps prior to discharge
- Do not use Curos on dialysis catheters or arterial lines

“Green means clean”
Correct Scrub the hub technique is essential to prevent central and peripheral line infections. Scrub the hub SAVES LIVES!

- Scrub the hub should be performed prior to accessing any IV line or tubing if Curos are not in use
- Scrub the hub must be done on all patients every time the hub is accessed and in between all IV push medications
- Scrub the hub is performed by using a VIGOROUS CIRCULAR motion on the hub for at least 15 seconds
CATHETER OCCLUSION

- Occlusions can be complete or partial
- Signs of an occlusion include inability to flush, sluggish flushing, and the lack of a brisk blood return despite normal flushing
- Partial and complete occlusions can be thrombotic (thrombus, fibrin) or nonthrombotic (mechanical, precipitate, lipid residue)
Catheter Occlusion

- Occlusions can cause serious consequences such as pain, infiltration, extravasations and line infections.
- When a central venous catheter shows signs of complete or partial occlusion, action must be taken to restore full function and prevent risk of infection and complications to the patient. (See Policy and Procedure for Thrombolytic Administration for definitions and procedure for occlusion of Adult Central Venous Access Devices)
CATHETER OCCLUSION

- Actions include:
  - Reposition the patient to ensure mechanical occlusion is not present
  - Notify the physician if full function is not present after repositioning
  - Request orders for thrombolytic alteplase (CathFlo Activase), or (TPA) as indicated to restore patency. (See Policy and Procedure)
  - CathFlo is administered by specially trained RNs in proper administration from oncology, dialysis, critical care, interventional radiology, or IV team (if your area has not been trained, contact the IV team)
  - CathFlo can be repeated if full function is not restored. Notify physician if full function (flushes easily with brisk blood return) is not present after 2 doses
REFERENCES


- BIOPATCH® package insert (2006): Johnson & Johnson Wound Management, a Division of ETHICON, INC., Somerville, NJ.


REFERENCES

- Aultman Hospital - Policies and Procedures
- APIC 2010