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| **DIVISION OF ADULT INSTITUTIONS**<br><br>**POLICY AND PROCEDURES** | **DAI Policy #:** 500.31.13 | **Page** 1 of 7 |
| | **Original Effective Date:** 12/23/24 | **New Effective Date:** 12/23/24 |
| | **Supersedes:** | **Dated:** N/A |
| | **Administrator's Approval:** Sarah Cooper, Administrator – 11/08/24 | |
| | **Required Posting or Restricted:**<br>☐ **PIOC** ☒ **All Staff** ☐ **Restricted** | |
| **Chapter:** 500 Health Services | | |
| **Subject:** Initiation of Hemodialysis Via Central Line Catheter | | |

## POLICY

The initiation of Hemodialysis utilizing central line catheters shall be in accordance with current nephrology nursing guidelines.

## REFERENCES

American Nephrology Nurses Association (2020). Core Curriculum for Nephrology Nursing, (Seventh Edition, pp.1105-1114). Pitman, New Jersey: Anthony J, Jannetti, Inc.

American Nephrology Nurses Association (2022). Contemporary Nephrology Nursing. (Fourth Edition, pp.417-437). Pitman, New Jersey: Anthony J. Jannetti, Inc.

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Loc, CE, Huber, TS, Lee T, et al; Kidney Disease Outcomes Quality Initiative Vascular Access Guideline Work Group. KDOQI clinical practice guideline for vascular access: 2019 update. Am J Kidney Dis. 2020;75(4) (suppl 2): S1-S164.

ICU Medical. (2022) Reference Guide for Tego Needlefree Connector. ICU Medical: California

O'Grady P, Alexander M, Burns LA, et al; Guidelines for the Prevention of Intravascular Catheter Related Infections: 2011 (Updated 2017). Centers for Disease Control. PP1-80.

## DEFINITIONS, ACRONYMS, AND FORMS

ACP – Provider with prescriptive authority

CVC - Central Venous Catheter

DOC-3023D – Prescribers Orders Standard Orders Hemodialysis

DOC-3423 - Hemodialysis Treatment Flow Sheet

HCR - Health care record

K/DOQI - Kidney Dialysis Outcome Quality Initiative

NS - Normal Saline

PIOC – Persons in Our Care

TX – Treatment

**PROCEDURE**

**I. Preparation of the Patient and the Catheter Site**

A. Obtain vital signs, weight and complete dialysis pre-treatment patient assessment. Document findings on the Hemodialysis Treatment Flow Sheet within the HCR. Notify the Nephrology ACP, as necessary, for abnormal findings with the dialysis pre-treatment nursing assessment.

B. Apply an impermeable gown, a medical-surgical mask and eyewear. Apply a medical-surgical mask to the patient to prevent any potential airborne contamination of the catheter. Perform hand hygiene and apply clean gloves.

C. Observe the catheter site visually when changing the dressing and/or by palpation through an intact dressing at each dialysis treatment. Inspect both limbs of the catheter to ensure patency.

D. If patient has tenderness at the insertion site, fever without obvious source or other manifestations suggesting local or bloodstream infection, the dressing should be removed to allow thorough examination of the site.

E. If the site presents with drainage and/or redness, culture any drainage that may be present. Notify the Nephrology ACP.

F. Place an impermeable pad under the catheter.

G. Place a sterile 4 x 4 gauze under the catheter ends.

H. Check catheter for integrity of catheter caps, hubs and lumens.

I. If needless connector end cap or standard end cap are used:
   1. Cleanse the catheter connection site with approved antimicrobial pledge. Wrap the pledge around the connection point between the catheter and the cap and scrub for 30 seconds. Hold the catheter with this pledge. With a fresh pledge, clean for 4 inches from the connection point toward the clamp and discard. Allow it to dry. Confirm both limbs of the catheter are clamped. Change TEGO caps per manufacturer's recommendations.
   2. If the patient is allergic to chlorhexidine, cleanse each catheter connection and end cap site vigorously with Betadine (allow 3-5 min contact time, then dry) or 70% Alcohol (allow 30 seconds to dry).

J. Attach a 3cc syringe to the arterial limb cap. Withdraw locking solution. Next obtain any blood specimens by attaching a vacutainer and adapter to the arterial port. Fill required blood tubes. Attach a 10mL 0.9% NS syringe and flush catheter lumen.

K. Attach a 3ml syringe to the venous lumen. Withdraw locking solution. Attach a 10ml 0.9% NS syringe and flush catheter lumen.

L. If unable to withdraw blood from both ports after flushing with 0.9% NS, implement Alteplase Protocol per Standard Hemodialysis Orders per DOC-3023D. If no resolution, contact the Nephrology ACP.

M. Next attach and administer the heparin bolus if prescribed. May use an additional 10 ml of 0.9% NS syringe to flush Heparin through catheter lumen.

N. Remove and dispose of gloves. Perform hand hygiene. Apply clean gloves.

O. Complete priming of blood lines per the manufacturer's recommendations.

P. Connect blood lines to the catheter utilizing aseptic technique. Verify that both connections are tight.

Q. Open both arterial bloodline clamps and open both venous blood line clamps. Verify that the saline line is clamped and air detector is armed. Remove gloves. Apply clean gloves.

R. Turn on arterial blood pump and gradually increase the arterial blood flow. Note the arterial & venous pressures as this is done. The minimally accepted dialyzer blood flow rate of 300mL min should be easily achieved by the new catheters that achieve rates of 400mL/ min or greater when properly placed.

S. If the arterial pressure is less than negative 250 mmHg, continue to turn up the blood flow rate to the prescribed amount. Arterial pressure shall be no greater than negative 250 mmHg. Venous pressure should remain equal to or less than positive 250mmHg.

T. If the catheter is not able to sustain a blood flow rate of 300 ml/ min it should be evaluated for causes of dysfunction. Catheter dysfunction can result in inadequate dialysis.

U. Signs of catheter dysfunction are:
   1. Blood Pump Flow Rates <300mL/min
   2. Arterial Pressure > -250 mm Hg
   3. Venous Pressure > 250 mm Hg

4. URR progressively < than standard
5. Unable to aspirate freely (late manifestation)
6. Frequent pressure alarms, not responsive to patient positioning or catheter flushing

V. In order to determine cause of dysfunction, determine the age of the catheter.
   1. Access dysfunction occurring after two weeks is more likely the result of progressive occlusion of the catheter tip by fibrin or thrombus.
   2. Access dysfunction occurring within the first two weeks, a decreased blood flow is usually the result of:
      a. Mechanical obstruction (kinks, cracks, drug precipitate)
      b. Improper tip location affected by the patient's position or the catheter integrity

W. Reversing the lines may increase blood flow temporarily, but should never be done routinely due to the risk of recirculation. It should only be done temporarily until the problem is corrected.

X. The need to use a Trendelenburg position to achieve adequate blood flow from a catheter placed in great veins leading to the right atrium can imply that the catheter is improperly placed. If the problem is not easily correctable, the patient shall be referred for intervention.

Y. Notify the Nephrology ACP if the catheter is unable to sustain a 300 Blood Flow Rate and/ or other signs of catheter dysfunction are present.

Z. After assessment precludes mechanical dysfunction, thrombolytic occlusion, either partial or total, is the most common cause of catheter dysfunction and/ or occlusion, thrombolytic therapy may need to be considered for access preservation.

AA. Maintain visibility of the access and connections at all times during the treatment. Complete documentation on the Hemodialysis Flow Sheet within the HCR.

BB. Verify the patient is comfortable providing blanket, chair reclined, etc.

CC. The Registered Nurse is to cosign the Hemodialysis Treatment Flow Sheets or HCR documentation for any Hemodialysis technicians that initiate the hemodialysis treatment. This cosign involves assessment of the patient, machine settings and the overall treatment plan of care.

DD. Monitor access function at least every 30 minutes during treatment. Access function monitoring includes:
1. Blood flow rate
2. Arterial Pressure
3. Venous Pressure

## II. Aseptically Change the Central Line Dressing

A. Replace transparent dressings used on tunneled or implanted CVC sites no more than once per week (unless the dressing is soiled or loose), until the insertion site has healed.

B. Type of dressing to be used shall be based on each patient clinical situation.
1. Transparent dressings with chlorhexidine shall be changed weekly and PRN if the dressing is soiled or loose.
2. Gauze or other types of dressings shall be replaced at each dialysis tx and PRN if the dressing is soiled or loose.

C. Steps for changing the dressing:
1. Apply a mask to self and patient. Perform hand hygiene and apply clean gloves. Remove the old dressing. Note the site for any signs of redness, warmth, draining, tenderness or other signs of infection. Discard gloves. Perform hand hygiene and apply clean gloves. Use sterile gloves for new catheters for the first 2 weeks. Begin to cleanse the site with an alcohol swab stick to remove dried debris if present.
2. Next cleanse the area with a chlorhexidine product. If the patient has an allergy to chlorhexidine, betadine can be used as a site cleanser. Apply the solution in a circular motion working from the catheter exit site outwards. Cover an area 10 cm in diameter. Allow both betadine and chlorhexidine to dry completely.
3. Apply the chlorhexidine disc at the catheter insertion site if used, leaving the blue colored side face up. Transparent dressings with impregnated chlorhexidine can also be utilized in place of the disc. If the patient has an allergy to chlorhexidine, discuss with the nephrology ACP the option of using a triple antibiotic ointment instead. Only use ointment if it does not interact with the material of the hemodialysis catheter per the manufacturer's recommendation.
4. Cover the site with a sterile 4X4 dressing. If a small amount of drainage is present, cover the site with an additional sterile 2x2 sterile gauze first.
5. If the patient is diaphoretic or if the site is bleeding or oozing, cover the site with a sterile 2x2 gauze. Do not cover the site with a transparent dressing.
6. Apply a medication added sticker to the dressing identifying the locking solution, date of dressing change and staff initials.

7. Educate patient to notify health care staff if the catheter site dressing becomes damp, loosened or visibly soiled. Heath care staff to change the dressing.
8. Notify the Nephrology ACP if abnormal symptoms exist.

**DIVISION OF ADULT INSTITUTIONS FACILITY IMPLEMENTATION PROCEDURES**

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| **Facility:** Name | | |
| **Original Effective Date:** | **DAI Policy Number:** 500.31.13 | **Page** 7 of 7 |
| **New Effective Date:** 00/00/00 | **Supersedes Number:** | **Dated:** |
| **Chapter:** 500 Health Services | | |
| **Subject:** Initiation of Hemodialysis Via Central Line Catheter | | |
| **Will Implement** ☐ As written ☐ With below procedures for facility implementation | | |
| **Warden's/Center Superintendent's Approval:** | | |

## REFERENCES

## DEFINITIONS, ACRONYMS, AND FORMS

## FACILITY PROCEDURE

I.

A.

B.

1.

2.

a.

b.

c.

3.

C.

II.

III.

## RESPONSIBILITY

I. Staff

II. Inmate

III. Other