

 <p style="text-align: center;">DIVISION OF ADULT INSTITUTIONS</p> <p style="text-align: center;">POLICY AND PROCEDURES</p>	DAI Policy #: 500.31.36	Page 1 of 6
	Original Effective Date: 04/01/16	New Effective Date: 10/01/18
	Supersedes: 500.31.36	Dated: 04/01/16
	Administrator's Approval: Jim Schwochert, Administrator	
Required Posting or Restricted:		
<input checked="" type="checkbox"/> Inmate <input checked="" type="checkbox"/> All Staff <input type="checkbox"/> Restricted		
Chapter: 500 Health Services		
Subject: Anticoagulation Therapy During Hemodialysis		

POLICY

All Division of Adult Institutions facilities offering hemodialysis shall provide anticoagulation therapy with unfractionated Heparin following recommended Nephrology Practice guidelines.

REFERENCES

Molzahn, A., & Butera, E. (Eds)(2006). Contemporary Nephrology Nursing: Principles and Practice, Second Edition. Pitman, NJ: American Nephrology Nurse's Association

Counts, C.S. (Ed.), 2015
Core Curriculum, Sixth Edition, 2015
2008T Hemodialysis Machine Operator's Manual, from <http://www.fmca.com> 2013
Medisystems Streamline Bloodlines Clotting Assessment Tool, 2014

DEFINITIONS, ACRONYMS AND FORMS

ALT – Alanine aminotransferase

Anticoagulation – Utilized to achieve a designated prolongation of clotting time to prevent blood from clotting in the blood lines or in the dialyzer.

AST – Aspartate aminotransferase

DOC-3423 – Hemodialysis Treatment

DOC-3023D – Prescriber's Orders (Standard Orders – Hemodialysis)

Kec_n – Effective clearance of small molecules.

UF – Ultrafiltration

UFR – Ultrafiltration Rate

PROCEDURE**I. Heparin Prescribing and Monitoring**

- A. The Nephrology provider shall prescribe the method of anticoagulation.
 1. Methods include Systemic-Routine Heparinization, Tight-Minimal-Fractional Heparinization or Heparin-Free.
 2. Heparin concentration to be administered is 1000 units/mL.

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- B. Heparin administration during hemodialysis shall be monitored by a Registered Nurse.
- C. Prior to the administration of heparin at each dialysis treatment, the inmate patient shall be assessed regarding any significant events or changes in condition.
 - 1. Heparin shall not be administered with any concerns regarding its safe usage.
 - 2. The nephrology provider shall be consulted, as indicated. Examples may include:
 - a. Open or closed injuries, falls.
 - b. Bruising or contusions, petechiae, bleeding gums, thrombocytopenia.
 - c. Blood in the stool, urine or emesis.
 - d. Signs and symptoms of pericarditis.
 - e. Hemorrhaging, including the nose and eye; if the bleed is moderate to significant heparin should be held until the hemorrhage is resolved. Heparin should be held the day prior to and after eye surgery.
 - f. Surgical, dental or biopsy procedures that have been performed, or will be performed within the last or next six hour period, necessitate only the heparin bolus to be given, not the continuous infusion.
 - g. Medications that may affect anticoagulation.
- D. The inmate patient shall be monitored for additional side effects of heparin administration including:
 - 1. Thrombocytopenia.
 - 2. High serum potassium, ALT, AST or Lipids.
 - 3. Pruritus.
 - 4. Allergy.
- E. Educate the inmate patient to observe for signs and symptoms of bleeding and to notify health care staff.

II. Heparin Administration

- A. The heparin bolus shall be administered via the inmate patient's venous needle or venous perm catheter port after obtaining any ordered lab draws and prior to connecting to the blood lines. With venous needle cannulation concerns, the bloodline venous port can also be utilized as an additional route to administer the bolus.
- B. A systemic technique shall be utilized, waiting 3-5 minutes after administering the heparin bolus prior to starting the blood pump. This allows for the anticoagulant to circulate in the inmate patient's circulatory system prior to the blood coming in contact with the dialyzer or blood lines.

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- C. If a continuous heparin pump is prescribed it shall be connected to the bloodlines and turned on at the start of the dialysis treatment. Initiation procedures include:
1. Attach a syringe of heparin to the heparin port connection on the tubing line.
 2. On the heparin screen of the dialysis machine, set the machine to prime the heparin line (0.2mL with Streamline Tubing). The dialysis machine will then automatically prime heparin into the line.
 3. Program the prescribed amount of heparin pump for infusion.
 4. Program the dialysis machine to discontinue the heparin pump on inmate patients with grafts and fistulas one hour prior to the end of the dialysis treatment.
 - a. The heparin pump may remain on during the full treatment for inmate patients with catheters.
 - b. Exceptions to this time frame may be obtained as indicated per provider order.

III. Methods of Heparin Administration

- A. Systemic routine heparinization is prescribed for inmate patients at a normal risk for bleeding.
1. 30-50 units/kilogram of heparin initial bolus followed with a continuous heparin pump of 800-1500 units per hour.
 2. The bolus and pump amount may be adjusted within the parameters based on inmate patient need.
- B. Tight, minimal, or fractional heparinization is prescribed for inmate patients who are at a slightly higher risk for bleeding. The best method for administration of tight heparin prescriptions is an initial bolus followed by a continuous heparin pump.
1. 10-25 units/ kilogram are administered initially followed by 10-22 units/kilogram/ hour through the continuous heparin pump based on the inmate patient need.
 2. Normal saline flushes may be administered through the arterial line, pre-dialyzer, every 30 or 60 minutes to maintain blood tubing and dialyzer patency as needed. Completely occlude the arterial line with a blue clamp during the normal saline flush.
 3. The amount of the saline flush can range from 50-200mL based on inmate patient need. Saline flushes will be added to the UF Goal after each is administered as the dialysis machine and ultrafiltration rate permits. If not, add them to the goal at the start of the treatment.
 4. The blood flow rate shall be maintained at a minimum of 300mL/minute, if possible.
- C. Heparin Free is prescribed for inmate patients with active bleeding or at significant risk of bleeding.

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1. Normal saline flushes shall be administered through the arterial line, pre-dialyzer, every 30 minutes as needed to maintain blood tubing and dialyzer patency. Completely occlude the arterial line with a clamp during the normal saline flush.
2. The amount of the saline flush can range from 50mL-200mL based on inmate patient need. Saline flushes will be added to the UF Goal after each is administered if the dialysis machine and UFR permits. If not, add them to the goal at the start of the treatment.
3. The blood flow rate shall be maintained at a minimum of 300mL/minute, if possible.

IV. Clotting in the Bloodlines and Dialyzer Shall be Defined As:

- A. Clear—No visible signs of blood.
- B. Slight—Small amount of fibrin in the blood lines and/ or occlusion of <10% of the dialyzer fiber.
- C. Moderate—Small amount of clotting in the blood lines and/ or occlusion of 10-50% of the dialyzer fibers or clot formation in drip chambers.
- D. Severe—Moderate to large amount of clotting in the blood lines and/ or occlusion of >50% of the dialyzer fibers or clot formation in drip chambers.
 1. At the end of the dialysis treatment, evaluate and document the clearance of the dialyzer and the bloodlines on the DOC-3423 – Hemodialysis Treatment. An increase in the heparin dosage may be appropriate.
 2. Assess all other treatment variables when reviewing the bloodlines and the dialyzer.
 - a. Blood flow rate through the dialyzer.
 - b. Amount of ultrafiltration.
 - c. Extent of recirculation in the extracorporeal circuit.
 - d. Length, diameter and composition of the bloodlines.
- E. Consult with the Nephrology Provider, as indicated.

V. Kecn Monitoring

- A. May be monitored on the online clearance screen of various models of dialysis machines. The delivered clearance of a dialyzer can be determined by evaluating the Kecn result.
- B. Mean Kecn results shall be documented on the DOC-3423 – Hemodialysis Treatment at each hemodialysis treatment if provided by the dialysis machine. All inmate patients shall have a Kecn measurement at a minimum of monthly and as needed.
- C. Kecn results shall range between 200 and 300.
 1. A Kecn of greater than 300 may allow for less heparin to be given.

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- 2. A Kecn of less than 200 may indicate internal clotting of the dialyzer membrane. An increase in the heparin dosage may be appropriate. Assess all other treatment variables when reviewing the Kecn result.
 - a. Blood flow rate through the dialyzer.
 - b. Amount of ultrafiltration.
 - c. Extent of recirculation in the extracorporeal circuit.
 - d. Length, diameter and composition of the bloodlines.

D. Consult with the Nephrology Provider, as indicated.

Bureau of Health Services: _____ **Date Signed:** _____
James Greer, Director

_____ **Date Signed:** _____
Paul Bekx, MD, Medical Director

_____ **Date Signed:** _____
Mary Muse, Nursing Director

Administrator's Approval: _____ **Date Signed:** _____
Jim Schwochert, Administrator

DIVISION OF ADULT INSTITUTIONS FACILITY IMPLEMENTATION PROCEDURES

Facility: Name		
Original Effective Date:	DAI Policy Number: 500.31.36	Page 6 of 6
New Effective Date: 00/00/00	Supersedes Number:	Dated:
Chapter: 500 Health Services		
Subject: Anticoagulation Therapy During Hemodialysis		
Will Implement <input type="checkbox"/> As written <input type="checkbox"/> With below procedures for facility implementation		
Warden's/Center Superintendent's Approval:		

REFERENCES

DEFINITIONS, ACRONYMS, AND FORMS

FACILITY PROCEDURE

- I.
 - A.
 - 1.
 - a.
 - B.
 - C.
- II.
 - A.
 - B.
 - C.