



**NEPHROLOGY PROGRAM
DEPARTMENT POLICIES AND PROCEDURES**

**Hemodialysis - Section 07 - Medication - Neph 7-05
Hemodialysis Anticoagulation Standards
No.: 01157 (TOH Standardized Policy Number)**

ISSUED BY:

Hemodialysis Clinical Practice Committee

DATE OF APPROVAL:

2001/05

APPROVED BY:

Program Clinical Director & Division Head

LAST REVIEW/REVISION DATE:

2018/04

CATEGORY:

Medication

IMPLEMENTATION DATE:

2001/05

PURPOSE:

- To prevent clotting of the extracorporeal circuit during a Hemodialysis treatment by effective use of anticoagulant

BACKGROUND STATEMENTS:

- Tinzaparin sodium will be the standard medication used for anticoagulation during Hemodialysis at TOH in-centre units
- For rare instances when patients are unable to receive Tinzaparin, Dalteparin will be the anticoagulant ordered by the physician or delegate. This medication follows all the same guidelines and procedures outlined below.
- If Dalteparin is required, it must be ordered from pharmacy
- In very rare cases of allergy to both Tinzaparin and Dalteparin, Fondaparinux can be used. Refer to [Neph 7-14](#).
- Tinzaparin cannot be used interchangeably (unit for unit) with unfractionated heparin or other low-molecular weight heparins as they differ in manufacturing process, molecular weight, distribution, anti-Xa and anti-IIa activities, units and dosages
- Tinzaparin is supplied in prefilled syringes of 2500 IU/0.25mL or 3500 IU/0.35mL
- Transient patients will require an order from the Nephrologist or delegate for Tinzaparin if coming from a hemodialysis program that uses unfractionated heparin
- Protamine is the medication that is used to neutralize the effects of Tinzaparin

Patients taking Warfarin, subcutaneous unfractionated heparin or low molecular weight heparin are to receive usual anticoagulation as ordered for dialysis unless they have contraindications as outlined in GUIDELINES FOR ANTICOAGULANT-FREE DIALYSIS

SUPPLIES:

- 70% Alcohol swab
- Tinzaparin in prefilled syringe at prescribed dose
- Non-sterile gloves
- NS 1L bags (for dialyzer flushes if required)

DEFINITION(S): N/A

NURSING ALERTS:

- Proper patient assessment is important to prevent any increased risk of bleeding to the patient
- Based on the pre-assessment of the patient, a nurse may choose to give the patient an anticoagulant-free dialysis treatment
- If circuit clots and new circuit is set-up, do not give additional dose of Tinzaparin. Continue with treatment, adding NS flushes as necessary
- Patients who receive Tinzaparin at the start of their hemodialysis treatment and stop treatment earlier than expected for medical or personal reasons will still be anticoagulated. Those with AVF/AVG may be at higher risk of bleeding from their needle sites, and should be educated to monitor their sites more closely once discharged from the dialysis unit

GUIDELINES FOR ANTICOAGULANT-FREE DIALYSIS:

Anticoagulant-free dialysis is required for patients who are actively bleeding or who are at high risk for bleeding. The list below is not inclusive; the nurse will use critical thinking to determine if anticoagulation should be held

1. Tinzaparin **will be held** for any of the following situations:
 - Any patient with a planned treatment time of less than 3 hours
 - Allergy or hypersensitivity to unfractionated heparin or low molecular weight heparins (including but not limited to Tinzaparin)
 - Heparin Induced Thrombocytopenia (HIT)
 - Endocarditis or pericarditis
 - Recent falls with associated hematomas and swelling
 - Active major hemorrhage (e.g. GI bleed)
 - Recent surgery after which bleeding would be very dangerous such as vascular, cardiac, retinal, brain, and renal transplant
 - Clotting conditions/diseases involving increased risk of hemorrhage (e.g., severe coagulopathy, severe thrombocytopenia, haemophilia)

- Intracerebral hemorrhage, or suspected increased risk of intracerebral hemorrhage due to a recent head injury
- Severe or uncontrolled hypertension (greater than 200/115 mmHg), especially with patients exhibiting neurological changes
- Severe liver insufficiency
- Insertion or revision of an AV graft for one treatment post insertion then resume patient's regular systemic anticoagulation
- Insertion of a peritoneal dialysis catheter for one treatment post insertion then resume patient's regular systemic anticoagulation
- Planned removal of hemodialysis catheter post dialysis
- Post femoral artery puncture for angiography (for at least 4 hours post angiogram)

PROCEDURE:

Section A: Anticoagulation

Anticoagulation includes:

1. Assessment of patient as per [Policy Neph 3-01](#) to determine their risk of bleeding, including ruling out any of the above indications for anti-coagulant free dialysis
2. Initiate hemodialysis treatment according to [Policy Neph 5-01](#) or [Policy Neph 6-01](#)
3. Obtain syringe of Tinzaparin and verify dose as prescribed by the physician in NephroCare. Follow proper medication administration standards as per [Policy Neph 7-10](#)
4. Once blood lines are connected and blood pump started, perform hand hygiene, don non-sterile gloves and administer medication

- Cleanse injection port on the arterial blood line with alcohol swab for 30 seconds and allow to air dry. Remove the prefilled syringe of Tinzaparin from the tube, bend the orange safety device (orange tab) away from the grey cap on the needle. Remove the grey cap from the needle, by twisting and pulling straight up. Insert needle at 90o into arterial injection port on blood line and administer medication. Following administration, engage safety device by pressing on hard surface, not a hand, and dispose into an appropriate sharps container



Note: Administration of prescribed dose of Tinzaparin is as a bolus into the arterial port of the hemodialysis circuit **within the first 5 minutes** of treatment. There is no continuous infusion

5. Document medication administration in NephroCare

6. Throughout the treatment, and post Rinseback, monitor the circuit (dialyzer, venous and arterial chambers) for signs of clotting – see Grading of Dialyzer and Circuit Post Rinseback in Section F
7. Monitor the patients for signs and symptoms of bleeding (petechiae, bruising, bleeding in the eyes, nose, mouth, sputum, urine, or stool)

Section B: Anticoagulant-Free Dialysis

1. Anticoagulant-free dialysis includes:
 - No administration of Tinzaparin
 - Flushing the circuit q 30 minutes with 200 mL of NS (flushes may be done more frequently if necessary) throughout the treatment. Flushing allows visual assessment of any extracorporeal clotting as well as reducing the risk of dialyzer clotting
 - Calculating and incorporating the volume of NS flushes into the total UF goal as follows: include the total number of flushes to be given during the treatment x the amount of NS per flush. (e.g. for a 4-hour treatment, 200 mL q 30 minutes x 7 flushes = 1.4 L.) This amount is then added into the calculated target loss at the start of treatment
 - If the patient is still exhibiting signs of clotting despite the ½ hour flushes, NS infusions can be used in addition to the flushes. The NS is infused into the arterial chamber via the arterial medication port @ 200 mL/hr and into the venous chamber @ 200 mL/hr via the venous medication infusion port. The total amount of NS infused during the treatment is to be added to the UF goal at the start of treatment (e.g. infusion at 200 mL/hour vial the arterial and venous medication ports = 400 mL/hr x the number of hours per treatment. Therefore, in a 4-hour treatment, the UF goal would be increased by 1.6 L)
2. Nursing assessment of anticoagulant-free dialysis:
 - The extracorporeal circuit is assessed for any visible signs of clot/fibrin formation during the treatment with each flush and after Rinseback. Signs of clotting include:
 - Increased venous pressure due to clot in venous drip chamber (decreasing TMP)
 - Rising TMP if dialyzer fibers clotting
 - Visible clot/fibrin formation in chambers
 - Dark colored dialyzer/blood lines
 - If signs of clotting present, assess the need for:
 - rinsing back the blood before potentially losing the entire circuit of blood
 - priming new circuit set up to continue treatment and if required recalculate the target loss
 - increased flushes next dialysis and/or NS infusions
 - the need to draw a Hgb next treatment if circuit clotted and the patients last Hgb was less than 95

Section C: In-patients who are systemically anticoagulated with Heparin

Specific to admitted patient's receiving IV or SC Heparin:

1. If the patient is receiving an IV Heparin infusion:

- Hold the ordered hemodialysis Tinzaparin dose
- Continue the prescribed hourly rate of Heparin (as per inpatient orders) through the peripheral access (if used) or move to the venous infusion port of the extracorporeal circuit if patient was receiving via the hemodialysis catheter
- Ensure that bloodwork for PTT/Heparin assay is done at the correct time as per inpatient orders and adjust the rate according to the inpatient algorithm

2. For patients on SC Heparin, the usual dialysis Tinzaparin order is to be followed. Administer the SC Heparin as ordered on the inpatient MAR.

Section D: Evaluation of Tinzaparin dose for frequent clotting of the hemodialysis Circuit

1. Patients with frequent clotting are those clotting a circuit > 2 times in any calendar month or > 1 in any given session
2. Upon meeting Frequent clotting criteria:
 - If patient is receiving anticoagulant-free dialysis, increase NS flushes of circuit or consider need for NS infusions into arterial and venous chambers with IV pumps as per guidelines in Section B
 - If patient is receiving Tinzaparin, notify Nephrologist/Delegate to reassess Tinzaparin dose before next planned treatment

Section E: Tinzaparin dosing for In-Center Nocturnal Hemodialysis

1. Dosing to be ordered by Nephrologist/Delegate. Typically for nocturnal hemodialysis treatments, patients will receive a dose at the start of their treatment, and an additional dose after 4 hours of treatment

Section F: Documentation

Document the following in NephroCare:

1. Tinzaparin administration

- a) Enter the order for the Tinzaparin dose in the Medication order.
- b) Enter the Tinzaparin dose under Hemodialysis Orders details screen. Update the dose under "Anticoagulant Bolus", leaving the hourly dose field blank and select Anticoagulation in the drop down menu

Anticoagulant: Bolus	2500	Hourly Dose		Cutoff Time (min)		Full I	Anticoagulation
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- c) After the medication is administered, sign the medication in the Meds Admin screen of the dialysis session, noting the correct time the medication was administered

2. NS flushes are documented in the 'Incidents' screen as "dialyzer flush"
3. NS infusions are documented in the 'Incidents' screen as "N/S IV Art @ 200 mL/hr" and "N/S IV Ven @ 200 mL/hr"
4. Clearance of the extracorporeal circuit is documented in the **Post Dialysis screen** using the following scale:

Grading of Dialyzer and Circuit Post Rinseback

Grade	Description
0	Dialyzer clear, no clots or fibrin in chambers
1	Few dark dialyzer fibers, less than 20% clotted and fibrin in venous chamber
2	Many dark dialyzer fibers, more than 20% clotted and fibrin or clot in venous chamber
3	Mostly dark dialyzer fibers, more than 80% clotted and large clot in venous chamber
4	Clotted circuit, unable to return patient's blood

Note: Contact the Nephrologist to reassess Tinzaparin dose if the grading of dialyzer and circuit post rinseback is Grade 2 or greater for 2 consecutive treatments

5. Hemostasis time for arterial and venous needle sites is documented in the **Post Treatment screen**
6. Any directions for the next treatment (e.g. increase anticoagulation due to poor clearances, increase # of flushes, NS infusions) are to be documented in the **Nurses Worksheet** and in the **Progress Notes**. If the plan is for future resumption of anticoagulation, document the planned date of resumption in the reminders section of the **Nurses Worksheet**

If the patient is to receive anticoagulant-free dialysis for more than one treatment (as ordered by the physician), place the Tinzaparin order on hold. In the comment section of the Hemodialysis orders, include a prompt for reassessment and resumption of anticoagulation

7. For TOH inpatients, Tinzaparin for hemodialysis purposes is not to be transcribed onto the inpatient medication administration record (MAR)

Section G: Use of Dalteparin for Anticoagulation

1. Assessment of patient as per [Policy Neph 3-01](#) to determine their risk of bleeding, including ruling out any of the above indications for anti-coagulant free dialysis
2. Obtain syringe of Dalteparin (Fragmin) as ordered by physician/delegate
3. Medication is administered in the arterial port, in the same manner as described in Section A

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4. Evaluation of the circuit will be as above in Section D
5. Documentation will be as above in Section E

RELATED POLICIES / LEGISLATION:

1. Nephrology Policies and Procedures – [Hemodialysis – Section 03 – Patient Assessment and Management – Neph 3-01 \(#00726\) Pre-dialysis, Intradialysis and post dialysis assessment](#)
2. Nephrology Policies and Procedures – [Hemodialysis – Section 05 – A/V Fistula/Graft – Neph 5-01 \(#00741\) Initiation of Hemodialysis using an Established Arterio-Venous Fistula/Graft](#)
3. Nephrology Policies and Procedures – [Hemodialysis – Section 06 - Hemodialysis Catheters – Neph 6-01 \(#00748\) Initiating Hemodialysis with a Hemodialysis Catheter](#)
4. Nephrology Policies and Procedures – [Hemodialysis – Section 07 – Medication – Neph 7-10 \(#00885\) Medication Preparation & Administration Standards in Hemodialysis](#)


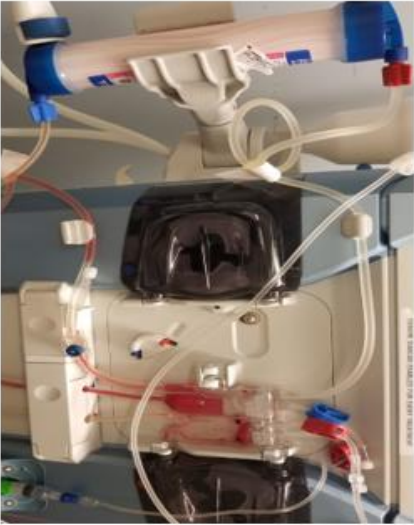



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1. Counts, C. (2008). American Nephrology Nurses' Association Core Curriculum. pgs 209-210, 690-692
2. Molsahn, E., Butera, E. (2006) [Contemporary Nephrology Nursing](#). Anthony J Janetti. Inc., New Jersey. Pgs 548-551
3. CPS [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2017 [updated 2017 May 26, cited 2018 Feb 23]. Innohep [product monograph] Available from <http://www.e-cps.ca>. Also available in paper copy from the publisher

COMMENTS / SIGNIFICANT REVISIONS:

1. Revised March 2018 to update for conversion from standard Heparin to Tinzaparin

APPENDIX A:

Grading of Dialyzer and Circuit Post Rinseback		
GRADE 0	GRADE 1	GRADE 2
 <p>Dialyzer clear, no clots or fibrin in chambers</p>	 <p>Few dark dialyzer fibers, less than 20% clotted and fibrin in venous chamber</p>	 <p>Many dark dialyzer fibers, more than 20% clotted and fibrin or clot in venous chamber</p>
GRADE 3	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Note: Contact the Nephrologist to reassess Tinzaparin dose if the grading of dialyzer and circuit post rinseback is Grade 2 or greater for 2 consecutive treatments.</p> </div> <p>TOH Nephrology Nurse Educators, March 2018</p>	GRADE 4
 <p>Mostly dark dialyzer fibers, more than 80% clotted and large clot in venous chamber</p>	 <p>Clotted circuit, unable to return patient's blood</p>	