



PROVINCIAL STANDARDS & GUIDELINES

Heparin Protocol NxStage

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Approved by the BCPRA Home Hemodialysis Committee and Medical Advisory Committee

Guideline created by:



In conjunction with:



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IMPORTANT INFORMATION

This BCPRA guideline/resource was developed to support equitable, best practice care for patients with chronic kidney disease living in BC. The guideline/resource promotes standardized practices and is intended to assist renal programs in providing care that is reflected in quality patient outcome measurements. Based on the best information available at the time of publication, this guideline/resource relies on evidence and avoids opinion-based statements where possible; refer to www.bcrenalagency.ca for the most recent version.

For information about the use and referencing of BCPRA provincial guidelines/resources, refer to <http://bit.ly/28SFr4n>.



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1.0 Practice Standard

Dialysate Composition

- The Home Hemodialysis (HHD) patient educator will review patient bloodwork.
- Under the direction of the Nephrologist, the HHD patient educator determines the dose of heparin to be delivered to patient on each hemodialysis run
- The HHD patient educator will have the necessary knowledge and skills to perform and teach the heparin procedure competently to patient.
- The patient will demonstrate an understanding of the procedure, and have documentation included on the chronic dialysis clinic chart, confirming successful certification in this procedure.

2.0 Equipment

For Heparin Loading Dose

- Heparin 1:1000 unit vial
- 3mL-10ml syringe for drawing up the heparin for the bolus
- 21 gauge needle

For Heparin Running Dose

- Heparin Pump
- 20 mL luer lock syringe for delivery of heparin during the hemodialysis treatment with heparin pump
- 21 gauge needle

3.0 Procedure & Rationale

	Procedure	Rationale
1	Starting dose of heparin as per prescribing nephrologist's orders.	
2	For clotting of the filter/cartridge <i>within first hour of treatment</i> , increase Heparin bolus dose by 500 units (= 0.5 cc) per run, to a maximum of 3000 units (= 3 cc).	IF CLOTTING PERSISTS FOLLOWING THESE INSTRUCTIONS, PATIENT SHOULD CONTACT THE HOME HEMODIALYSIS PATIENT EDUCATOR, WHO WILL DISCUSS WITH THE MOST RESPONSIBLE NEPHROLOGIST.
3	For clotting of the filter/ cartridge <i>after the first hour of the treatment</i> , discuss with prescribing nephrologist. The use of a heparin pump may be necessary.	
4	If bleeding occurs at any time, the nephrologist should be notified immediately.	Nephrologist may need to alter patient prescription and will need to be aware if patient suddenly requires emergency medical attention.
5	When adequate anticoagulation has been achieved (defined as clot-free filter/Nx Stage Cartridge), heparin requirements should be reviewed by the most responsible nephrologist at the next follow-up clinic.	To see if the required dose of heparin can be reduced. Excessive heparin can lead to bone demineralization.
6	In the event that the patient commences systemic anti-coagulation for any reason, the patient must immediately notify the Home Hemodialysis Nurse.	To review with the most responsible nephrologist regarding ongoing heparin requirements.
7	<p>Blood work should be reviewed on a regular basis with respect to the platelet count. In the event that the platelet count drops below 100:</p> <ul style="list-style-type: none"> • The heparin should be immediately discontinued (including priming and dwelling solution for cuffed catheters), and advice sought from the most responsible Nephrologist regarding anti-coagulation requirements. • In the event that the cause is felt to be due to Heparin-Induced Thrombocytopenia (HIT), as evidenced by a positive HIT assay, all heparin (including catheter-locking solutions) should be discontinued. The most responsible Nephrologist should document this adverse reaction (including an updated allergy status form) in the permanent dialysis record. 	<p>The most responsible nephrologist will be notified as soon as possible to facilitate establishment the etiology of the thrombocytopenia to protect patient from excessive uncontrolled bleeding</p> <p>4% citrate should be ordered to lock HD CVC</p> <p><i>Allergy to heparin to be documented and communicated to renal team to prevent a reoccurrence of Heparin-Induced Thrombocytopenia</i></p>
8	If warfarin or other anticoagulant started, notify the most responsible nephrologist.	The most responsible nephrologist needs complete information on the patient.

4.0 Documentation Considerations

1. Document on Training Checklist as permanent record of training.
2. Process, as per other medication orders. Ensure the correct dosage is recorded on the patient's Kardex and in the HD treatment field in PROMIS
3. Document any significant findings observed with respect to clotting parameters in the extra-corporeal circuit.
4. Document communications with most responsible Nephrologist.

5.0 Special Considerations

When blood comes into contact with foreign surfaces, including blood tubing and dialyzers, the clotting mechanism of blood is activated.

This clotting mechanism is activated through the adhesion and aggregations of platelets on these foreign surfaces. The platelets become damaged by contact with a foreign surface. As a result of this damage, platelet factors are released which cause the platelets to stick and start the clotting process. The extrinsic clotting cascade may then continue to significant thrombus formation and clotting of the extracorporeal (dialysis) circuit.

NOTE: There is an intrinsic clotting pathway initiated by rupture of vessels within the body (GI bleed, aneurysm) and an extrinsic clotting pathway, which is initiated by contact with air or foreign material.

Heparin is considered the anticoagulant drug of choice in the hemodialysis setting. Heparin binds to circulating anti-thrombin III, which then combines with the enzymes of various coagulation factors leading to the inactivation of these factors at the platelet membrane. Heparin has little effect on platelet-surface interaction.

The half-life of heparin is 30 to 120 minutes. Heparin's effects may be reversed with the use of protamine sulphate. Protamine sulphate can be used in "regional heparinization". (For a review of the various methods of anticoagulation refer to references below).

Typical undesirable side effects of heparin include: pruritus, allergy, osteoporosis, hyperlipidemia, thrombocytopenia and excessive bleeding. Careful controlled use of heparin may minimize some of the side effects.

NOTE: Bone and joints: prolonged therapeutic doses > 3 months have been associated with osteoporosis and spontaneous vertebral fractures.

PTT results are an objective method of monitoring effectiveness of heparinization. For information regarding bedside heparin monitoring devices see the references below.

NOTE: INR/PT are used to objectively monitor the effectiveness of the anticoagulant effects of warfarin (Coumadin).

6.0 Assessment Requirements

Clear evidence of persistent (more than one episode, especially with our long term hemodialysis patients) clotting of the hemodialysis extracorporeal system needs to be apparent before increasing the heparin dose due to the significant long-term side effects of heparin. Significant clotting would include a rating of “3-4” for the NxStage dialyzer.

The new hemodialysis patient may not experience clotting to the extracorporeal system. However the a long-term hemodialysis patient may have the occasional clotting that may not require a change in heparin dose, because:

- the clotting episode may be due to slower pump speeds,
- or more than usual blood pump stoppages that day,
- difficulty needling the access which activates the clotting cascade,
- more than his/her usual fluid removed leading to an increased hematocrit hence increased stickiness of the blood.

7.0 References

Core Curriculum for Nephrology Nursing, 6th Edition. (2015) American Nephrology Nurses' Association (ANNA).

Daugirdas, John T; Blake, Peter G; Ing, Todd S; Gallieni, Maurizio.(2014) Handbook of Dialysis, 5th Edition. (2014). Lippincott, Williams &Wilkins, NY.

Kallenbach, Judith Z. (2015) Review of Hemodialysis for Nurses and Dialysis Personnel, 9th Edition. Mosby Inc.

The National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF- KDOQI) 2006, Clinical Practice Guidelines For Vascular Access

8.0 Sponsors

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