



MANITOBA RENAL PROGRAM

SUBJECT <ul style="list-style-type: none"> ▪ Providing Hemodialysis without Heparinization 	SECTION 30.10 Hemodialysis Equipment and Procedures
	CODE 30.10.13
AUTHORIZATION <ul style="list-style-type: none"> ▪ Professional Advisory Committee, Manitoba Renal Program ▪ Nursing Practice Council, St. Boniface Hospital 	EFFECTIVE DATE January 2000
	REVISION DATE April 2009 September 2012 October 2015 October 2018

PURPOSE:

1. To provide instruction for performing hemodialysis to patients who are at high risk for bleeding and who are not suitable candidates for low doses of heparin.

POLICY:

1. Heparin-free dialysis can be initiated based on nursing assessment. Notify physician prior to patient's next treatment.
2. Long term heparin-free hemodialysis treatments require a physician's order.
3. Indications for heparin-free dialysis would include (but not exclusively):
 - Patients with platelets less than 100×10^9 /Liters
 - Patients with pericarditis/pericardial effusion
 - Patient with prolonged bleeding and/or bleeding episodes related to vascular access (arteriovenous fistula/graft)
 - Patients with active bleeding/a recent bleed/post-surgery
 - Patients with or suspected Heparin-Induced Thrombocytopenia (HIT)
4. Heparin free dialysis may be performed using different strategies based on nursing assessment and by type of priming solution used:
 - a) Normal Saline (0.9 % NaCl) priming. There are two methods for performing 0.9% NaCl infusions as described below in section 1A and 1B. The method selected is at the nurse's discretion and individualized for the specific patient based upon patient's tolerance and successful prevention of system clotting.
 - b) On-Line priming: See Section 2. Bolus amounts of substitute may be administered as per MRP Policy 30.10.05 *Providing a Fluid Bolus using the Fresenius 5008 ONLINEplus™ System*.
 - c.) No flushes or infusion is an option for both normal saline priming and OnLine priming. See Section 3. Careful monitoring of TMP, venous pressure and/or decreased clearance values is required. It is recommended that prior to initiating this method, an hourly flush method be trialed.

PROCEDURE:

1. Heparin Free Hemodialysis for Normal Saline (0.9% NaCl) priming method:

- A) Intermittent normal saline flushes/boluses
- B) Continuous infusion of normal saline

1A. Intermittent Normal Saline Flushes/Boluses

1. Prior to initiating hemodialysis verify that the heparin line is clamped. If syringe is not connected to the heparin infusion line, check that cap is securely fastened to end of line.

2. Check heparin pump setting on the heparin sub screen. Verify that the automatic start and bolus function is turned off for the pump and bolus.

3. Initiate dialysis as per procedure.

4. Monitor the following parameters during treatment:

a. Blood flow and frequency of blood pump interruptions.

b. Transmembrane pressure (TMP).

c. Venous pressure

d. On line clearance tests and cumulative and projected Kt/V values

5. Perform saline flushes every half hour as follows:

KEY POINT:

- Air can enter into the extracorporeal circuit during hemodialysis if the cap is not secure.

- It is not possible to set the heparin pump to 0 mL/hr.

- When treatment starts ensure heparin pump is turned off.

- Blood flow rates below 200 mL/min and frequent stopping of the blood pump increases chance of clotting.

- Decreasing TMP may indicate clotting of the dialyzer fibres (negative TMP indicates severe clotting or a kink in venous bloodline below dialyzer) however, as the Fresenius 5008 operates volumetric control within a closed loop system there may not be marked changes in TMP despite clotting.

- TMP is also affected by:
 - Ultrafiltration rate
 - Dialyzer type
 - Blood flow rate

- Increased venous pressure may indicate clot formation in the venous bubble catcher.

- Decreased venous pressure may indicate clotting of the dialyzer fibres.

- Decreased online clearance values and Kt/V may occur as result of dialyzer clotting and/or decreased Qb

- The frequency of flushes may be increased or decreased as per nursing assessment.

- Total volume of flushes anticipated must be calculated into planned fluid removal.

- If recording blood pressures at the same time as providing flushes, perform BP measurement prior to administering bolus as the bolus may momentarily increase the patient's blood pressure and cause an inaccurate BP measurement

PROCEDURE:

- a. Note the TMP prior to the flush.
- b. Turn blood pump down to 200 mL/minute.
- c. Open the left door of the Fresenius 5008
Blood pump will stop.
- d. Open roller clamp on IV administration line and open clamp on T-line.
- e. Clamp arterial blood line between patient and machine before T-line.
- f. Close the left door or press *CONTINUE* to start blood pump.
- g. Infuse 100 mL of 0.9% NaCl over 30 seconds.
- h. Observe dialyzer and chamber for failure to clear and estimate fiber loss.
- i. Stop the blood pump. Unclamp arterial blood tubing between patient and the machine.
- j. Clamp both 0.9% NaCl administration set and T-line.
- k. Resume desired blood flow rate.
- l. Document flush volume and observations on *Hemodialysis Treatment Record*.

6. Be prepared to perform the following interventions if significant clotting occurs.

- a. Reinfuse blood before extracorporeal circuit clots.
- b. Prepare a new set-up as per MRP policy 30.10.09 *Changing the Extracorporeal circuit during hemodialysis treatment for the Fresenius 5008*. Resume dialysis if required
- c. Initiate low dose heparin if ordered by physician's order.

1B. Continuous Infusion of Normal Saline (For Normal Saline Prime ONLY)

KEY POINT:

- TMP can be recorded on page 2 of the hemodialysis treatment record.
- Ensure adequate amount of 0.9%NaCl to complete flush.

- Blood pump will automatically start once door is closed.

- A venous pressure alarm may occur immediately following a flush.
- Record any clotting of the dialyzer fibers and chambers using the following guidelines:
 - none
 - FF few fibres
 - MF moderate fibres
 - LF large amount of fibres

- Record UF removed and Na+ if using Na+ Profile, KT/V, time remaining as required.
- Recalculate UF goal to account for reinfusion volume.

- Follow MRP policy 80.20.01 *Guidelines for Heparinization during Hemodialysis*. If dialysis needs to resume, maintain patency of patient access.

- Continuous infusion cannot be used as a method for OnLine priming as the infusion port on the arterial bloodline is used to attach the Safeline
- It is not recommended to attach continuous infusion to the T-Line due to risk of air entering the extracorporeal circuit as the T-line is situated pre blood pump.

PROCEDURE:

1. Prior to initiating hemodialysis verify that the heparin line is clamped. If syringe is not connected to the heparin infusion line, check that cap is securely fastened to end of line.

2. Check heparin pump setting on the heparin sub screen settings. Verify that the automatic start and bolus function is turned off for the pump and bolus.

3. Attach a 1 litre 0.9% NaCl IV bag to an IV administration set, prime the tubing, and load set to infusion pump.

4. Connect the IV administration set to the arterial medication port on the bloodline. (Luer lock port on the arterial bloodline pre-dialyzer>)

5. Unclamp the IV administration set and start infusion once dialysis treatment is initiated.

6. Monitor the following parameters during treatment:

a. Blood flow and frequency of blood pump interruptions.

b. Transmembrane pressure (TMP)

KEY POINT:

▪ Air can enter into the extracorporeal circuit during hemodialysis if the cap is not secure.

▪ It is not possible to set the heparin pump to 0 mL/hr.

▪ In general, total volume to be infused is approximately 200 mL per hour of treatment.

▪ Total volume of infusion anticipated must be calculated into planned fluid removal

▪ The administration set should be attached to the arterial blood line post blood pump and pre dialyzer.

▪ Once HD is started, the following alarm/warning may appear:

*External leakage in the dialysate circuit.
Check the dialyzer couplings!"*

▪ Information reads:

Possible cause:

- *Medication administered or infusions connected*
- *Sampling valve not correctly closed*
- *Dialysate lines leaking*
- *Air in the dialysate circuit*

Possible remedy:

Remove remaining air from the dialyzer

▪ Press Confirm if the check successful,

▪ If required, an intermittent flush may be performed at any point in order to visualize the dialyzer fibers.

▪ Blood flow rates below 200 mL/min and frequent stopping of the blood pump increases chance of clotting.

▪ Decreasing TMP may indicate clotting of the dialyzer fibres;(negative TMP indicates severe clotting or a kink in venous bloodline below dialyzer) however as the Fresenius 5008 operates volumetric control within a closed loop system there may not be marked changes in TMP despite clotting.

▪ TMP is also affected by:

- Ultrafiltration rate
- Type of dialyzer
- Blood flow rate

PROCEDURE:

- c. Venous pressure

- d. On line clearance tests and cumulative and projected Kt/V values

7. Be prepared to perform the following interventions if excessive clotting occurs.

- a. Reinfuse blood before extracorporeal circuit clots.
- b. Prepare a new set-up as per MRP policy 30.10.09 *Changing the Extracorporeal circuit during hemodialysis treatment for the Fresenius 5008*. Resume dialysis if required.
- c. Initiate low dose heparin if ordered by physician's order.

2. Heparin Free Hemodialysis using intermittent flushes/boluses when using OnLine priming method

- 1. Prior to initiating hemodialysis verify that the heparin line is clamped. If syringe is not connected to the heparin infusion line, check that cap is securely fastened to end of line.

- 2. Check heparin pump setting on the heparin sub screen settings. Verify that the automatic start and bolus function is turned off for the pump and bolus.

- 3. Perform substitute bolus/flush every half hour.

KEY POINT:

- TMP can be recorded on page 2 of the hemodialysis treatment record.

- Increased venous pressure may indicate clot formation in the venous bubble catcher.
- Decreased venous pressure may indicate clotting of the dialyzer fibres

- Decreased online clearance tests and Kt/V may occur as result of dialyzer clotting and/or decreased Qb.

- Record UF removed and Na⁺ if using Na⁺ Profile, KT/V, time remaining as required.
- Recalculate UF goal to account for reinfusion volume.

- Follow MRP policy 80.20.01 *Guidelines for Heparinization during Hemodialysis*. If dialysis needs to resume, maintain patency of patient access.

- Continuous infusion cannot be used as a method for OnLine priming as the infusion port on the arterial bloodline is used to attach the SafeLine
- It is not recommended to attach continuous infusion to the T-Line due to risk of air entering the extracorporeal circuit as the T-line is situated pre blood pump.
- Refer to MRP Policy 30.10.05 *Providing a Fluid Bolus using the Fresenius 5008 ONLINEplus™ System*.

- Air can enter into the extracorporeal circuit during hemodialysis if the cap is not secure,

- It is not possible to set the heparin pump to 0 mL/hr.

- The frequency of flushes may be increased or decreased as per nursing assessment.
- Total volume of flushes anticipated must be calculated into planned fluid removal
- If recording blood pressures at the same time as providing flushes, perform BP measurement prior to administering bolus as the bolus may momentarily increase the patient's blood pressure and cause an inaccurate BP measurement.

PROCEDURE:

4. Note the TMP prior to the flush.
5. Go to *Options* screen and select **ONLINE**
6. Screen appears with dropdown menu:
Choose Volume
 - a. Select 120 mL volume for adult blood lines and dialyzers.
 - b. If nurse determines on assessment other volume (more or less) should be given alternate volume can be selected
 - c. Total volume given during treatment is added to UF Goal
7. Press **Bolus I/O** button to start bolus.
7. Once blood pump starts, lower blood pump speed to **0** mL/min.
8. Visualize dialyzer and venous chamber for clotting.
9. Increase blood pump speed when prompt appears to increase blood flow to pre bolus mL/min.
10. Document bolus /flush volume delivered and observations on *Hemodialysis Treatment Record*.
11. Monitor the following parameters during treatment:
 - a. Blood flow and frequency of blood pump interruptions.
 - b. Transmembrane pressure (TMP)

KEY POINT:

- TMP can be recorded on page 2 of the hemodialysis treatment record.
- Volume options given in increments of 30 mL (30 mL – 240 mL)
- Volume can be dependent on size of dialyzer and/or risk of clotting.
- Substitute pumps starts and then stops upon completion of volume chosen
- Qb (blood pump) will be at 50 mL/min
- Bolus infusion rate (substitute pump) will be Qb before bolus selected minus 50.
- This ensures that blood does not mix with the substitute thus making it easier to visualize clotting in extracorporeal circuit.
- Changes in TMP, clearance, and venous pressure may also indicate clotting in extracorporeal circuit.
- The cumulative amount of bolus received is displayed on the “Bolus” screen
- Record any clotting of the dialyzer fibers and chambers using the following guidelines:
 - none
 - FF few fibres
 - MF moderate fibres
 - LF large amount of fibres
- If required, an intermittent flush may be performed at any point in order to visualize the dialyzer fibers.
- Blood flow rates below 200 mL/min and frequent stopping of the blood pump increases chance of clotting.
- Decreasing TMP may indicate clotting of the dialyzer fibres; (negative TMP indicates severe clotting or a kink in venous bloodline below dialyzer) however as the Fresenius 5008 operates volumetric control within a closed loop system there may not be marked changes in TMP despite clotting.
- TMP is also affected by:
 - Ultrafiltration rate
 - Blood flow rate

PROCEDURE:

- c. Venous pressure

- d. On line clearance tests and cumulative and projected Kt/V values

12. Be prepared perform the following interventions if excessive clotting occurs.

- a. Reinfuse blood before extracorporeal circuit clots.
- b. Prepare a new set-up as per MRP policy 30.10.09 *Changing the Extracorporeal circuit during hemodialysis treatment for the Fresenius 5008*. Resume dialysis if required
- c. Initiate low dose heparin if ordered by physician's order.

3. No Flushes or Infusions

1. Review patient's hemodialysis records to determine patient's history of extracorporeal circuit clotting during hemodialysis.

2. Prior to initiating hemodialysis verify that the heparin line is clamped. If syringe is not connected to the heparin infusion line, check that cap is securely fastened to end of line.

3. Check heparin pump setting on the heparin sub screen settings. Verify that the automatic start and bolus function is turned off for the pump and bolus.

4. Initiate dialysis as per procedure.

5. Monitor the following parameters during treatment:

- a. Blood flow and frequency of blood pump interruptions.
- b. Transmembrane pressure (TMP).

Document TMP reading q 30 minutes on page 2 of the hemodialysis treatment record

KEY POINT:

- Type of dialyzer
- Increased venous pressure may indicate clot formation in the venous bubble catcher.
- Decreased venous pressure may indicate clotting of the dialyzer fibres

- Decreased online clearance tests and Kt/V may occur as result of dialyzer clotting and/or decreased Qb
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- Record UF removed and Na+ if using Na+ Profile, KT/V, time remaining as required.
- Recalculate UF goal to account for reinfusion volume.

- Follow MRP policy 80.20.01 *Guidelines for Heparinization during Hemodialysis*. If dialysis needs to resume, maintain patency of patient access.

- It is recommended that prior to initiating this method, an hourly flush method be trialed.
- If required, an intermittent flush may be performed at any point in order to visualize the dialyzer fibers.

- Air can enter into the extracorporeal circuit during hemodialysis if the cap is not secure.

- It is not possible to set the heparin pump to 0 mL/hr.

- When treatment starts ensure heparin pump is turned off.

- Blood flow rates below 200 mL/min and frequent stopping of the blood pump increases chance of clotting.
- Decreasing TMP may indicate clotting of the dialyzer fibres; (negative TMP indicates severe clotting or a kink in venous bloodline below dialyzer) however as the Fresenius 5008 operates volumetric control within a closed loop system there may not be marked changes in TMP despite clotting.

PROCEDURE:

- c. Venous pressure
- d. On line clearance tests and cumulative and projected Kt/V values

6. Be prepared to perform the following interventions if excessive clotting occurs.

- a. Reinfuse blood before extracorporeal circuit clots.
- b. Prepare a new set-up as per MRP policy 30.10.09 *Changing the Extracorporeal Circuit during Hemodialysis Treatment for the Fresenius 5008*. Resume dialysis if required
- c. Initiate flushes or infusion as described in section 1 or 2 above or initiate low dose heparin if ordered by physician's order.

KEY POINT:

- TMP is also affected by:
 - Ultrafiltration rate
 - Blood flow rate
 - Type of dialyzer
- Increased venous pressure may indicate clot formation in the venous bubble catcher.
- Decreased online clearance tests and Kt/V may occur as result of dialyzer clotting and/or decreased Qb.

- Record UF removed and Na⁺ if using Na⁺ Profile, KT/V, time remaining as required.
- Recalculate UF goal to account for reinfusion volume.
- Follow MRP policy 80.20.01 *Guidelines for Heparinization during Hemodialysis*. If dialysis needs to resume, maintain patency of patient access.

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