PURPOSE:

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

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 x 10^9/Liters
   - Patients with pericarditis/pericardial effusion
   - Patient with prolonged bleeding and/or bleeding episodes r/t vascular access (Atreiovenous fistula)
   - 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 trial and error as described below:
   - There are two methods for performing 0.9% NaCl infusions described below. 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.
   - Alternatively, not performing flushes is an option. However TMP changes, venous pressure rise or decreased clearance values may occur and should be monitored. It is recommended that prior to initiating this method, an hourly flush method be trialed.
PROCEDURE:  

A. Method I: Intermittent Normal Saline Flushes

1. Establish vascular access using 0.9% NaCl as prime.

2. Initiate dialysis as per procedure.

3. Perform saline flushes every half hour as follows:

   a. Turn blood pump down to 200 mL/minute.
   b. Open clamp on administration line and 0.9% NaCl T line.
   c. Clamp arterial blood line between patient and arterial chamber before T-line.
   d. Infuse 100 mL of 0.9% NaCl over 30 seconds.
   e. Observe dialyzer and chamber for failure to clear and estimate fiber loss.
   f. Unclamp arterial blood tubing between patient and the arterial chamber.
   g. Clamp both 0.9% NaCl administration set and T-line.
   h. Resume desired blood flow rate.
   i. Document flush volume and observations on Hemodialysis Treatment Record.

4. Monitor the following parameters during treatment:

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

KEY POINT:

- Heparin line remains clamped. Check that cap is securely fastened to end of line.
- When treatment starts ensure heparin pump is turned off.
- Total volume of flushes anticipated must be calculated into planned fluid removal. The frequency of flushes may be increased or decreased as per nursing assessment.
  - For pediatric hemodialysis, normal saline flush volumes must be prescribed by physician.
- Ensure adequate amount of 0.9%NaCl to complete flush.
- A high venous pressure alarm may occur immediately following a flush.
- Record any clotting of the dialyzer fibers and chambers using the following guidelines:
  - FF = a few fibers clotted
  - SF = small amount fibers clotted
  - MF = Moderate amount of fibers clotted
- Blood flow rates below 200 mL/min increases chance of clotting.
- Increased TMP decreased online clearance and increased venous pressures may indicate clotting in dialyzer.
PROCEDURE:

5. Be prepared to act on the following interventions if moderate clotting occurs.
   a. Initiate low dose heparin as per physician’s order.
   b. Return blood before extracorporeal circuit clots.
   c. Resume dialysis if required.

KEY POINT:

- Record UF removed and Na if using Na Profile, KT/V, time remaining as required.
- If dialysis needs to resume, maintain patency of patient access.
- Recalculate UF goal to account for reinfusion volume.

B. Method II: Continuous Normal Saline Infusion

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

2. Connect administration set to the arterial medication port on the bloodline.

3. Program pump to infuse desired volume over entire length of treatment.

4. Unclamp administration set and medication port and start infusion once dialysis treatment is initiated.

5. Monitor the following parameters during treatment:
   a. Blood flows and frequency of blood pump interruptions.
   b. Transmembrane pressure and venous pressure.

6. Be prepared to act on the following interventions if excessive clotting occurs.
   a. Initiate low dose heparin as per physician’s order.
   b. Return blood before extracorporeal circuit clots.
   c. Resume dialysis if required.

- The administration set should be attached to the arterial blood line post blood pump and pre dialyzer.
- Include this volume in fluid calculation and adjust UF Goal accordingly.
- Recommended volume is 200ml/hour but can be individualized to patient

- If required, an intermittent flush may be performed at any point in order to visualize the dialyzer fibers.
C. Method III: No 0.9% NaCl Infusion

1. Monitor the following parameters during treatment.
   a. Blood flows and frequency of blood pump interruptions.
   b. Transmembrane pressure and venous pressure.

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

2. Be prepared to act on the following interventions if excessive clotting occurs.
   a. Initiate low dose heparin as per physician’s order.
   b. Return blood before extracorporeal circuit clots.
   c. Resume dialysis if required.

   ▪ Record UF removed and Na if using Na Profile, KT/V, time remaining as required.
   ▪ If dialysis needs to resume, maintain patency of patient access.
   ▪ Recalculate UF goal to account for reinfusion volume.

REFERENCES:


Personal Communication (Dr. Paul Komenda Nephrologist Manitoba Renal Program and Dr. Ryan Zarychanski Medical Oncology and Hematology.