



# **DIALYSIS MANUAL**

<b>TITLE:</b> DIALYSIS MANUAL	<b>MANUAL NUMBER:</b> ZH/MANUAL/DIAS	
<b>PREPARED BY:</b> HOD NEPHROLOGY	<b>VERIFIED BY:</b> QUALITY TEAM	<b>APPROVED BY:</b> CEO
<b>JCI STANDARD:</b> NA	<b>DATE ISSUED:</b> Aug 2007	<b>DATE REVISED:</b> 4 <sup>th</sup> June 2012

## HEMODIALYSIS

Hemodialysis is a process of cleansing the blood of accumulated waste products. It is used for patient with end stage renal failure or acutely ill patient who requires short term dialysis

Dialysis is performed in the dialysis unit where Hemodialysis machines have been installed with dedicated reverse Osmosis Water treatment plant. Dialysis is performed by trained nurse on the order of the Nephrologist.

The dialysis nurse ensures that the patient is negative for HbsAg (Hepatitis B, Hepatitis C surface antigen and HIV). Patients positive for HbsAg are referred to another Hospital where dedicated machine is available.

Hepatitis C Antibody and HIV antibody reports are obtained prior to dialysis.

Hepatitis C positive patients are dialyzed in separate dialysis unit (unit 1).

If positive for Hepatitis C Antibody and HIV, extra precautions can be taken by the staff as below.

### **One to one Nursing.**

- Nurse wears gowns, mask, gloves and goggle for the entire duration of dialysis.  
Careful cleaning of dialysis machine and the dialysis unit environmental surfaces.
- The dialysis nurse is well versed with the detailed procedure of dialysis and heparinisation schedules, which are kept in the dialysis unit.
- The details such as vascular access, chosen heparinisation schedule and ideal body weight will be communicated by the Nephrologist to the dialysis nurse.
- Informed consent is obtained from the patient (or next of kin if the patient unable to take the decision) every Hemodialysis.
- Dialysis is performed and records are maintained during the procedure.
- In case of medical emergency duty doctor in Medical ward on call is informed and the Nephrologist notified.

- Dialysers and tubings are not reused in the dialysis unit.
- The buffer used is Bicarbonate. Acetate is not used any more.
- In cases of elective dialysis, the date and time of the next dialysis is communicated verbally and in writing to the patient.
- Inj: Erythropoietin is administered if indicated intravenously at the end of dialysis.

## **4.0 PROCEDURE:**

### **4.1 PREDIALYSIS SAFETY CHECK**

- Ensure proper functioning of water system through performing on-site chemical testing and gauge readings.
- Ensure absence of chemical used to disinfect dialysis machine.
- Correct concentrate(s) present.
- Correct patient dialyser is present.
- Ensure proper functioning of dialysis machine through checking alarm and /or pressure holding tests.

### **4.2 PREPARATION OF THE MACHINE**

- Turn on the water supply.
- Put the machine in the Disinfection and Rinse mode for 38mts.
- Press Hemodialysis mode for self test sequence.
- Connect acid concentrate line (red) to the acid can.
- Connect Bibag (bicarbonate powder) to the machine after self test.
- After the Bibag has been connected, an automatic program will be started. This program will first remove all air from the Bibag and fill the bag with water.
- After the test passed connect the dialysate connector(red) to the dialyser inlet port, and other dialysate connector(blue) connect to the dialyser outlet port.
- Connect the dialyser and bloodlines to the machine.
- Rinse the dialyser and bloodlines with 1000ml Normal Saline.
- Set the treatment parameters. Acknowledge data before connecting patient.

### 4.3 INITIATING HEMODIALYSIS TREATMENT

**Venous pressure** – measurement of the extracorporeal blood circuit after the dialyzer and before the blood re-enters the patient’s body; it measures the resistance of the blood returning to the patient via the venous needle.

**Arterial pressure** – measurement of the extracorporeal blood circuit between the needle site and site near the blood pump. It is equivalent as the negative pressure created by the blood pump.

**Acceptable pressure limits** – pressure limits in the initiation of dialysis treatment with blood flow rate of 100-140ml/min:

Arterial – (negative 20 to 80 mmHg)  
Venous – (positive 50 to 100 mmHg)

#### **Resources Required:**

- Dialysis machine, set up with prescribed order
- Gloves
- Patient's Hemodialysis Prescription
- Hemodialysis log sheet

#### **Prepare equipment:**

- Check the patient's dialysis prescription against the set up sign on the log sheet.
- Ensure that the person setting up the machine has completed the residue test and the alarm check for the machine and has signed in the log sheet.
- Set the machine parameters as ordered:
  - Dialysis type
  - Heparin dosage
  - Target fluid loss
  - Duration of treatment
  - Concentration of dialysate
  - Temperature

- Bicarbonate
- Potassium concentration of bath

**Prepare the patient:**

- Explain the procedure to the patient.
- Prior to initiating dialysis, the patient should be assessed for vital signs (blood pressure, temperature, pulse rate), weight, and general well being.
- Prepare patient's access (see procedures for insertion of needle or preparing central venous catheters).
- If using central line, place the patient in supine position.

**Connect the Patient:**

- Turn blood pump "OFF".
- Clamp saline line.
- Clamp arterial bloodline and arterial line of the drainage bag.
- Attach arterial end of bloodline to patient's arterial access and ensure that connection is secured.
- Unclamp both arterial clamps (patient and bloodlines).
- Turn blood pump "ON" at 100-140 ml/min.
- Allow blood to prime the lines (drainage bag will fill with saline); when blood reaches venous drip chamber, turn blood pump "OFF".
- Clamp venous bloodline and venous line of drainage bag.
- Disconnect venous line from drainage bag and attach to patient's venous access.
- Unclamp both venous clamps (patient and bloodlines).
- Turn pump "ON" at 100-140 ml/min, observe venous closely for acceptable pressure limits and observe the patient's access for swelling and bleeding.
- Once arterial and venous pressure parameters are stable, blood flow rate can be increased gradually to 300ml/min.
- Document the procedure.

## **Initiation of hemodialysis**

- Receive the patient.
- Explain the procedure to the patient. Obtain informed signed consent.
- Check the weight and vital signs.
- Set the parameters as per the physicians order.
- Set the Inj: Heparin as per the physicians order.
- Prepare the access and connect the bloodlines (artery and venous) to the patient.
- Release the clamp and start the blood pump.
- Keep the blood pump speed to a required speed.
- Watch arterial and venous pressure monitors
- Put on ultrafiltration menu; make sure the machine is in the dialysis mode.
- Check the vital signs every 30mts and record it.

## **4.4 TERMINATION OF DIALYSIS**

- Reduce the pump speed up to 100-150ml/mt and stop it.
- Clamp the arterial needle and tubing also.
- Disconnect the tubing from the arterial needle.
- Connect the I.V.set with the connector to the arterial line.
- Switch on the blood pump and return the blood to the patient.
- Clamp the venous needle venous line.
- Disconnect tubing from the patient and take out tubing and dialyser from the machine.
- Remove the needle at the same angle as it was inserted to avoid extending the incision.
- Do not apply any pressure until the needle is completely withdrawn from the skin.
- Apply moderate, direct pressure over the site where the needle entered the access not the insertion site of the skin. Palpate the access above and below site for a thrill. Too

little pressure may lead to prolonged bleeding or hematoma formation from oozing.  
Excessive pressure may lead to clotting of the access.

- Continue to apply pressure for 5-10mts.
- Clean and dress the site when bleeding is stopped

#### **4.5 ADMINISTRATION OF IRON SUCROSE DURING HEMODIALYSIS TREATMENT**

##### **Resources Required:**

- 1 bag 100cc normal saline
- 1 pc 10cc syringe
- 1 pc 18G aspirating needle
- Infusion pump
- Infusion set

##### **Procedure:**

- Check doctor's order.
- Explain procedure to the patient.
- Complete hand washing.
- Prepare materials needed.
- Check the dosage and expiry date of the drug.
- Draw 5ml (100 mg) of iron sucrose and dilute it to 100cc normal saline.
- Connect infusion set to 100cc normal saline bag.
- Set up infusion set with iron sucrose solution to infusion pump
- Prime infusion set and attach to venous chamber port.
- Start infusion:
  - For the test and first dose, infuse the first 25mg of iron sucrose solution (25ml) over a period of at least 15 minutes. If no adverse effects are observed, infuse the remaining solution over a period of at least 45 minutes.
  - Note: The physician must be present for the first 15 minutes of infusion during the first administration.



- For subsequent doses, infuse solution over 60 minutes.
- Observe patient for any adverse reaction.
- Note: For any adverse reactions, stop infusion immediately and notify the Nephrologist.
- Document procedure completed.

#### **4.6 BLOOD GLUCOSE MONITORING OF HEMODIALYSIS PATIENTS**

##### **Resources Required:**

- Blood glucose meter
- Test strip
- Non-sterile gloves
- Alcohol swab
- 1 pc 1cc Syringe
- 1 pc 23G needle

##### **Procedure:**

- Complete hand washing.
- Don disposable non-sterile gloves.
- Turn on the glucose meter.
- Prepare the meter by validating the proper calibration with the strip to be used (this involves matching a code number on the strip bottle to the code registered on the meter); the meter will indicate its readiness for testing blood glucose by message or symbol.
- Cleanse the arterial port with alcohol swab and withdraw 0.1 ml of blood.
- Apply the blood carefully to the test strip area.
- Insert test strip to glucose meter; wait until reading/result appears.
- Document the result.
- Refer if result is <60mg/dl (3.3mmol), or >250mg/dl (18.8mmol).

## 4.7 BLOOD TRANSFUSION DURING HEMODIALYSIS

### Resources Required:

- 1 pc Y-type blood transfusion set
- Infusion pump
- 1 bottle 500ml normal saline
- Blood product as prescribed

### Procedure:

- Check the doctor's order.
- Inform the patient of the procedure, blood product to be given and desired outcome of the transfusion.
- Obtain and record baseline vital signs.
- Prepare materials needed.
- Obtain blood products from the blood bank. Inspect blood for abnormal color, cloudiness, clot, or excess air. Read instruction on the product label regarding storage and infusion.
- Check expiration date.
- Verify patient identification:
  - Ask the patient to state his/her full name and compare it with name on the blood bag and blood transfusion sheet. If the patient is unable to state his/her name, verify identification with an individual familiar with the patient.
  - Confirm ABO Rh compatibility by comparing the bag label, bag tag, blood transfusion sheet and the medical doctor's order. Check bag labels for expiration date and satisfactory serologic testing; blood products must be checked / stickers to be signed two Registered Nurses.

Note: Do not proceed with the transfusion if there is any discrepancy between patient identification and blood bag information; in such cases, contact blood bank immediately.

- Start transfusion slowly (check and document vital signs). Remain at bed side for 15-30 minutes. If there are no signs of any adverse effect, increase flow to prescribed rate.

Note: Blood products (1 bag) can be transfused within 45 minutes to 1 hour on the first two hours of hemodialysis treatment.

- Observe the patient closely; check vital signs at least every 15 minutes. Report signs of any untoward reaction.
- Document the following:
  - Date, time, and name of person starting and ending the transfusion.
  - Name of individuals verifying patient identification.
  - Product identification number.
  - Product and volume infused.
  - Immediate response – example "No apparent reaction".
  - In the event of a blood transfusion reaction, a form for blood transfusion reaction is to be filled up. Blood bag and transfusion set should be returned to the blood bank together with the form.

#### **4.8 MANAGEMENT OF BLOOD TRANSFUSION REACTION IN THE HEMODIALYSIS PATIENT**

##### **Resources Required:**

- Vital signs equipment
- Hydrocortisone (IV)
- Antihistamines

##### **Procedure:**

- Check for signs and symptoms of blood transfusion reaction
- Skin rashes/pruritus/itchiness
- Chills
- Increase in temperature

- Difficulty breathing / dyspnea
- Backache
- Wheezes
- Chest pain
- Hypotension
- When any of the mentioned signs and symptoms are present, stop blood transfusion immediately.
- Inform the Nephrologist concerning the patient's untoward manifestation(s).
- Send transfused blood bag to blood bank.
- Administer oxygen to the patient.
- Check patient's vital signs (blood pressure, respiratory rate, pulse rate, and temperature).
- Document patient's complaint/s and inform the Nephrologist.
- In the event of severe itching and bronchospasm, give Hydrocortisone 100mg IV immediately and/or Antihistamine tablet/injection as per doctor's order.
- Check patient's vitals signs every 15 minutes for 1 hour.
- If assessed to be still unstable, the doctor will evaluate and take appropriate decision.
- Document the time of reaction and interventions done.
- Generate an IR and send it to Quality Department.

#### **4.9 COLLECTION OF SPECIMEN FOR UREA TESTING POST DIALYSIS TREATMENT**

##### **Resources Required:**

- Appropriate vacutainer (yellow top)
- Vacutainer needle
- Vacutainer holder
- Clean gloves
- Alcohol swab

**Procedure:**

- Check doctor's order.
- Wear gloves.
- Wait until dialysis time is completed.
- Wipe arterial port with alcohol swab then draw 3cc of blood.
- Collect blood sample in appropriate vacutainer.
- Label the vacutainer appropriately then send specimen to laboratory.
- Take patient off the machine as normal.

**4.10 DISCONTINUATION OF HEMODIALYSIS TREATMENT (CLOSED SYSTEM)**

Dialyzer appearance – appearance of dialyzer post-dialysis, graded as follows:

0 – Clear of any residual blood
1 – Visible clotting in a few fibers
2 – Visible clotting in a bundle of fibers
3 – Visible clotting in 50% of fibers
4 – Visible clotting in >50% of fibers

**Material Required:**

- 1 bottle 500cc Saline IV

**Procedure:**

- Explain procedure to the patient.
- Turn blood pump “OFF”.
- Clamp blood line before arterial chamber using a tube occluding forceps.
- Open IV port clamp.
- Allow normal saline to flow back to the arterial access by means of gravity.
- Clamp arterial needle and arterial blood tubing once clear of blood.
- Remove tube occluding forcep.

- Turn "ON" blood pump up to 140ml/min allowing the saline to flow.
- Note: Milking the bloodline or intermittently clamping them loosens red blood cells and maximizes blood return to the patient. Use the tube-occluding forceps for this.
- Turn blood pump "OFF".
- Clamp both the venous access and the bloodlines.
- Disconnect bloodlines from the venous access.
- Document:
  - Dialyser appearance.
  - Liters processed (cumulative blood volume).
  - Total fluid removed

#### **4.11 GUIDELINE FOR HEPARINIZATION IN THE HEMODIALYSIS TREATMENT**

##### **Materials Required:**

- 10, 20 or 30 ml syringe can be used in B’Braun machine as “selected”.
- Heparin 1:1500iu or 1:1000iu
- Normal Saline to dilute Heparin

##### **Procedure:**

- Check Doctor’s order.
- Do hand washing.
- Don gloves.
- Calculate the bolus dose and the hourly infusion dose.
- Draw the required amount of heparin in the infusion syringe.
- Program the heparin infusion pump. Select syringe type. Set Bolus dose and hourly dose.
- Connect patient to the dialysis machine.
- Give bolus heparin dose by pushing the bolus button to the required amount.
- Start heparin pump as normal.

#### 4.12 MANAGEMENT OF COMPLICATIONS DURING HEMODIALYSIS TREATMENT

PROBLEM	POSSIBLE CAUSE	SIGNS & SYMPTOMS	RECOMMENDED TREATMENT
Air Embolus	Defective air detector  Air infused during reinfusion of blood in arterial segment of bloodlines.	Chest Pain  Dyspnea  Coughing  Cyanosis  Confusion  Seizures  Acute visual disturbances  Cardiac / respiratory arrest  Visible air or foam in venous blood	Turn blood pump OFF.  Immediately clamp all lumens at patient's access.  Immediately clamp ALL bloodline.  DO NOT attempt to return patient's blood.  Place patient in Trendelenburg position on left side.  Disconnect bloodlines, attaching a sterile 35cc syringe to patient's access. Unclamp access (venous lumen first) and aspirate any remaining air, if possible. Clamp lumen and repeat with arterial side if necessary. Flush access with 5cc normal saline and clamp.  Notify the Physician.  Administer 100% oxygen by mask.  Obtain assistance and initiate emergency resuscitative measures as required.  Note: DO NOT initiate cardiac massage until air has been removed from right ventricle via needle aspiration.
Air in bloodlines	Loose connections.	Visible air in lines  Air in blood alarms	Turn blood pump OFF and position patient flat.

	Empty air-vented IV bottles (e.g. albumin)		<p>Immediately clamp patient's access and machine bloodlines. Secure any loose connections and clamp vented IVs.</p> <p>Attach sterile syringe with normal saline to patient's access, aspirate to ensure no air is present, then flush with saline and clamp.</p> <p>Attach bloodlines to "recirculate" (patient's access remains clamped), open saline administration line, place machine in minimum UFR.</p> <p>Turn blood pump on slowly and attempt to remove air.</p> <p>As air enters venous drip chamber, raise fluid level (removing air).</p> <p>When air is removed, reconnect bloodlines to patient's access, clamp saline line, recommence dialysis.</p> <p>If unable to remove air, discontinue dialysis and request a new set-up.</p>
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<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SIGNS &amp; SYMPTOMS</b>	<b>RECOMMENDED TREATMENT</b>
Angina	<p>Severe vascular volume depletion in susceptible individuals.</p> <p>Anemia.</p>	Chest pain.	<p>Decrease ultrafiltration rate (minimum UFR x 10min, then resume at a lower rate for remainder of dialysis)</p> <p>Raise feet &amp; lower head.</p> <p>Administer small saline bolus of 100 to 200cc</p> <p>Administer oxygen/medication as ordered/required. (Nitroglycerine)</p>



			<p>Decrease blood pump speed to 250ml/min.</p> <p>Discontinue dialysis if severe and notify physician.</p> <p>Monitor hemoglobin. Cardiac Enzyme</p> <p>*Moderate Leak No visible blood. Chemstrip positive for more than trace amounts &gt;10ERY/<math>\mu</math>l</p> <ul style="list-style-type: none"> <li>• Discontinue dialysis, returning blood to patient. (moderate blood leak is unlikely to reseal)</li> <li>• Recommence dialysis with new dialyzer.</li> </ul> <p>*Minor Leak No visible blood Chemstrip positive for trace amounts, &lt;10ERY/<math>\mu</math>l</p> <ul style="list-style-type: none"> <li>• Reduce pump speed to 150ml/min to allow leak to seal.</li> <li>• Retest dialysate in 15 minutes with chemstrip, to determine if rupture has sealed.</li> <li>• If results are negative, gradually increase blood pump speed and ultrafiltration rate to pre-blood leak levels.</li> <li>• If chemstrip remains positive, discontinue dialysis. Blood may be returned and hemodialysis recommended using a new dialyzer.</li> </ul> <p>*No Leak No visible blood Negative result on chemstrip</p> <ul style="list-style-type: none"> <li>• Discontinue min UFR</li> <li>• Increase pump speed slowly</li> </ul> <p>If alarm reoccurs, test again with chemstrip. If result is negative, continue dialysis with a lower blood</p>
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			<p>pump speed (250-300ml/min). If alarm persists with continued negative tests, discontinue dialysis and request machine to be serviced by Biomedical Engineer. Recommence dialysis using new dialyzer and machine.</p>
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<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SIGNS &amp; SYMPTOMS</b>	<b>RECOMMENDED TREATMENT</b>
Cardiac Arrest	<p>Electrolyte imbalance</p> <p>Dysrhythmias</p> <p>Myocardial infarction</p> <p>Cardiac tamponade</p> <p>Air embolus</p> <p>Hemolysis</p> <p>Hyperthermia</p>	<p>Absence of apical/carotid pulse</p> <p>Unresponsive</p> <p>Lack of spontaneous respiratory effort</p> <p>Asystole or ventricular fibrillation on cardiac monitor</p>	<p>Initiate cardiac arrest procedure per hospital protocol.</p> <p>Place patient on floor, if he/she is not in a bed. Use the sheet under the patient to transfer. Take care not to dislodge needles or central venous catheter during transfer.</p> <p>If possible, return the patient's blood. When reinfusion is complete, or if unable to reinfuse, disconnect the bloodlines from the patient's access and connect to intravenous tubing with attached 1L bag of normal saline solution to the venous needle/lumen.</p> <p>Cap off any other needles/lumens and flush with saline.</p> <p>Move the dialysis machine away from the area (if possible) to make space available.</p>
Clotted dialyzer and/or bloodlines	<p>Inadequate heparin</p> <p>Inadequate blood flow</p> <p>Hemo-concentration due to excessive fluid</p>	<p>Rising venous pressure</p> <p>Rising transmembrane pressure (TMP)</p> <p>Blood appears very dark</p>	<p>Rinse dialyzer with 100-200cc normal saline solution, to determine the extent of clotting. If the dialyzer appearance is #3 or #4 return blood and set up new dialyzer / lines prior to recommencing treatment.</p> <p>Do activated clotting time (ACT) next dialysis to determine adequacy</p>

	<p>loss</p> <p>Elevated hemoglobin due to erythropoietin injection (EPO)</p>	<p>Presence of clots in arterial/venous chamber</p>	<p>of heparinization.</p> <p>Ensure pump speed at minimum, 280ml/min for low dose heparin situations.</p> <p>Ensure ultrafiltration rates not to exceed unit protocols, to prevent hemoconcentration.</p> <p>Review patient's hemoglobin, EPO orders, pump speed, typical UF rates to determine heparin needs. Notify physician.</p>
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<p>Disequilibrium syndrome</p>	<p>Overly efficient dialysis in acute renal failure patients or those with very high serum blood urea nitrogen (plasma osmolality decreases faster than that of intracellular osmolality leading to cerebral edema).</p>	<p>Headache</p> <p>Nausea &amp; vomiting</p> <p>Restlessness</p> <p>Hypertension</p> <p>Seizures</p> <p>Coma</p>	<p>Prevent with slower more frequent dialysis on a less efficient dialyzer (for acute patients).</p> <p>Early recognition of symptoms.</p> <p>Raise dialysate sodium concentration (150-140 gradual decrease) to increase serum osmolality.</p> <p>Discontinue dialysis if symptoms worsen.</p> <p>Notify physician.</p>
<p>Hemolysis</p>	<p>Hypotonic or hypertonic dialysate</p> <p>Hypotonic or hypertonic IV solutions</p> <p>High dialysate temperature</p> <p>Very high negative pressure</p> <p>Blood exposure to</p>	<p>Chest pain</p> <p>Dyspnea</p> <p>Hypotension</p> <p>Blood appears translucent</p> <p>Localized pain at venous access site</p> <p>Dysrhythmias</p>	<p>Immediately stop dialysis.</p> <p>Clamp venous line immediately, <b>DO NOT RETURN HEMOLYZED BLOOD.</b></p> <p>Monitor vital signs, notify Physician immediately.</p> <p>Check hemoglobin and electrolytes STAT.</p> <p>Administer oxygen.</p> <p>If necessary, replace volume with</p>

	oxidants		normal saline solution.
	Blood exposure to formaldehyde		Obtain pre-, and post-dialyzer samples of dialysate for testing.
Hypotension	Excessive of inaccurate volume depletion  Antihypertension medications  Consumption of food on dialysis (splanchnic vasolidation)  Anemia  Hypoalbuminemia  Unstable cardiovascular status  Incorrect target (dry) weight  Dialysate sodium concentration too low  Dialysate temperature too warm  Autonomic neuropathy	Low blood pressure Pallor  Nausea & vomiting  Perspiration or cold, clammy skin  Diaphoresis  Patient feels warm  Dizziness on sitting or standing  Tachycardia  Loss of consciousness	Place patient in Trendelenburg.  Reduce ultrafiltration rate to lowest rate possible (minimum UFR).  Administer normal saline bolus (100cc-500cc) as required via venous line. Reduce pump speed to 250ml/min for remainder of dialysis.  Notify physician.  Note: If patient is no longer on dialysis, give salty broth to drink (if able). If ineffective, recannulate or open central venous catheter (CVC) and administer saline bolus as required.  If ordered, use osmotic agents such as albumin.  Review patient's fluid status, weight gains, blood pressure, medications, blood work. Consider: <ul style="list-style-type: none"> <li>• reducing dialysate temperature to 36<sup>0</sup>C.</li> <li>• sodium profiling concentrations (150-140).</li> <li>• restricting food consumption during dialysis.</li> <li>• raising dry weight.</li> <li>• holding antihypertensive medications pre-dialysis.</li> </ul> Patient teaching re: fluid gains, medications, and recognizing and reporting symptoms.
<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SIGNS &amp; SYMPTOMS</b>	<b>RECOMMENDED TREATMENT</b>

Membrane incompatibility	<p>Complement activation pathway by new cellulosic membranes</p> <p>Hypersensitivity to sterilizing agents</p> <p>User of ACE inhibitors when using AN69 dialyzer membrane</p>	<p>Usually occur in the first 15 minutes of dialysis</p> <p>Backpain</p> <p>Chest pain</p> <p>Hypo / hypertension</p> <p>Acute bronchoconstriction</p> <p>Initial feeling of uneasiness</p> <p>Agitation</p> <p>Dyspnea</p> <p>Urticaria</p>	<p>Immediate termination of dialysis.</p> <p>Do not return blood.</p> <p>Management of symptoms (may require benadryl, epinephrine, or solu-cortef)</p> <p>Use of different dialyzer for subsequent treatments (steam sterilized if possible).</p> <p>Ensure proper rinsing of ethylene oxide sterilized dialyzers.</p>
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<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SIGNS &amp; SYMPTOMS</b>	<b>RECOMMENDED TREATMENT</b>
Muscle cramps	<p>Excessive fluid removal</p> <p>Hypokalemia</p> <p>Hypocalcemia</p> <p>Low sodium dialysate</p>	Cramps or pain in muscles	<p>Reduce ultrafiltration rate (minimum UFR x 10 minutes).</p> <p>Administer normal saline bolus (100cc-200cc). Apply heat.</p> <p>Administer osmotic agents if ordered (50% dextrose).</p> <p>Re-assess patient's fluid status and adjust target "dry" weight accordingly.</p> <p>Patient teaching re: interdialytic fluid gains.</p> <p>Consider sodium profiling, and fluid loss.</p>
Nausea / Vomiting	Hypotension due to excessive fluid removal	Nausea / Vomiting	Check BP, if hypotension exists, treat as above.

	Eating on dialysis  Uremia		Administer antiemetics as ordered,if BP allows.  Ensure ultrafiltration rates do not exceed unit protocols.  Patient teaching re: restricting interdialytic fluid gains and not eating during treatment.
Pyrogen reaction  Note: usually occurs within the first 60 minutes of dialysis	Backfiltration in high flux dialyzers  Introduction of pyrogens or endotoxins via dialysate	Chills Involuntary shaking  Fever  Hypotension  Note: Patients with pyrogenic reactions are typically afebrile pre- and post-dialysis, and symptomatic while dialyzing. Patient with septicemia and/or access-related infections are typically febrile pre-, during, and post dialysis.	Notify the physician.  Assess for source of infection.  Obtain blood cultures.  Obtain dialysate (inlet and outlet) cultures.  Obtain water cultures.  Administer antipyretics as ordered.  Administer antibiotics as ordered.  Discontinue dialysis if severe.  Note the ultrafiltration rate.
Seizures	Hypotension  Electrolyte imbalance  Disequilibrium syndrome  Severe hypertension	Loss of consciousness Seizure activity	Discontinue dialysis.  Maintain airway.  Suction as required.  Protect patient from injury. Note: protect patient's access site from separation/dislodgement.  Notify the physician.  Obtain blood sample for electrolytes and serum calcium

			<p>Counteract hypotension with saline bolus (100-500cc)</p> <p>Administer medication as ordered.</p>
<p>Uremic hemopericardium and/or Cardiac Tamponade</p>	<p>Acute hemorrhagic pericarditis</p> <p>Constrictive pericarditis</p> <p>Viral infection (e.g. – cytomegalovirus)</p> <p>Heparin administration and/or a reduction in vascular volume in above situations may precipitate cardiac tamponade</p>	<p>Central chest pain (worse when supine, improves when upright)</p> <p>Pericardial friction rub</p> <p>Fever</p> <p>Hypotension during dialysis (inappropriate to ultrafiltration rate)</p> <p>Paradoxical pulse</p>	<p>Minimal or no anticoagulation during dialysis (use ACT for heparin dosing).</p> <p>Maintain intravascular volume to avoid hypotension in a patient with known pericarditis.</p> <p>Notify the physician.</p>
<p>Anaphylactic Shock</p>	<p>Severe acute allergic reactions to medications.</p>	<p>Apprehension, itchiness, flushing of the face, stridorous or wheezy breathing, cyanosis, a drop in blood pressure, and loss of consciousness</p>	<p>An anaphylactic kit should be available where and when medications should be administered.</p> <p>Stop infusion of medication.</p> <p>Efforts should be directed at reducing venous blood flow.</p> <p>Administer drugs from the anaphylactic kit as prescribed by the doctor.</p> <p>After administration of the drugs, oxygen should be administered.</p>

#### 4.13 NURSING MANAGEMENT OF THE HEMODIALYSIS PATIENT

- **Fluid status** – state of patient hydration based on dry weight and presenting signs and symptoms.
- **Vascular access** – a surgically created line that allows blood draw and return during dialysis treatment.
- **Acutely ill patients** – those patients dialyzed in critical care areas and those patients who are seriously ill, unstable, or at risk for severe hypotension.
- **Conductivity** – electrical proportioning of dialysate concentrate with water.
- **Ultrafiltration rate** – the rate of fluid removal during dialysis treatment.
- **Dry weight** – ideal post dialysis weight after the removal of all or most excess body fluid.
- **Total fluid loss** – sum of fluid removal from patient during dialysis which includes the difference between patient’s pre-dialysis weight and set dry weight and other intradialytic fluids infused.
- **Net fluid loss** – amount of fluid removed from the patient during dialysis, based on the difference between patient’s pre-dialysis weight and set dry weight.

Hemodialysis patients shall receive appropriate nursing management during treatment.

##### **Procedure:**

- Assessment:
  - On admission to the Renal Unit and/or prior to initiation of dialysis, the patients overall condition will be assessed.
- Hemodialysis Nurses will assess the following:

##### **Fluid Status**

- Weight gain or loss
- Compare to previous treatment and to dry weight



- For symptoms of fluid depletion or overload, check patient for:
  - Edema of extremities
  - Periorbital edema
  - Shortness of breath
  - Adventitious breath sounds
  - Enlarged neck veins
  - Complaints of nausea and vomiting or diarrhea
  - Change in urinary output
  - Skin turgor
  - Dietary problems

**Blood Pressure & Temperature:**

- Taken first sitting, and then standing (to assess for postural hypotension) using the appropriate cuff size. An abnormal blood pressure taken on an automatic machine should be confirmed with a manual blood pressure reading.
- Compare current reading to previous recordings.
- Ascertain if the blood pressure corresponds with the patient's weight gain.
- Assess medication regimen/compliance.
- If temperature is  $>37.50^{\circ}\text{C}$  assess patient for possible source of infection.
- Pulse:
  - Assess rate and rhythm.

**Physical Condition:**

- Assess general well-being of the patient.
- Check any problems following last hemodialysis treatment.
- Assess presence of any chest pain.
- Assess presence of constipation or diarrhea.
- Assess presence of nausea or vomiting.

**Vascular Access**

- Assess fistula and grafts for:
  - Patency
  - Anomalies

- Signs of infection
- Assess Central Venous Catheter for:
  - Patency & integrity
  - Signs of infection
  - Presence of anchor suture

### **Review of Patient Chart**

- Patient's charts will be reviewed prior to initiating haemodialysis (doctor's orders, nurse's notes, medication record, and progress notes).
- Transient patients will have their chart reviewed prior to commencing dialysis for medical history and doctor's orders.
- Review information sent from the patient's home dialysis unit to become familiar with the patient's usual response to dialysis.
- Prescription
- Hemodialysis nurses will:
  - Check that the dialysis machine is set up according to the patient's current dialysis prescription.
  - Verify that water supply has tested negative for chlorine and chloramines each morning.
  - Verify that dialysis equipment has tested negative for chemical residue following any chemical cleaning/disinfection.
  - Check the expiry date and diameter of the blood lines.

Note: While hemodialysis is in progress, the patient and dialysis machine will be checked every 30 minutes. Acutely ill or very unstable patients will be checked every 15 minutes and as necessary.

Note: It is the responsibility of the attending dialysis nurse to interpret the hourly or more frequent checks, to ensure that the patient receives an adequate, well controlled treatment.

- Dialysis Machine will be checked for:

- Blood flow, if set as prescribed.
  - Arterial pressure:
    - Is not less than -250mmHg.
    - Venous pressure:
      - Is not greater than +250mmHg.
      - Corresponds to blood flow.
  - Ultrafiltration rate (UFR).
    - Conductivity.
    - Heparin (set rate vs. delivery rate).
- Upon Completion of Hemodialysis Treatment:

Patient will be checked for:

- Blood pressure - compare to pre-dialysis measurement.
- Note: Patient's blood pressure should be checked during the last 30 minutes of dialysis.
- Pulse – compare rate and rhythm; should be consistent with pre-dialysis measurement.
- General well being.
- Accuracy of goal weight when compared to pre- and post-dialysis blood pressure (weight should be within 0.5 kg of goal weight).
- Temperature.
- Overall physical condition – presence or absence of hypotension, dizziness, or chest pain.
- Vascular access (record length of time needed for needle sites to clot).

Equipment will be checked for:

- Heparin (record amount received by patients).
- Record appearance of dialyzer and lines and liters processed.

- **Safety considerations:**

- Fluid Removal

- Maximum rate of fluid removal is 1.0kg per hour (net loss from patient) during dialysis, unless otherwise ordered by the Nephrologist.
- Maximum rate of fluid removal is 2.0kg per hour (total loss) during ultrafiltration.

Note: IV fluids may be added to calculations and are not included as net fluid removal.

Note: If a patient has no dryweight yet, a physician's order for target ultra filtration is required.

- Equipment

- Each set-up will be checked and signed on the hemodialysis log sheet by the nurse/technician setting up, and the nurse initiating hemodialysis, for the correct prescription, including:
  - Time prescribed.
  - Sodium setting.
  - Completed alarm checks.
  - Dialyzer.
  - Dialysate.
  - Temperature of dialysate.
- Check heparin dose and fluid loss calculations.
- Dialyzers sterilized with ethylene must be rinsed with a minimum of 1 liter saline when primed.
- All equipment connections must be luer locked.
- Four tube occluding forceps should be available at the bedside during dialysis.
- A minimum of 300cc normal saline will be attached to the bloodlines via saline infusion lines at all times when dialysis is in progress.

- Positioning the Patient

- Place patient supine when performing the following procedures:
  - Initiating and disconnecting hemodialysis using central venous catheter or permcath.
- Temporary interruption of Dialysis ("recirculation")

- Patients' blood pressure must be within normal limits.
- If patient is hypotensive, patient should not be placed in recirculation.
- If reason for recirculation is unstable needle, return blood first (via the arterial needle if necessary. If reason for recirculation is to go to the bathroom, a bedpan should be used.
- Place dialysis machine in "Bypass" and Minimum UFR" and open saline line.
- Dialysis should not be interrupted for longer than 10 minutes. If patient has been disconnected from the bloodlines for 15 minutes or longer, discard the blood and notify the physician.
- Technical safety
  - Dialysate samples taken post dialysis will be sent for culture and colony count monthly.
  - Water from the Reverse Osmosis unit shall be tested:
    - Daily:
      - Chlorine
    - Monthly:
      - Culture and colony count
    - Annually:
      - Inorganic metals

## **VASCULAR ACCESS:**

Fistula needles must be secured with tape to prevent dislodgement during dialysis.

A central venous catheter line will be secured to the patient's clothing during treatment and not to the bed or the pillow.

Patient's vascular access must remain visible throughout dialysis treatment.

Luer-lock injection site caps are used for central venous catheter and permanent catheters.

- Fistula
  - A new fistula may be cannulated eight weeks after surgical creation.
  - If the patient has a secondary access (e.g. CVC), follow this protocol:

- For the first three runs, use one 17G fistula needle for ARTERIAL access; CVC to be used for venous return.
- For the next three runs, use one 17G fistula needle for VENOUS return; CVC to be used for arterial access.
- If there are no problems noted on these runs, use two 17G fistula needles on subsequent treatments; begin with blood
- Pump speed of 200ml/min. Increase pump speed and needle gauge over several runs as fistula matures.

If the patient does not have a secondary access, follow this protocol:

- For the first three runs, use two 17G fistula needles and keep blood pump speed at 200ml/min.
- If the vein is too short for two needles, use one 15G single needle, and keep blood pump speed at 300ml/min.

Note: If the fistula is very small, it may be necessary to use a smaller single needle, e.g. 17G with a Y-connector.

- PTEE Graft
  - A new graft may be cannulated two weeks after surgical creation.
    - Two 16G fistula needles may be used for first and subsequent runs.
    - Increase to 15G if needed after third run.
    - Use 200ml/min blood pump speed for the first three runs. After the 3rd run, increase blood pump speed as required/ordered.
  - General access specifications
  - Maximum venous pressure is (+250) for fistula, grafts, and CVCs.
  - Minimum arterial pressure is (-250) for fistula, grafts and CVCs.

- Unless otherwise ordered, pump speed should be 400ml/min for fistula and graft if venous and arterial pressure allows, and if the patient's cardiac status is stable. Pump speed should be 300 ml/min for CVCs.
- Rotate needle sites to ensure maximum use of vascular access.
- Nurse must request assistance from the physician or another nurse if they are unsuccessful in cannulating a patient's vascular access after two attempts.
- Altogether, no more than four attempts should be made. If there is one successful needle at this time, it should be converted to a single-needle and the patient dialyzed accordingly. Notify the Nephrologist.
- Document all problems with patient's vascular access, e.g. difficulty cannulating, increasing venous pressure, etc.

#### **ANTICOAGULATION:**

- MINIMAL HEPARIN guidelines are as follows:
  - NO initial bolus should be given.
  - The continuous heparin should be started at 500IU per hour and continued for the duration of the treatment.
  - Hourly rate should be titrated according to Activated Coagulation Time (ACT) results.
  - In the absence of ACT testing, saline flushes should be done every thirty minutes to assess anticoagulation effectiveness.
- REGULAR HEPARIN guidelines are as follows:
  - Initial bolus (given 3-5 minutes before commencing dialysis) should be 2000IU heparin.
  - The continuous heparin should be started at 1000IU per hour.

- Hourly rate should be titrated according to ACT results.
- In the absence of ACT testing, saline flushes should be done hourly (100-150ml each flush) for the first two treatments to assess anticoagulation.
- Stop continuous infusion of heparin 30 minutes prior to the end of treatment for patients using fistulas or grafts; continuous infusion for duration of dialysis for patients with CVCs.
- If vascular access (fistula or graft) requires more than 15 minutes to clot, stop the continuous infusion 45 minutes before the end of treatment; request the Nephrologist to review heparin dose.
- If significant clotting is noted in the dialyzer or bloodlines post-dialysis, increase continuous infusion to 1500IU per hour after verifying with nephrologist.
- Use 2000IU Heparin in 1 liter 0.9% saline when priming dialyzer.
- Activated Coagulation Time (ACT) testing will be done on:
  - All new patients to establish a baseline coagulation time (to be done on the first dialysis treatment).
  - All chronic patients who exhibit coagulation problems (i.e. excessive bleeding post-dialysis or clotted, or partially clotted, dialyzers).
  - All chronic patients with new risk factors (e.g. recent surgery).
  - All acute patients.
  - All patients ordered to use low dose heparin.
  - All patients scheduled for an invasive procedure or CVC removal post-dialysis.
- ACT testing will be done from the arterial port to measure the patient's coagulation.



- ACT testing may be done from the venous port if a measurement of the dialyzer's coagulation is necessary (e.g. charcoal filters which clot quickly).
- Activated Coagulation Times (ACTs)
  - Draw "baseline" time prior to administering any heparin (average is 90-140 seconds).
  - For "systemic" heparinization, repeat ACT 15 minutes after initiating dialysis, then hourly, and at the time dialysis is discontinued. ACT readings should be 1.5-2.0 times the baseline.
  - For "low dose" heparin, repeat ACT every 15 minutes for four times, then every 30 minutes for the remainder of dialysis treatment if ACTs are stable. ACT readings should be 1.25 times the baseline. A reading greater than 1.5 times the baseline indicates excessive and undesirable heparinization in a "low dose" situation.
- Increase or decrease the heparin rate as needed to achieve the correct ACT and notify the nephrologist.
- "No heparin" may be ordered for patients with a severe risk of hemorrhage.
- The following interventions are recommended:
- Keep the dialysis blood pump at a minimum 280-300 ml/min.
- Flush the hemodialysis circuit with 150cc sterile saline 0.9% every 30 minutes.
- Give the initial dose of heparin through the first needle inserted, to follow the patient to become systemically anticoagulated prior to commencing hemodialysis.

- Dialyzers will be assessed at the end of every dialysis treatment and graded using the following scale:
  - 0... clear of any residual blood
  - 1... visible clotting in a few fibers
  - 2... visible clotting in bundle of fibers
  - 3... visible clotting in 50% of fibers
  - 4... visible clotting in >50% fibers
- Patients will have IM injections administered 30 minutes or more prior to heparinization or 4 hours after heparin is discontinued.

Note: If CVC must be removed post-dialysis, heparin rate should be "low-dose" and discontinue heparinization 30 minutes or more prior to termination of treatment.

**REPORTABLE CONDITIONS:**

Notify the Nephrologist on call if any of the following occur:

- Hemodialysis access is unusable, e.g.
  - Central venous catheter may be blocked or malpositioned.
  - Vascular access may be clotted or cannot be cannulated due to immaturity or hematoma.
- Signs or symptoms of infection
  - e.g. elevated temperature, presence of exudate, redness or swelling.
- Chest pain during dialysis.
- Severe hypotension during or post-dialysis.
- Suspected pyrogen reaction.
- Air embolus.
- Prolonged bleeding from needle sites post-dialysis

- e.g. longer than 30 minutes to clot.
- Any situation which results in patient's dialysis being discontinued early, e.g.
  - Machine malfunction.
  - Blood loss of 200cc or more.
  - Nausea/vomiting/diarrhea.
  - Patient 1kg or more, above or below goal weight, post-dialysis.
  - Any allergic reactions.
  - Hyperkalemia or Hypokalemia

## **DOCUMENTATION:**

### **1. All assessments**

- Occurrence and management of reportable conditions.
- Any medications given and response to same (if applicable).
- Any specimens obtained and sent to the laboratory.
- Any problems with patient's vascular access.
- Hemodialysis log sheets must be completed and signed by the RN. All interventions (medications, changes in dialysate, IV saline bolus, etc) must be noted on this log. Admitted patients shall have a copy of the hemodialysis log placed in their chart and the original shall be retained in the Renal Unit patient chart.

### **2. Technical matters**

- All specimens obtained for testing.
- Results of tests, when completed.
- Special acid concentrate mixes shall be relabeled with the new acid type, and the old label crossed off (use a permanent felt-tip marker).
- Procedural errors shall be documented on the patient's hemodialysis log, if they occur during the treatment.

#### 4.14 REMOVAL OF AVF NEEDLES AFTER HEMODIALYSIS TREATMENT

##### Materials Required:

- 1 pack 4"x4" sterile gauze
- 1 pair non-sterile gloves
- Transparent tape (optional)
- Surgi-aid / Band Aid / Urogard
- Surgicel (optional)
- Chlorhexidine solution
- Sharp disposal container

##### Procedure:

- Complete hand washing.
- Prepare materials needed.
- Explain procedure to the patient.
- Don gloves.
- Remove tegaderm or protective gauze over the access.
- Remove arterial needle applying slight pressure for at least ten minutes using a sterile gauze over the insertion site; surgicel may be applied if needed.
- Discard arterial needle appropriately.
- Remove venous needle applying slight pressure for at least ten minutes using a sterile gauze over the insertion site; surgical may be applied if needed.

Note: Instruct the patient to hold the gauze over the arterial site while removing the venous needle.

- Discard the venous needle appropriately.
- Apply pressure until bleeding stops.
- If the bleeding has stopped, apply surgi-aid or band-aid. Transparent tape may be applied over the band-aid as per patient request.
- Wipe patient's arm with chlorhexidine solution.
- Reassess access site.

#### **4.15 REQUIREMENT FOR CLINICAL MANAGEMENT OF HEMODIALYSIS PATIENTS**

- Dialyzer appearance – the appearance of dialyzer fibers after the dialysis procedure.
- Procedural fluid – estimated normal saline contained in the bloodlines and dialyzer which is infused

#### **PROCEDURE:**

- For blood pressure of  $>180/110$  post hemodialysis, the nurse should inform the Nephrologist prior to patient discharge for administration of anti-hypertensive drugs and further evaluation.
- Vital signs of stable chronic renal failure patients on regular dialysis should be taken every (30) minutes during the entire treatment; and for unstable patients, vital signs should be taken as often as needed.
- In the initial dialysis treatment of a new patient in the unit, the following blood works should be done as per order of the Nephrologist:
  - HCO<sub>3</sub>, glucose, urea, creatinine, alkaline phosphatase, lipid profile.
  - Electrolytes – Sodium, Potassium, Chloride,
  - CBC – Complete Blood Count
  - HIV – Human Immuno deficiency Virus
  - VDRL – Venereal Disease Research Laboratory
  - HBsAg – Hepatitis B surface antigen
  - Anti- HBS – Hepatitis B antibody
  - Anti HCV – Hepatitis C virus
  - MRSA – Methicillin Resistant Staphylococcus Aureus
  - Calcium, Phosphate

- LFT – Liver Function Test
  - Uric Acid
  - Iron studies: Serum Ferritin, Serum Iron, TIBC (Total Iron Binding Capacity)
  - Blood Grouping and typing
  - PTH – Parathyroid Hormone
- For patients diagnosed of diabetes mellitus (DM), blood sugar should be checked pre dialysis. If result is below 60 mg/dl, may initially give 20 ml of 50% dextrose then repeat test after 30 minutes; and refer if necessary. Notify the nephrologist if blood sugar is >250 mg/dl or >13.3 mmol/L.
  - In case of clotted blood in the dialyzer (blood was not returned), CBC and review of heparinization should be done pre-dialysis in the next treatment.
  - For the heparin-free patient, flushing of 150cc normal saline should be done every 30 minutes, and total amount of flushes shall be included in the target ultrafiltration.

Note: Presence of menstruation during hemodialysis does not alter heparinization.

- Heparinization should be reviewed by RNs and referred to Nephrologist if dialyzer appearance is >3 post dialysis.

Note: Scale for dialyzer appearance:

- 0 – Clear of any residual blood
- 1 – Visible clotting in a few fibers
- 2 – Visible clotting in a bundle of fibers
- 3 – Visible clotting in 50% of fibers
- 4 – Visible clotting in >50% of fibers

- The femoral catheter of the patient must be removed aseptically prior to discharge as per doctors' order.

- After removal of a Central Venous Catheter(s) send catheter tip for culture and sensitivity testing. If patient is observed to have signs and symptoms of catheter- related sepsis.
- Swab culture and sensitivity testing should be collected from the exit site(s) if noted to have signs and symptoms of infection; then notify nephrologists.
- Set procedural fluid to 300ml per treatment and add it to the total amount of fluid to be removed.

#### **4.16 TEMPORARY INTERRUPTION OF HEMODIALYSIS TREATMENT**

- Access problems – problems that occur in the vascular access of the patients while on dialysis that results in ineffective treatment thus needing temporary interruption.
- Recirculation – blood is temporarily circulated in the bloodline via a circle or connector after disconnecting the bloodline from the patient’s access.

#### **PROCEDURE:**

##### **Materials required:**

- 2 pcs 10cc luer lock syringe
- 2 pcs 18G needle
- Non-sterile gloves
- Stop cock and/or connector
- Transparent tape
- Sterile saline (use saline attached to the machine)
- Two pieces of sterile gauge

Note: Patients are placed in "recirculation" to allow hemodialysis nurses to manipulate access problems.

- Preparation
- Check patient’s blood pressure.

- Draw up 5cc saline in 10cc syringe, use the saline bag attached to patient's machine.

- Put on clean non-sterile gloves.

- Turn blood pump to 100 ml/min.

- Remove tape from patient to expose bloodlines.

Note: Ensure that fistula needle remains securely taped.

- Place patient in recirculation:

- Explain procedure to the patient.

- Turn blood pump "OFF".

- Clamp both fistula needle and bloodlines.

- Keep the sterile gauge under the needle connection to avoid blood spillage.

- Disconnect arterial bloodline and attach it to a connector. Attach syringe to arterial needle, open fistula clamp, flush fistula, and reclamp.

- Repeat procedures B and C for venous line.

- Open both bloodline clamps.

- Open saline line.

- Turn blood pump on at 100 ml/minutes.

- Place machine in "bypass" to prevent hemolysis of blood.

- **Monitor**

- Note the time the patient is in recirculation.

Note: Recirculation time should not exceed 15 minutes as it may cause hemolysis of blood, if so, do not return blood to the patient.

- Monitor patient during interruption of treatment. Do not leave patient unattended.

- Document procedure done.



#### **4.17 ADMINISTRATION OF ERYTHROPOIETIN VIA INTRAVENOUS INJECTION FOR HEMODILYSIS PATIENTS**

##### **Resources Required**

- Prescribed Erythropoietin injection
- 1 pc alcohol swab
- 1 pair non-sterile gloves

##### **Procedure:**

- Check doctor's order.
- Prepare materials needed (Epoetin required, Alcohol Swab).
- Check the patient's vital signs.

Note: If the patient's blood pressure is greater than 180/110, hold Erythropoietin and inform the doctor on duty.

- Inform patient of the procedure prior to administration.
- Wear gloves.
- Wipe venous port with alcohol swab.
- Administer prescribed dosage of erythropoietin thirty (30) minutes prior to dialysis termination.
- Discard needles in sharp container.
- Document procedure done.

##### **5.0 Related Documents:**

5.1 Hemodialysis consent form

5.2 Hemodialysis chart

##### **6.0 References: NA**

**7.0 Amendments (Revision Dates):**

<b>Date Revised</b>	<b>Revision Number</b>	<b>Revised by</b>	<b>Verified by</b>	<b>Amendments</b>
4th June '12	02	Quality Team	Quality Team	DQAP logo changed

**8.0 Reviewed Dates:**

<b>Sr. no:</b>	<b>Reviewed on</b>
1	2010