Hemodialysis: Using a "Circle" During Hemodialysis

Site Applicability

PHC Hemodialysis Units

Practice Level

Specialized
Registered Nurses and Licensed Practical Nurses who have completed the required education, and provide nursing care in a PHC Renal Program hemodialysis specialty unit

Need to Know:

1. This procedure is used to temporarily interrupt dialysis to allow the patient bathroom privileges, or to troubleshoot access problems.
2. Always check blood pressure and heart rate prior to allowing a patient to use the bathroom or commode.
3. To prevent potential hypotensive episodes due to hypovolemia while attending the bathroom/ commode, the blood in the circuit must be returned to the patient before initiating this procedure per machine-specific and unit guidelines (both arterial and venous sides of patient's bloodlines or venous only).
4. If patient declines to blood reinfusion (after risk is explained), patient refusal must be documented. And providing bedpan is the option.
5. After bathroom use it may be appropriate to adjust the patient's target weight.
6. To reduce the risk of back filtration and blood circuit contamination, the maximum time that the blood tinged normal saline can be circulated in the extracorporeal circuit is 30 minutes. **After 30 minutes,** bloodlines must be discarded and replaced to continue treatment.
7. To reduce excessive de-oxygenation of blood and risk of clotting when troubleshooting access problems, the maximum time that blood can be circulated in the dialysis system is **15 minutes.**
8. If dialyzer, line(s), and or entire system clots during temporary disconnect, replace as per guidelines and notify the nephrologist for orders as required.
9. Minimum ultrafiltration rate (UFR), is programmed while in circle to prevent back filtration from dialysate into the blood compartment.

Procedure

Equipment & Supplies:

AV fistula/graft (AVF/AVG)	Central line
1. 1 Sterile circle connector	1. 1 Sterile circle connector
2. 2 - 10 mL syringes with normal saline	2. 2– 20 mL syringes with normal saline
3. Clean drape	3. Sterile gloves (if changing Tego/dressing), otherwise clean gloves
4. Clean gloves	4. 2 – 4x4 sterile gauze
5. 2 – 4x4 sterile gauze	5. Approved antimicrobial agent
6. Approved antimicrobial agent	6. Mask or face shield and gown
7. Mask or face shield and gown	

Suspending Treatment- Generic

STEPS	RATIONALE
1. Check vital signs and record machine parameters.	Record base line data before initiating procedure and ensure patient is stable.
2. Perform hand hygiene and apply appropriate PPE (Personal Protective Equipment) for vascular access	Reduce transmission of microorganisms.
3. Per unit guidelines, prepare for temporary termination of dialysis.	
4. For Bathroom or commode use, return patient's blood per machine specific and unit guidelines (both arterial and venous sides of patient's bloodlines OR venous only).Not required for venous access troubleshooting.	To reduce the risk of hypotensive episode due to hypovolemia.
5. Stop blood pump. Clamp arterial and venous bloodlines, and arterial and venous fistula needles or catheter lumens.	
6. Disconnect arterial bloodline from access and connect to sterile recirculation device.	
7. Attach normal saline syringe to access and flush.	Ensure patency of access.
8. Repeat Steps 6 & 7 using venous line.	

9. Secure syringes attached to AVF / AVG needles or CVC lumens.	To prevent access dislodgement while temporarily disconnected from hemodialysis machine.
10. Check patient's BP sitting and standing after reinfusion and document	To ensure patient's stability.
11. Unclamp arterial and venous lines.	
12. Follow specific hemodialysis machine sequence to temporarily halt dialysis	Follow program for specific procedures.
13. Turn on blood pump at 150 mL/min. (Fresenius) and 150 mL/min (BBraun)	Maintain circuit integrity and prevent back filtration of dialysate into the blood path.
14. Remove PPE and perform hand hygiene.	

Resuming Treatment - Generic

Steps	Rationale
1. Consider having patient re-weigh on return from bathroom.	This information will help you assess the UF goal.
2. Perform hand hygiene and apply appropriate PPE for vascular access	Reduce transmission of microorganism.
3. Turn off the machine blood pump. Clamp normal saline IV line and arterial and venous bloodlines.	
4. Using aseptic or clean technique open access clamps and withdraw at least 3 mL of blood and observe for clots and resistance.	To check for patency of access.
5. Reconnect bloodlines to access per unit-specific guidelines.	
6. Open clamps on arterial and venous access and bloodlines. **Ensure normal saline is clamped.**	Decrease risk of unnecessary normal saline bolus
7. Turn blood pump on to continue dialysis treatment. Gradually increase blood pump speed as arterial and venous pressure allows.	
8. Resume dialysis as per hemodialysis machine specific sequence.	Follow program of specific procedures.
9. As necessary, reprogram total weight loss to include extra normal saline rinse back and / or fluid loss.	To accurately calculate fluid loss.
10. Disinfect contact area of hemodialysis machine with specific disinfectant post procedure.	Reduce cross contamination of micro-organisms and blood borne pathogens.

11. Record vital signs and patients tolerance of procedure and machine parameters.	

Machine-Specific Considerations

Fresenius- Fresenius 5008

- Only the venous portion of the circuit will be returned on suspension of treatment.
- The UF will automatically adjust to 0 while in circulation. Do not adjust.
- The saline must be clamped while in circulation.
- The machine will notify you every 10 minutes while in "circle."

To suspend Treatment: Online Substitute Set-up

Steps of ONLINE bolus delivery:

1. Open "Online" screen located in "Options" menu.
2. The bolus volume can be manually adjusted by the nurse in the bolus screen to a max of 240 mL per bolus. (bolus rate will be blood flow (Qb) minus 50 mL/min and Qb will be 50 mL/min. Press **Bolus I/O**
3. When blood flow drops to 50 mL/min, decrease to 0
4. Allow bolus to run until it stops on its own or until venous bloodline is clear
5. If further rinse is required, press **bolus I/O** again.
6. Stop blood pump and clamp arterial and venous bloodlines and access. (Note: If screen message "Continue-Treatment-Remove bloodlines" appears, press **Treatment** and stop blood pump)
7. Press **Options**
8. Press **Circulation**
9. Press **Circulation Start**
10. Press green hard key (as if starting blood pump)
11. Screen message indicates "Use recirculating adapter to join the arterial and venous patient connectors". –Circulation-Treatment Continue
12. Connect the arterial and venous bloodline together with a recirculation adaptor, unclamp lines.
13. Flush access as required with normal saline via 10 or 20 ml prefilled syringes
14. Blood flow commences at 150 mL/min.
15. Screen message indicates **"Stop Circulation?"** (The machine will notify you every 10 minutes while in "circle").
16. When patient is ready to be reconnected, press **OK**
17. Screen message indicates "Has the patient been reconnected?-

    Circulation-Treatment Continue

18. Clamp bloodlines
19. Reconnect the patient, unclamp all lines and access site cannulas
20. Press **Continue**
21. Gradually increase the blood flow rate as desired
22. Reprogram blood pressure interval and start blood pressure.

Circulation when using HDF Post Dilution

1. Stop blood pump
2. Change safeline from post HDF port to pre HDF port. Can use cap from pre port to cover post. (maintain the sterility of the safeline tip when disconnecting)
3. Initiate bolus and run until it stops on its own or until venous bloodline is clear. (machine default for bolus is 240 mL)
4. Turn blood pump from 50 to 0, to stop removing blood from patient.
5. Disconnect lines and put it in circle.
6. While the patient is in circle, the safeline can be switch back to post dilution port.
7. Pre dilution port should be capped with sterile red cap. (for infection control practice)

   Reminder: You have now changed the ONLINE bolus settings from default and you will need to re-set them once treatment resumed. The default bolus settings are a 240 mL bolus to be infused at automatic.

BBraun – Dialog+

- Touch Red Man to initiate blood return. (this way it opens up the parameters)
- Follow the Generic Circle Protocol for Temporary Interruption of Dialysis.
- When patient is ready to resume hemodialysis, touch Green man.

Patient Education & Resources:

1. Hypotension is a common side effect of this procedure due to volume depletion and postural changes.
2. Patient should report any symptoms of hypotension such as: dizziness, weakness, and visual disturbances to your nurse.
3. Patient should ensure that their bladder or ostomy bag is emptied prior to the initiation of dialysis.

Documentation:

1. Document vital signs, machine parameters, patient response, access status, and interventions on Hemodialysis Log sheet.

2. Document the time procedure starts and treatment resumes.

Related Standards & Resources:

1. B-00-13-10058 - Hemodialysis: Patient Assessment Pre, Intra and Post Dialysis
2. B-00-12-10152 - Hemodialysis: Accessing a Central Venous Catheter (CVC) with and without Tego Connectors
3. B-00-07-13045 – Standard Precautions: Blood and body Fluids

References:

BC Health Authority Guidelines used in the development of this guideline:

- Island Health- Reinfusion and Recirculation for Bathroom Attendance (April 2017)
- Vancouver Coastal Health- Hemodialysis: Circle Protocol for Temporary Interruption of Dialysis

BC Provincial Renal Agency guidelines used in the development of this guideline:

- BC Renal Agency - Central Venous Catheter (CVC): Discontinuance of Dialysis; Approved August 15, 2011 revised Dec. 16, 2011 and June 17, 2012
- BC Renal Agency – Central Venous Catheter (CVC): Initiation of Dialysis; Approved August 15, 2011

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Effective Date:	June 2007
Posted Date:	
Last Revised:	11-OCT-2018
Last Reviewed:	
Approved By: *(committee or position)*	PHC
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Owners: *(optional)*	PHC
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