



**NEPHROLOGY PROGRAM
DEPARTMENT POLICIES AND PROCEDURES**

**Hemodialysis - Section 11 - Auxiliary Hemodialysis Procedures - Neph 11-05b
Assessing Access Recirculation and Flow using the Transonic HD03
Hemodialysis Monitor (as per table of content)
No.: 01208 (TOH Standardized Policy Number)**

ISSUED BY:

Hemodialysis Clinical Practice Committee

DATE OF APPROVAL:

2003/04

APPROVED BY:

Program Clinical Director and Division
Head

LAST REVIEW/REVISION DATE:

2015/03

CATEGORY:

Auxiliary Hemodialysis Procedures

IMPLEMENTATION DATE:

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PURPOSE:

- To prospectively monitor and identify vascular access function to promote early detection and quantification of access Recirculation and access flow
- To verify proper needle placement in relation to arterial and venous side of the access

BACKGROUND STATEMENT(S):

- Trends in vascular access flow allow for proactive intervention rather than crisis response to access failure
- Access Recirculation (R%):
 - Occurs when the vascular access flow is lower than the set Hemodialysis blood flow (Qb)
 - Late predictor of vascular access failure
- Access Flow (Qa):
 - Determined using a dilution indicator technique
 - Measured by reversing the bloodlines and introducing a saline bolus to the extracorporeal circuit

- The process of establishing Access Recirculation (R%) and Access Flow (Qa) requires a small 0.9% NaCl infusion. Add 100 ml to the patient intradialytic weight loss calculations so that this extra 0.9% NaCl can be removed during the treatment
- Access Recirculation (R%) and Access Flow (Qa) measurements are done in the first half of the hemodialysis treatment while the patient is normotensive
- In certain situations placement of the arterial needle can affect Access Recirculation (R%) and Access Flow (Qa) results. If the patient has an aneurysm on the access or if the patient has an upper arm fistula with an access flow > 2L/min the arterial needle must be facing the arterial flow so that Access Recirculation (R%) and Access Flow (Qa) measurements are accurate

POLICY STATEMENT(S):

- Access Flow (Qa) measurements will be performed:
 - Q Monthly on all Hemodialysis patients with an established AV fistula or AV graft
 - On a new AV fistula/graft when Hemodialysis blood flow \geq 300 ml/min
 - On 1st and 2nd hemodialysis treatment following a vascular access surgical intervention or radiological angioplasty
 - Notify Dialysis Access RN/APN and Responsible Nephrologist of result if less than 500ml/min or not within 20% of baseline access flow (as measured prior to identification of a stenosis with the AV fistula or AV graft)
 - During the training period and as scheduled for Home Hemodialysis patients.
 - May be done more frequently based on the assessment of the nursing staff, Nephrologist / delegate or Dialysis Access RN/ APN
- If AV Graft access blood flow is < 600 ml/min or has decreased > 20% from previous measurement, notify the Nephrologists/delegate and the Dialysis Access RN/ APN
- If AV Fistula access blood flow is < 500 ml/min or has decreased > 20% from previous measurement, notify the Nephrologists/delegate and the Dialysis Access RN / APN
- The Transonic HD03 Hemodialysis Monitor can be used for patients on isolation precautions. See section E for details

INTERPRETATION:

- **Access Recirculation** is measured during dialysis at the patient's prescribed Qb and there should be **0% Recirculation** because Transonic HD03 separates cardiopulmonary recirculation from access recirculation. This is performed:
 - At the time of the first measurement of access flow in a new AV fistula or AV graft
 - At the time of access flow measurement posts surgical or radiological intervention
 - It is not necessary to perform this test on a monthly basis

- If Recirculation is present repeat the test to confirm. If Recirculation persists, repeat the test again with the lines reversed:
 - To rule out inversed flow direction and orientation of the lines
 - To confirm that Recirculation is due to decreased access flow
- Report Access Recirculation to the Dialysis Access RN / APN and Responsible Nephrologist/Delegate, **Access Flow**:
 - 800-2000 ml/min represents adequate access flow. There are three predictors of impending stenosis/failure of AV access:
 - Access flow decreases of \geq than 20% from previous measurement.
 - AV Graft Access flow < 600 ml/min or AV Fistula Access flow < 500 ml/min.
 - A downward trend of Qa.
- If any of the above is discovered, the Dialysis Access RN / APN should be notified without delay
- The Transonic Qb reading should be within 10% of the dialysis machine Qb
 - Discrepancies can be related to small needle size for the Qb setting, arterial needle placement, pump calibration or Qb that is set higher than access blood flow
 - Pump calibration can be determined by lowering Hemodialysis pump speed to 200 ml/min and ensuring that the new Transonic reading is between 190-210 ml/min
- Nephrologist/delegate and Dialysis Access RN / APN should be informed of all changes to vascular accesses

SUPPLIES:

- Transonic HD03 Hemodialysis Monitor
- 1 alcohol swab
- Mask with visor
- Protective drape/pad
- Virox wipes
- 1 pkg sterile 10cm X 10 cm gauze
- 3 pair of clean disposable gloves

DEFINITION(S): N/A

ALERTS: N/A

PROCEDURE:

Section A: Transonic HD03 Hemodialysis Monitor

1. Wheel Transonic unit to Hemodialysis station and plug in the power cord at bedside
2. Perform hand hygiene and don clean disposable gloves

3. Place a small drape under patient's access arm and bloodline connections
4. Remove the flow / dilution sensors from the holder at the back of the machine
5. Open the door of the flow/dilution sensor
6. Place the tubing segment to be inserted next to the flow/dilution sensor. The arrow on the sensor must point in the direction of flow
7. Open the alcohol swab and wipe the entire circumference of the tubing segment which will be inserted into the flow/dilution sensor
8. Immediately insert this tubing segment into the flow/dilution sensor and close the door. The alcohol evaporates from the tubing surface in a few seconds. It is important to wipe, insert tubing, and close door as a continuous sequence
9. Repeat for the second paired flow/dilution sensor and tubing segment
10. Remove gloves and perform hand hygiene
11. Turn the HD03 Monitor on (switch at back of unit)
12. When the transonic monitor has been turned on and a patient is begin measured, a signal strength indicator will display in the upper left of the monitor screen. Verify that this signal strength indicator is green. This means that the flow/dilution sensors have adequate ultrasound contact with the tubing. If the signal strength indicator is not green, repeat the wipe-insert-close sequence to achieve proper contact

Section B: Patient Selection

1. PRESS the "MEASURE PATIENT" key
2. Select "GAMBROARTISET 113908"
 - Do **not** select "Transonic Flow-QC"
3. Select "DELIVERED FLOW"
 - Enter the blood pump setting
4. Select "MEASURE"
 - Record the measured delivered flow (note, the transonic will also display the % difference between the Hemodialysis machine and the Transonic)

Section C: Establishing Access Recirculation on a AVF/AVG

1. PRESS the "CHOOSE PROTOCOL" key
2. Select "RECIRCULATION" and follow instructions on the screen
3. When the Traffic light on the Transonic FD03 screen turns green, Press the "Expand A/V limits" button on the Gambro Artis machine to open the alarm limits in order to avoid alarms
4. OPEN the 0.9% NaCl for 5 seconds without clamping to the arterial bloodline ensure dilution
5. The Transonic Hemodialysis Monitor will analyze results and display reading.
6. Make a note of results
7. Press "CHOOSE PROTOCOL"

Section D: Establishing Access Flow on a AVF/AVG

1. Using clean technique, disposable gloves and mask with visor, reverse the patient's bloodlines. Sensors remain in the same position – DO NOT adjust or reverse them
2. Remove gloves, perform hand hygiene and set blood pump speed to 200-300 ml/min (300 ml/min ideal)
 - NOTE: If $Q_b < 200$ ml/min you must use the 10 ml 0.9% NaCl bolus injection method via the venous chamber
3. Press "CHOOSE PROTOCOL"
4. Select "ACCESS FLOW"
5. Access flow is best measured at 300 ml/min. Only one reading is necessary unless "repeat" appears on the screen
6. Following instructions wait for the Traffic light on the Transonic HD03 to turn green.
7. PRESS the "Expand A/V limits" button on the Gambro Artis machine to open alarm limits
8. OPEN the 0.9% NaCl for 5 seconds without clamping the arterial bloodline to ensure dilution
9. The Transonic Hemodialysis Monitor will analyze results and display reading
 - NOTE: If the access flow is > 2000 ml/min on an AV Graft or AV Fistula the computer will prompt the user to repeat the test using the 10ml 0.9% NaCl injection method in the venous chamber and not the slow 0.9% NaCl infusion method
10. When done press "NEXT PATIENT" to stop measurements
11. Put on clean disposable gloves
12. Return bloodlines to appropriate direction and resume all ordered treatment parameters
13. When testing is complete, cleanse the entire transonic using virox wipes:
 - Start with the transonic machine, the pole and then the power cord
 - Use a fresh virox wipe to cleanse the transducer cable starting near the transonic machine to and including the sensors
 - Use a third virox wipes to re-cleanse the sensor heads paying special attention to cracks and crevasses
14. Put the sensors in the holder
15. Remove PPE and perform hand hygiene
16. Ensure that weight loss calculation has been increased by 100 ml 0.9%NaCl to account for the NaCl administered to the patient during this procedure
17. Record results and report as necessary

Section E: For Patients on Isolation Precautions

For patients on precautions other than Hep B:

1. Perform testing wearing appropriate PPE for the precautions needed for that patient
2. When testing is complete, cleanse the entire transonic using virox wipes:

- Start with the transonic machine, the pole and then the power cord
- Use a fresh virox wipe to cleanse the transducer cable starting near the transonic machine to and including the sensors
- Use a third virox wipes to re-cleanse the sensor heads paying special attention to cracks and crevasses

For patient's with Hep B:

1. Remove the transducers and cable from the transonic machine and leave outside the room
2. Once in the Hep B room, attach the designated transducer and cable to the transonic machine
3. Perform testing wearing appropriate PPE for the precautions needed for that patient
4. When testing is complete, cleanse the entire transonic using virox wipes
 - Start with the transonic machine, the pole and then the power cord
 - Use a fresh virox wipe to cleanse the transducer cable starting near the transonic machine to and including the sensors
 - Use a third virox wipe to re-cleanse the sensor heads paying special attention to cracks and crevasses
5. Remove the designated transducers from the machine prior to removing the machine from the room and store inside the Hep B supply drawer
6. After removing PPE and performing hand hygiene, exit the room, re-attach the regular transducers to the machine and return to storage area
7. It is recommended to do access testing in the Hep B room on Saturdays to reduce the movement of the machine in and out of the room

DOCUMENTATION:

1. NephroCare
 - From the Dialysis menu item click on Hemodialysis Access
 - Highlight the patient's current hemodialysis access
 - Click on Recirculations- the list of past measurements / recirculations will be displayed
 - Click on the first New button
 - From the Recirculation Table, open the drop down under Measurement type and select Transonic Flow
 - Enter the access flow value in the Flowrate (ml/min) box
 - Enter % of Recirculation in Recirculation rate (%) box prn
 - Enter in the comment box:
 - Blood pressure at the time reading was obtained
 - Actions taken if recirculation present and/or access flow rate reported
 - **Do not enter anything in the Mean Flow Rate or Standard Deviation, as they will calculate automatically when multiple rates are entered for same day
 - Ensure information is correct (pt/date), then click Save, click Close

2. Document the date of the next Transonic test in the Access Info section of the Nurses Worksheet
3. Document that transonic testing was done in the 'Incidents' section in NephroCare by selecting "Transonic Monitoring", "Normal Saline 100cc", "Goal Increased"
4. If this is a non-TOH patient, also document the values in a progress note so that they can be printed and sent to the receiving unit

TROUBLESHOOTING:

- Call the Transonic Systems Hotline at 1-800-353-3569 for troubleshooting advice

RELATED POLICIES / LEGISLATION: N/A

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COMMENTS / SIGNIFICANT REVISIONS: N/A