



## TECHNICAL/CLINICAL TOOLS

### BEST PRACTICE 2: IMPROVE CARDIOVASCULAR OUTCOMES

#### **WHY IS THIS IMPORTANT?**

The risk of cardiac disease, including ischemic heart disease, is associated with early death due to any cause in renal patients. Further compounding the cardiac mortality risk among dialysis patients are modifiable factors relating to management of extracellular volume and hypertension.

Because cardiac risk factors are well established, as are methods to reduce these risk factors, the Technical Guidance/Curriculum Development Panel recommends a best practice—and interventions to achieve the practice—to reduce vascular morbidity and mortality for first-year dialysis patients. The overarching goal is to better manage cardiovascular outcomes as a function of extracellular volume/fluid management, hypertension and electrolyte imbalance, and systematically manage other cardiac and vascular risk factors. The term “cardiovascular” includes cerebrovascular disease, hypertensive cardiovascular disease, arteriosclerotic heart disease, and arterial or peripheral vascular disease. The best practice includes evaluation and management of hypertension, lipid status, coronary artery status, cardiac status, and peripheral vascular disease.

#### **BEST PRACTICE 2**

***Reduce vascular morbidity and mortality for first year dialysis patients.***

#### **HOW DO YOU ACHIEVE THIS BEST PRACTICE?**

1. Consult cardiologist as needed:
  - a. Be alert for cardiovascular symptoms.
  - b. Control hypertension.
  - c. Monitor and manage lipids, especially HDL
  - d. Get ECHO, EKG at dialysis initiation, and annually thereafter.
  - e. Manage arrhythmias, and be aware of arrhythmia risk factors. With ejection fraction (EF) <30%, consider automatic implantable cardioverter defibrillator (AICD).
  - f. Manage congestive heart failure.
  - g. Assess for peripheral vascular disease Consider left ventricular mass index (LVMI), plethysmography, and post-dialysis ultrasound.
  - h. Assess carotids, and place stents as indicated.
  - i. Consider more aggressive interventions on a case-by-case basis, and as indicated, perform cardiac catheterizations, stent placements, and bypass surgery.

2. Control extracellular volume:
  - a. Educate to optimize extracellular volume.
  - b. Increase dialysis time or frequency to reduce excess extracellular volume.
  - c. Reducing excess extravascular volume will reduce hypertension.
3. Management of fluid removal during dialysis and intradialytic weight gain (IDWG):
  - a. Limit sodium and fluid intake.
  - b. Mandatory determination of estimated dry weight (EDW) by nephrologist and nursing staff at minimum monthly, but preferably, weekly. Consult registered dietician (RD) as needed for changes in appetite or usual dietary intake patterns.
  - c. Sodium modeling can be considered but only in the presence of a protocol with mention of dialysis machines that tracks blood volume monitoring. (Cautionary note: There are risks and benefits that should be considered with the utilization of sodium modeling).
4. Monitor potassium.
5. Assess monthly for potential inflammatory state. Manage vascular aspects of chronic inflammatory states. (Note: see nutrition and inflammation for managing inflammation).
6. Establish appropriate site of care (home vs. facility-based dialysis).
7. Routine monthly review of all medications.
8. Determine accountability and tracking tool for who tracks cardiovascular issues to be sure each is regularly addressed.
9. Routine monthly review of all medications.
10. Determine accountability and tracking tool for who tracks cardiovascular issues to be sure each is regularly addressed.
11. Educate about recommended lifestyle changes—i.e., smoking/alcohol cessation, dialysis adherence.

TECHNICAL/CLINICAL BEST PRACTICE #2: TOOLS AND RESOURCES	
Tools and Resources	
<b>High Blood Pressure and CKD</b>	<p>Dialysis Patient Citizens  <a href="http://advocacy.dialysispatients.org/site/DocServer/High_Blood_Pressure_and_Chronic_Kidney_Disease.pdf?docID=3881&amp;JServSessionIda001=tsqtu8euo1.app11c">http://advocacy.dialysispatients.org/site/DocServer/High_Blood_Pressure_and_Chronic_Kidney_Disease.pdf?docID=3881&amp;JServSessionIda001=tsqtu8euo1.app11c</a></p> <p>DPC Classroom: <a href="http://www.dpcclassroom.org">www.dpcclassroom.org</a></p>
<b>Lifestyle Changes</b>	<p>American Heart Association  <a href="http://www.americanheart.org/presenter.jhtml?identifier=4735">www.americanheart.org/presenter.jhtml?identifier=4735</a></p>
<b>Method to Assess Treatment Choices for Home Dialysis (MATCH-D)</b>	<p>Medical Education Institute  <a href="http://www.homedialysis.org/match-d">www.homedialysis.org/match-d</a></p>
<b>Performance Measurement</b> Table 3-Dimension of Care Measures Matrix (pg 1301) and Table 5- ACCF/AHA Primary Prevention of Cardiovascular Disease Performance Measurement Set (pg 1303)	<p>American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures  <a href="http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.109.192617">http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.109.192617</a></p>
<b>Tools for Hypertension and Fluid Management</b>	<ul style="list-style-type: none"> <li>• <a href="#">Hypertension Cause and Effect Fishbone Diagram</a></li> <li>• <a href="#">Fluid Management Success in Reaching Target Fishbone Diagram</a></li> <li>• <a href="#">Hypertension/Fluid Management Tracking Tool</a></li> </ul>

- [Unit-wide Hypertension Action Plan](#)
- [Unit-wide Fluid Management Action Plan](#)

### Supporting Literature

Cohen LM et al. **Predicting six-month mortality for patients who are on maintenance hemodialysis.** *Clin J Am Soc Nephrol.* 2010 5(1):72-9. Epub 2009 Dec 3. <http://cjasn.asnjournals.org/cgi/content/short/5/1/72?rss=1>

Glasscock RJ et al. **Left Ventricular Mass in Chronic Kidney Disease and ESRD.** *Clin J Am Soc Nephrol.* 2009 4:S79-S91. [http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement\\_1/S79](http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement_1/S79)

Inrig JK, et al. **Decreased pulse pressure during hemodialysis is associated with improved 6-month outcomes.** *Kidney Int.* 2009 Nov;76:1098-1107. <http://www.nature.com/ki/journal/v76/n10/full/ki2009340a.html>

O'Hare A, Johansen K. **Lower-extremity peripheral arterial disease among patients with end-stage renal disease.** *J Am Soc Nephrol.* 2001 12:2838-2847. <http://jasn.asnjournals.org/cgi/content/abstract/12/12/2838>

Povlsen JV, Ivarsen P. **How to start the late referred ESRD patient urgently on chronic APD.** *Nephrol Dial Transplant.* 2006 21(Suppl 2):ii56-ii9. [http://ndt.oxfordjournals.org/cgi/content/abstract/21/suppl\\_2/ii56](http://ndt.oxfordjournals.org/cgi/content/abstract/21/suppl_2/ii56)

Rajagopalan S, et al. **Peripheral arterial disease in patients with end-stage renal disease: Observations from the Dialysis Outcomes and Practice Patterns Study (DOPPS).** *Circulation.* 2006 114:1914-1922. <http://www.circ.ahajournals.org/cgi/content/abstract/114/18/1914>

Ritz E, Bommer J. **Cardiovascular problems on hemodialysis: Current deficits and potential improvement.** *Clin J Am Soc Nephrol.* 2009 4:S71-S78. [http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement\\_1/S71](http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement_1/S71)

Wingard RL, et al. **The "Right" of Passage: Surviving the First Year of Dialysis.** *Clin J Am Soc Nephrol.* 2009 4:S114-S120. [http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement\\_1/S114](http://cjasn.asnjournals.org/cgi/content/abstract/4/Supplement_1/S114)