Renal Physicians Association Clinical Practice Guideline: Appropriate Patient Preparation For Renal Replacement Therapy: Guideline Number 3

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Editor’s Note
JASN is cooperating with the Renal Physicians Association and other renal journals in publishing this executive summary of a clinical practice guideline on appropriate patient preparation for renal replacement therapy. The full text of the guideline is available from the Renal Physicians Association (www.renalmd.org). The American Society of Nephrology participated in developing the content of this guideline, but this publication does not constitute endorsement of its content by JASN or the American Society of Nephrology.

Introduction
Chronic kidney disease (CKD) of various stages and end-stage renal disease (ESRD) afflict approximately 20 million individuals in the United States with an attendant staggering social and financial cost (1). An additional 20 million persons possess risk factors for developing CKD and possibly ESRD in the future. The National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (K/DOQI) has published and is preparing evidence based Clinical Practice Guidelines (CPGs) on CKD (1) and possible interventions for management of various aspects of CKD which encompass the full spectrum of renal function. The numbers of at-risk persons who progress, the effect of intervention, and the cost-effectiveness of intervention for early stages of CKD remain to be clarified and are currently under study. In contrast, patients with advanced CKD (K/DOQI CKD Stages 4 and 5) have a high propensity for progression to ESRD in a relatively short period of time with well known multiple co-morbid conditions and poor outcomes. Interventions in this group of patients would likely be associated with improved clinical outcomes. Since most patients with advanced CKD reach the need for renal replacement therapy (RRT), the optimal approach to therapy should describe appropriate preparation of this population for RRT using the best available evidence for this specific subgroup of CKD patients.

Executive Summary
The present document is the Executive Summary of the Renal Physicians Association (RPA) CPG on Appropriate Patient Preparation for RRT. This is the RPA’s third CPG. The full document containing the full text CPGs and Clinical Performance Measures (CPMs) is available from the RPA (2).

To develop this document, the RPA convened a “Working Group” consisting of clinical experts and stakeholders. Participants were nominated by national organizations representing practitioners, patients, administrators, insurers, regulators, and federal granting agencies (Appendix). The Working Group was supported by a team of methodologists and nephrologists from the Duke Center for Clinical Health Policy Research and the Duke Institute of Renal Outcomes Research and Health Policy. The evidentiary foundation of the CPG and associated CPMs is a comprehensive review of the literature whose results were certified by the Agency for Healthcare Research and Quality (“Evidence Report: Appropriate Preparation for Renal Replacement Therapy”) (3) as well as expert consensus on the most effective interventions.

The patient population at the center of the RPA’s CPG is the patient subset referred to as “advanced CKD,” a shorthand term for the more specific designation of those patients whose clinical condition is categorized as advanced CKD stages 4 and 5 (1), but not on RRT. This corresponds to a glomerular filtration rate (GFR) of less than or equal to 30 ml/min per 1.73 m², when kidney function is at a high risk of progression. Before stage 4, the focus of diagnosis and treatment of CKD is on slowing progression and identifying and managing comorbidities. When the vast majority of CKD patients reach stage 4, they will likely progress and require RRT. As the patient progresses to stages 4 and 5, the focus shifts to managing complex metabolic disturbances and preparing the patient for RRT (dialysis or transplantation). Proactive preparation for RRT is recommended to facilitate the transition and reduce the burden of clinical risk factors known to be associated with worse outcomes in ESRD patients.

The recommendations contained in the CPG are intended to provide clinicians with practical guidance for the care of individuals with advanced CKD not yet requiring RRT. Since these
patients have complex needs, the CPG is targeted to nephrologists and generalists with a special interest in advanced CKD patients. The objective of this document is to enhance, but not substitute for, the provider’s ability to care for patients based on the best available clinical and scientific evidence. The CPGs have been developed on the basis of the CPGs are not intended for physician comparison, survey or population purposes; instead, they are meant to facilitate individual physician quality improvement efforts. The guideline is applicable to the population of adult patients (18 years of age and older) with advanced CKD not yet on RRT who are expected to progress and require RRT within 6 to 18 months. This CPG is not intended for use in children and adolescents with CKD.

The RPA has identified seven particularly important goals of care to be addressed by this CPG: (1) optimal management of anemia, (2) prevention of hyperparathyroidism, hyperphosphatemia, hypocalcemia, and metabolic bone disease, (3) control of BP, (4) maintenance of adequate nutrition, (5) managing qualitative and quantitative lipid disorders, (6) timing of the initiation of RRT and vascular access, and (7) counseling for choices of RRT, patient rehabilitation, and psychosocial and economic preparation.

A summary of the guidelines is presented on the following pages. Recommendations are graded: A, strongly recommend with good evidence; B, recommended with fair evidence; and C, recommended with little evidence but with consensus of expert opinion. The levels of evidence from the Evidence Report and Grades of Recommendation are presented in detail in the Evidence Report (3). For further detail, explanation, and elaboration, see the full text (2).

Anemia Guidelines

Monitoring Anemia Regularly

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), then s/he should have his/her hemoglobin checked at least every three months. (Grade C)

Workup of Anemia

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) and a hemoglobin < 12 g/dl if a woman, and < 13 g/dl if a man, then s/he should undergo a complete work-up for anemia including iron studies. (Grade B)

Treating Iron Deficiency

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), and if iron deficiency is identified, then s/he should be treated. (Grade C)

Treatment with Erythropoietin or Erythropoietin Analogue

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), and remains anemic despite appropriate evaluation and iron therapy, then s/he should be treated with erythropoietin or analogue. (Grade B)

Monitoring BP for Those Receiving Erythropoietin or Erythropoietin Analogue

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), and is receiving erythropoietin or analogue, then s/he should have his/her BP checked with each dose. (Grade C)

Bone Disease Guidelines

Monitoring for Metabolic Acidosis

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) then s/he should be monitored for acidosis (serum bicarbonate concentration) at least every three months. (Grade C)

Correcting Metabolic Acidosis

If a patient has a GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) then his/her chronic metabolic acidosis should be corrected to a serum bicarbonate \( \geq 22 \text{ mmol/L} \). (Grade C)

Monitoring Calcium, Phosphorus, and iPTH

If a patient has a GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), then s/he should have his/her serum calcium and phosphorus measured at least every three months, and iPTH levels measured at least once. (Grade B) AND if calcium and/or phosphorus levels are abnormal, iPTH should be monitored at least every three months. (Grade C)

Treating HPTH and/or Hyperphosphatemia

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \), and if iPTH > 100 pg/ml (or > 1.5 times the upper limit of normal for each assay used), OR serum phosphorus > 4.5 mg/dl then s/he should be placed on a low phosphorus diet (< 800–1000 mg/d) for one month, and phosphorus levels should be re-checked, regardless of phosphorus or iPTH levels. (Note: a low phosphorus diet implies a low protein diet.) If serum phosphorus is still > 4.5 mg/dl, then phosphate binder should be started. (Grade B) AND iPTH levels should be monitored every three months following the initiation of therapy, whether phosphorus is controlled or not. (Grade B)

Managing Decreased Vitamin D Levels (Vitamin D Insufficiency)

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) and if iPTH > 100 pg/ml (or 1.5 times the upper limit of normal for each assay used), then measure 25(OH) vitamin D; AND if 25(OH) vitamin D is decreased (serum levels < 30 ng/ml) then s/he should receive vitamin D \( \geq 50,000 \text{ units orally every month for 6 months} \). (Grade C)

Managing Hypocalcemia

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) and corrected serum calcium is < 8.5 mg/dl (using a normal reference range of 8.5 to 10.5 mg/dl) after phosphorus issues are addressed, then s/he should receive elemental calcium 1 g/d between meals or at bedtime. (Grade C)

Treating Refractory HPTH

If a patient has GFR \( \leq 30 \text{ ml/min per 1.73 m}^2 \) and iPTH remains > 100 pg/ml (or > 1.5 times the upper limit of normal
for each assay used) after 3 months of previously recommended interventions, then s/he should receive oral vitamin D therapy with 0.25 mcg/d of calcitriol (Grade C) or alfacalcidol 0.25 mcg/d, to a maximum of 0.5 mcg/d.

**Hypertension Guidelines**

**Monitoring BP**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, then his/her BP should be checked with every clinic visit (Grade A), which should be at least every three months. (Grade C)

**Responding to Elevated BP**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, and if BP is determined to be elevated (systolic $>130$ mmHg OR diastolic $>80$ mmHg), then s/he should receive encouragement and instruction to initiate therapeutic lifestyle changes (Grade C) and s/he should receive intensified antihypertensive therapy. (Grade B)

**Treating with ACE Inhibitors and ARBs**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$ and hypertension, then s/he should receive an ACE inhibitor or an ARB as a first-line agent. (Grade C)

**Nutrition Guidelines**

**Monitoring Nutritional Status Regularly**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, then his/her nutritional status should be monitored by measuring body weight and serum albumin every three months. (Grade B)

**Managing Malnutrition**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, and if body weight decreases unintentionally by more than 5% or serum albumin decreases by more than 0.3 g/dl or is $<4.0$ g/dl (for Bromo-Cresol-Green assay, or 3.7 for Bromo-Cresol-Purple assay), then s/he should be evaluated for causes. If other causes are ruled out and cause is therefore determined to be CKD, then s/he should receive diet assessment and counseling by qualified and experienced personnel. (Grade C)

**Initiating RRT Based on Nutritional Status**

If a patient has GFR $<20$ ml/min per 1.73 m$^2$, with evidence of malnutrition that does not respond to nutritional intervention in the absence of other causes of malnutrition, then s/he should begin RRT. (Grade C)

**Dyslipidemia Guidelines**

**Monitoring for Dyslipidemias**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, then she/he should be monitored for dyslipidemias; measurements should include triglycerides, LDL, HDL, and total cholesterol. (Grade B)

**Evaluation for Secondary Causes**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, and has dyslipidemia, then s/he should be evaluated for secondary causes including comorbid conditions and certain medications. (Grade C)

**Treatment of Dyslipidemias**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, LDL should be targeted to $<100$ mg/dl; non-HDL cholesterol should be targeted to $<130$ mg/dl; and fasting triglycerides $\geq 500$ mg/dl should be treated. (Grade C)

**Timing Guidelines**

**Early Counseling about Modality of RRT**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, modality of RRT should be discussed with him/her. (Grade B).

**GFR as a Guide to RRT Timing**

No recommendation can be made for initiating RRT based solely on a specific level of GFR. (Grade B).

**Early Referral for Transplant Evaluation**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$ and is willing to have a renal transplant, then s/he should receive a transplant evaluation (Grade B), unless s/he has an unacceptable level of surgical risk or does not satisfy the United Network for Organ Sharing (UNOS) Ethics Committee criteria for transplant candidacy.

**Preservation of Veins for Vascular Access**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$ and it has been determined that s/he will receive hemodialysis, veins suitable for placement of vascular access should be preserved. (Grade C).

**Timing for Vascular Access Placement**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, and it has been determined that s/he will receive hemodialysis, then s/he should be referred for surgery to attempt construction of a primary AV fistula. (Grade C).

**Counseling and Rehabilitation Guidelines**

**Exercise**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$ and does not engage in regular physical activity, then s/he should receive counseling and encouragement to increase physical activity. If a patient is unable to walk or unable to increase fully mobile physical activity, then s/he should be referred to physical therapy or cardiac rehabilitation. (Grade B)

**Evaluation, Education, and Encouragement**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$, then s/he should receive structured education regarding preparation for RRT. (Grade C)

**Employment Counseling**

If a patient has GFR $\leq 30$ ml/min per 1.73 m$^2$ then s/he should be encouraged to maintain employment and be referred to vocational counseling per his/her preference. (Grade C)
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