

Chronic Kidney Disease: The Silent Epidemic

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Chronic kidney disease (CKD) is a worldwide health problem. Only recently has CKD become a major priority of care for the healthcare system. Cases of early stages of CKD are now reaching epidemic proportions. This trend is witnessed by comprehensive data on CKD provided by the Third National Health and Nutrition Examination Survey (NHANES III). Approximately 800,000 Americans have CKD as manifested by a serum creatinine level of 2.0 mg/dL or greater, while more than 6.2 million are estimated to have a serum creatinine level of 1.5 mg/dL or greater.¹ Data extrapolated from the Framingham study suggest that approximately 20 million people in the United States are at risk for CKD.²

Even more concerning is the rising incidence and prevalence of significant kidney disease in the United States that culminates in the need for chronic renal replacement therapy. Examination of data generated by the United States Renal Data System (USRDS) reveals a nearly doubling in the incidence of end-stage renal disease (ESRD) from 1987 to 1996.³ During this time interval, the incidence increased from 142 cases of ESRD per million population to 276 cases per million population, and it further increased to 308 cases per million in 1999.^{3,4} The growth in the incidence of ESRD is undoubtedly an extension of the rapid increase in CKD and subsequent progression of kidney disease. Unfortunately, most physicians are unaware of the magnitude of the problem. As a result of the underdiagnosis and undertreatment of CKD in the United States, it has become a "silent epidemic" with several important consequences.

The lack of recognition that has fueled the CKD epidemic is likely related to a number of factors. A primary factor leading to the underappreciation of the growing CKD population has been the absence of a universal definition or classification system. Until recently, such a system did not exist, which limited the timely identification and treatment of patients with CKD. Also, the evaluation and management of CKD has traditionally focused on diagnosis and treatment of specific types of kidney disease rather than on the whole spectrum of CKD. Thus, a limited number of renal disease states have received most attention. Furthermore, the priority

of management has typically been on initiation of renal replacement therapy and renal transplantation rather than on aggressive treatment to slow progression of renal disease and correct associated uremic complications and comorbidities.

LOST OPPORTUNITIES

Lack of awareness of the CKD epidemic has had significant repercussions. Most disturbing are the lost opportunities for aggressive treatment and prevention of complications in patients that are a direct result of or associated with CKD. Poor outcomes in both CKD and ESRD patients are also a consequence of unrecognized kidney disease. For example, screening for proteinuria in high-risk groups and control of blood pressure are considered to be standards of care. The following examples illustrate the suboptimal job we have done in the management of CKD and associated comorbidities. In a multi-institutional retrospective study, urine protein was measured in only 63% of Medicare beneficiaries hospitalized with diabetes mellitus and hypertension, a group considered at highest risk to develop proteinuric kidney disease.⁵ In addition, angiotensin converting enzyme (ACE) inhibitors were prescribed in only 32% of diabetic patients with abnormal kidney function.⁵ These data are particularly disturbing, because ACE inhibitors and angiotensin receptor blockers have been documented to reduce the progression of diabetic kidney disease. Also, only 59% of nondiabetic patients with hypertension had urine protein measured, while 74% of hypertensive patients with an elevated serum creatinine level were not prescribed an ACE inhibitor.⁵ Data from NHANES III reveal that fully 25% of patients with hypertension and an elevated serum creatinine level were not receiving treatment with a blood pressure-lowering medication.¹ Only 11% of patients receiving an antihypertensive medication had their blood pressure lowered to the level recommended by the Joint National

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Table 1. Approach to Chronic Kidney Disease as a Public Health Problem

Define CKD
Recommend laboratory tests suited to assess kidney function
Classify CKD and develop a staging system
Estimate prevalence of the various stages of CKD
Associate stage of kidney disease with uremic complications
Outline the components of an action plan for management of CKD

CKD = chronic kidney disease.

Table 2. Goals of a Clinical Action Plan for the Management of Chronic Kidney Disease

Educate patient and family about CKD
Decrease progression of CKD
Correct anemia associated with CKD
Treat mineral disturbances associated with CKD
Reduce cardiovascular complications associated with CKD
Smooth transition to and adequately prepare patients for the initiation of renal replacement therapy

CKD = chronic kidney disease.

Committee on Detection, Evaluation, and Treatment of High Blood Pressure (< 130/85 mm Hg). Furthermore, only 27% had their blood pressure reduced to less than 140/90 mm Hg. Treated patients had a mean blood pressure of 147/77 mm Hg, and 48% of patients were on monotherapy despite suboptimal blood pressure control.¹

Anemia was also a problem for patients entering an ESRD program, a reflection of undertreatment of anemia in the CKD population. Reports based on the USRDS noted that 52% of patients starting hemodialysis met criteria for severe anemia as defined by a hematocrit of less than 28%.^{6,7}

Late referral to a nephrologist, defined as referral less than 3 months before starting renal replacement therapy, occurred in 39% of patients beginning hemodialysis.⁸ It was also noted that 24% of patients initiated dialysis late in the course of disease, as reflected by a glomerular filtration rate (GFR) of less than 5 mL/min per 1.73 m².^{6,7} Late patient referral is not without significant consequences. A study of 1057 patients initiating chronic dialysis documented an increase in 5-year mortality in patients who received less than 6 months of predialysis nephrologic care (41%) versus those who had more than 72 months of predialysis care by a nephrologist (23%).⁹ Finally, approximately half of the patients starting hemodialysis did not have permanent vascular access, increasing reliance on catheter-based vascular access devices.⁸

ADDRESSING THE PROBLEM

One would expect that increased recognition of patients with or at risk for CKD would encourage physicians to enact action plans and interventions that would address and correct many of these issues. In 2000, a working group was created by the National Kidney Foundation to address the CKD epidemic. The CKD Work Group was charged with the task of defining and

creating a staging system for CKD, estimating prevalence of the various CKD stages, and developing action plans for clinicians for each of the CKD stages. After a major multidisciplinary effort, in 2002, the CKD Work Group published clinical practice guidelines to aid physicians in diagnosing and managing CKD in a supplement of the *American Journal of Kidney Diseases*.¹⁰

Table 1 outlines a brief but rational approach to the CKD epidemic as put forth by the CKD Work Group. This approach to CKD would accomplish a number of goals. First, healthcare professionals would have a common definition of CKD to apply to patients. This would identify patients with or at risk for CKD through screening and risk assessment. Second, prevalence data would allow predictions of disease burden and allow for appropriate planning. Finally, physicians could apply logical strategies of care to an action plan for each patient to mitigate the progression of CKD, correct complications of uremia and other associated comorbidities, and prepare the patient for ESRD care through education and other appropriate interventions. Goals for an action plan are briefly outlined in **Table 2**.

GOALS OF THIS SERIES

To promote awareness of recent recommendations for management of CKD, a series on chronic kidney disease is being undertaken in *Hospital Physician*. This series, which will appear in forthcoming issues of *Hospital Physician*, will cover key topics that were published in detail by the CKD Work Group in 2002.¹⁰ The first article, which appears in this issue of *Hospital Physician*, addresses the definition, classification, and staging of CKD. The next article will review the maneuvers that are available to slow the progression of CKD to ESRD or kidney transplantation. Following these initial publications will be articles covering the complications that develop from CKD, including anemia and disturbances in mineral metabolism. The major comorbidity associated with

CKD, cardiovascular disease, will also be reviewed. The final article in the series will discuss the emotional and physical preparation of the patient for renal replacement therapy (ie, hemodialysis, peritoneal dialysis, renal transplantation). We hope this series on CKD will provide a comprehensive yet concise review of the CKD epidemic and allow health care providers to apply this information to patient care in their practices. **HP**

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