Optimal Preparation for ESRD

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Clinical guidelines for the care of patients with progressive chronic kidney disease (CKD) have been developed by a broad range of organizations within the kidney community. Despite consensus among these guidelines and significant effort on the part of federal agencies, voluntary health organizations, and professional groups, existing data suggest that much work remains to achieve acceptable levels of recommended care. Several small studies have described CKD interventions to improve outcomes, but there are few examples of large-scale attempts to improve CKD care in a systematic way. Southern California Kaiser Permanente has developed a population management approach to CKD in a health maintenance organization setting that has improved outcomes. The Indian Health Service, an agency of the Public Health Service that provides direct care to American Indians and Alaska Natives, has enhanced its diabetes care delivery system to address the renal complications of diabetes. This effort may explain a significant decrease in the incidence rate of ESRD among American Indians with diabetes. Because much of the burden of CKD falls on ethnic and racial groups with decreased access to care, enhancing CKD care in the primary setting may offer the best opportunity to improve outcomes. The National Kidney Disease Education Program in collaboration with community health centers has developed a model to improve outcomes through application of the chronic care model to CKD management in primary settings that serve high-risk populations.

Guidelines and Clinical Performance

A number of organizations have developed guidelines for the care of patients with chronic kidney disease (CKD) before initiation of renal replacement therapy (RRT) (1,2). There is consensus that patients should receive multidisciplinary comprehensive clinical management by kidney disease professionals for at least 6 mo before requiring RRT. In addition to dietary instruction and modality education, recommended care includes counseling on cardiovascular disease risk factors, management of BP, screening for bone and mineral disease of CKD and anemia, hepatitis B immunization, and administration of nephroprotective agents (renin-angiotensin system antagonists). Consensus guidelines also emphasize placement of permanent dialysis access that is functional at the time of initiation, as well as assessment and referral for preemptive transplantation, if possible. There is near-universal consensus that patients should be referred to a nephrologist when estimated GFR (eGFR) drops below 30 ml/min per 1.73 m².

Most of these recommendations have been in place for several years; some were included as measures in Healthy People 2010, developed in the late 1990s. Despite significant effort on the part of federal agencies, voluntary health organizations, and professional groups, data from the US Renal Data System suggest that much work remains to achieve acceptable levels of recommended care (3). In 2006, <35% of patients with diabetes and with kidney disease received basic care (an eye examination, lipid evaluation, and two measurements of glycosylated hemoglobin). Seventy-three percent were treated with renin-angiotensin system (RAS) antagonists, a level little improved over the previous 5 yr. BP control for patients with CKD is poor, with nearly half of the patients with hypertension in the National Health and Nutrition Examination Survey (NHANES) having uncontrolled hypertension and another quarter being unaware of having hypertension or not having their hypertension treated. One third of patients do not see a nephrologist before initiation of RRT, and only 13% have seen a dietitian before initiation. Approximately half of patients with no pre-dialysis nephrology care had preinitiation hemoglobin levels <10 g/dl, compared with 35% of patients with >1 yr of nephrologic care. For >80% of patients who initiated dialysis, vascular access was provided by a catheter.

These data suggest that the primary barrier to improving outcomes is not defining optimal care but rather finding a way to deliver this care to those who need it. Lack of appropriate care, synonymous in much of the literature with “late referral,” is associated with more rapid progression of CKD, worse health status at the time of initiation (4), higher mortality after starting dialysis (5,6), and decreased access to transplantation (7).

Models of Improving Care

Patients with CKD are seen in the wide range of settings in which Americans receive their health care. Several small studies have described interventions to improve dialysis outcomes, including delaying the need for initiation through patient education (8) and using multidisciplinary approaches to improve survival (9) and fistula use (10) and decrease postinitiation hospitalizations (11); however, there are few examples of large-scale attempts to improve CKD care in a systematic way. The Renal Physicians Association has developed the CKD Toolkit (12) with an array of instruments to optimize care within the
neurologist's office. The toolkit is just now undergoing formal evaluation, and few data are available.

Southern California Kaiser Permanente (SCKP) is a health maintenance organization that has 3 million members and has implemented a systematic approach to identifying and managing CKD (13). Routine reporting of eGFR was implemented in 2003, identifying a CKD population of 72,000, 67% of whom had diabetes and 10% of whom were black. To focus interventions on patients who are most likely to progress to kidney failure, the SCKP registry modified the National Kidney Foundation's staging algorithm to divide stage 3 CKD (eGFR 30 to 59 ml/min per 1.73 m²) into chronic stage 3 and modified stage 3. Chronic stage 3 included members who did not have diabetes and excreted <300 mg albumin/g creatinine and for whom the sum of eGFR plus half their age was >85 (eGFR + [age/2] = >85). This older group (71% older than 70 yr) of approximately 50,000 members was not targeted for population management, because they were considered less likely to progress.

The population care management system at SCKP ensured that patient-specific information and advice were provided at the time of the visit. The electronic medical record includes a case management summary sheet and algorithm-based reminders. These decision support tools were enhanced through provider education. The SCKP includes 60 full-time nephrologists. There is no disincentive to refer, and a “culture of early referral” was promoted, especially for all patients with stages 4 and 5 CKD (eGFR <30 ml/min per 1.73 m²). Although CKD interventions for most patients with eGFR >30 ml/min per 1.73 m² were integrated with other population care efforts, providers were urged to refer these patients when they posed diagnostic or therapeutic challenges. Eighty-nine percent of patients with stage 5 CKD in the registry had been seen by a nephrologist in the past 12 mo, as had 77% of patients with stage 4 CKD. Overall, 85% of visits by patients with CKD were to primary care providers; 79% of these visits were coded for CKD, suggesting a high level of identification of CKD by generalists.

Data collected on visits by SCKP patients to their providers reflect better performance in delivering appropriate care than described in the 2008 US Renal Data System Annual Data Report (3). Nearly 79% of all SCKP’s patients with CKD had a urinary albumin-to-creatinine ratio measured in the past 12 mo, 44% had BP <129/79, and 84% of patients with diabetes or proteinuria were treated with RAS antagonists. For patients with stages 4 and 5 CKD, 77% had seen a nephrologist and 86% had hemoglobin measured within the past 12 mo (only 13% of whom had a hemoglobin level <11g/dl). Surprising, however, <40% attended a renal replacement class. SCKP defines “optimal start of ESRD” as initiating RRT with peritoneal dialysis or with a preemptive transplant or using an arteriovenous fistula with hemodialysis. Approximately 54% of SCKP patients achieved an “optimal start.”

Indian Health Service

The Chronic Care Model (CCM) (14) offers a strong framework for identifying system-level change concepts that can engage both providers and patients in improving CKD detection and management. The CCM has improved outcomes in a number of chronic diseases by promoting evidence-based change in the community and in the four elements of the health care delivery system: Self-management support, delivery system design, decision support, and clinical information systems. Is there a setting in which a CCM-based approach has produced better outcomes in CKD? The Indian Health Service (IHS), an agency of the Public Health Service that provides health care to >1 million American Indians and Alaska Natives (AI/AN), provides one example (15). IHS is a direct care agency that is based on a public health model. Although not formally organized around the CCM, IHS incorporates many of its basic principles and, indeed, served as one of the empiric models on which the CCM was based.

Since World War II, American Indians have experienced an epidemic of type 2 diabetes and diabetic complications associated with changes in lifestyle and diet, an epidemic now being duplicated throughout the US population. The single highest incidence rate of ESRD by race and diagnosis is among American Indians with kidney failure as a result of diabetes. American Indian communities in the Southwest experience the highest rates of treated ESRD in the United States.

IHS has a well-developed diabetes control and prevention program that has implemented a system of registries and multidisciplinary clinics. Because nearly 80% of kidney disease among AI/AN is due to diabetes, the IHS approach has been to improve CKD care within the existing diabetes care system rather than use a disease-specific specialty clinic (i.e., a CKD clinic). “Best practices” for diabetes care were revised to encourage primary providers to

- Identify, manage, and monitor patients with diabetes and CKD (eGFR <60 ml/min per 1.73 m² and/or proteinuria)
- Initiate appropriate treatment for anemia, malnutrition, metabolic bone disease, and hyperlipidemia
- Provide appropriate nutritional counseling for CKD
- Provide patient education on established CKD educational topics
- Provide appropriate preparation for RRT, including education on treatment choices, early referral for vascular access, and transplantation

IHS process measures demonstrate that levels of screening for CKD, treatment of hypertension, and use of RAS antagonists have improved significantly. The outcome measure of greatest interest, ESRD incidence among patients with diabetes, seems to reflect the significant impact of this approach. Incidence rates, which rose rapidly through the early 1990s, subsequently leveled off, and from 1999 through 2005, the average yearly decrease in ESRD incidence as a result of diabetes among AI/AN was 3.4% (16). The decrease in incidence was observed in all age groups.

Lessons learned from the IHS experience are consistent with the principles of the CCM and could be used to improve care provided within other health systems:

- CKD must be part of primary care (not relegated to specialty clinics).
- Changing patterns of care requires changing “the system” of care.
• Improvement in care results from changes that are implemented by physicians as well as nonphysician health professionals.
• The most efficient way to improve care for the 50% of patients with CKD as a result of diabetes is through the existing diabetes care delivery system.
• Surveillance and prevention of CKD are part of multisystem chronic disease control.
• Emphasis should be on ensuring that patients receive care from a competent and interested individual, not on the timing of referral.

National Kidney Disease Education Program and Community Health Centers
Although the SCKP and IHS examples demonstrate what can be accomplished in closed systems in which, by definition, all patients are insured, much of the burden of CKD falls on ethnic and racial groups with decreased access to care (17). Much of the recent growth of CKD is attributable to rising rates of type 2 diabetes in these high-risk groups. For many of these patients, referral to a nephrologist occurs late or not at all (18). As SCKP and IHS suggest, approaches to enhancing CKD care in the primary setting may offer the best opportunity to improve outcomes; however, several barriers exist to improving CKD care in this setting: CKD is underdiagnosed, implementation of recommended care is poor, and many primary care clinicians feel inadequately educated to manage CKD.

The National Kidney Disease Education Program (NKDEP) was established in 2000 by the National Institute of Diabetes and Digestive and Kidney Diseases with the goal of reducing the morbidity and mortality caused by CKD and its complications (19). Specifically, NKDEP aims to improve early detection of CKD, facilitate identification of patients who are at greatest risk for progression to kidney failure, and—guided by the CCM—promote evidence-based interventions to slow progression of CKD. NKDEP considers community health centers (CHCs) to be crucial partners in its efforts to improve outcomes by applying the CCM to CKD. Health centers serve many of the people who are at greatest risk for CKD: Those who have diabetes or hypertension or who are black or Hispanic. In addition, CHCs have demonstrated the capacity to improve outcomes systematically through the Health Disparities Collaboratives initiative (http://www.healthdisparities.net) of the Health Resources and Services Administration (20).

Of particular interest to NKDEP are CHCs that have participated in diabetes collaboratives. In February 2008, NKDEP launched the CHC-CKD Pilot with a group of five health centers in the Northeast United States. Through patient and provider education and the development of new clinical tools, the pilot aims to improve CKD detection, BP control, use of RAS antagonists, screening for complications of CKD, and education of patients about CKD. The pilot has supplied centers with self-management support tools including patient education guidelines, provided decision support tools including a CKD screening/treatment algorithm, and developed tools to support collaborative management with nephrologists. Key to this effort are improvements to the clinical information systems to facilitate CKD-related data collection and analysis. All of the participating health centers use electronic medical records that have been modified to allow monthly data collection on performance measures that aid in assessment of improved care. A key objective is to identify best practices that can be disseminated throughout the CHC system and beyond.

One tenet of the CCM is to integrate specialist expertise and primary care. The CHC-CKD Pilot is currently developing clinical tools to facilitate the most productive relationship between primary providers and nephrologists, including defining an appropriate screening evaluation before referral, criteria for referral, and tools for communicating to the nephrologist and back to the referring provider.

Conclusions
Improving the care of people with CKD requires changing clinical practice in settings in which high-risk populations are served. The greatest opportunities to improve outcomes exist early in the course of disease, when patients are treated in the primary care setting. Improving the treatment of patients before referral is necessary to optimize subspecialty care. Achievement of this goal includes facilitating a redefinition of the primary care/nephrology relationship so that each can contribute optimally to better patient outcomes.

Disclosures
None.

References
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