The Need for Collaboration to Improve Cardiovascular Outcomes in Patients With CKD

T he global population of patients who have CKD is increasing at a staggering rate. Individuals with CKD are at risk of progressing to ESRD, but they also are exposed to a disproportionate rate of cardiovascular complications. The convergence of CKD and cardiovascular illnesses poses a unique problem for the public health. In the United States, 26 million people have some form of CKD, and more than 600,000 patients have ESRD and, thus, require some form of kidney replacement therapy.1 In Taiwan and Japan, the prevalence of ESRD is reported to be ~2500 per million population, whereas in the United States, Portugal, and Singapore, ESRD occurs in 1600 to 2000 per million population.1 Between 2007 and 2011, the reported population of patients with ESRD increased 24.7% internationally and 16.4% in the United States.1 Unfortunately, patients with ESRD have an extremely high mortality because of cardiovascular diseases. In the 1990s, dialysis patients in the United States carried a risk of cardiovascular disease that was 10 to 20 times greater than what was observed in the general population.2 In 2011, the US Renal Data Systems reported that causes of death in dialysis patients were acute myocardial infarction in 4.7%, congestive heart failure in 4.8%, cerebrovascular accident in 3.1%, and arrhythmias (sudden cardiac death) in 26.9%. In contrast, only 24.2% of deaths in the general population in the United States were attributed to cardiovascular complications.3 Cardiac risk is also augmented among patients who have less advanced CKD. Data from the National Health and Nutrition Examination Survey demonstrate that acute myocardial infarction was diagnosed 2.3 times more often, cerebrovascular disease was identified 1.3 times more often, and congestive heart failure 2.3 times more often in people with pre-ESRD CKD compared to those without CKD.1 Thus, the population of patients who have CKD or ESRD is burgeoning worldwide, and the disproportionate burden of cardiovascular disease in the large population of patients with CKD necessitates a fresh evaluation of strategies for care.

Currently in the United States, the health care for patients with CKD is discontinuous and fragmented. At the point of delivery within primary care settings, kidney dysfunction often remains undetected, and even when CKD is acknowledged the severity of kidney disease is often misjudged.4 Because of perceived lack of ancillary support or limits in the number of nephrology subspecialists, patients with CKD are frequently referred by primary care providers (PCPs) to nephrology subspecialists late in the clinical course, after their kidney function has progressed. Late referral to nephrologists is associated with poor clinical outcomes.5,6 Furthermore, once a patient is recognized to have CKD, involvement of subspecialists and providers from other disciplines may remain limited.7,8 This paradox is surprising in the setting of high rates of comorbid illnesses, such as hyperlipidemia and diabetes, that further fuel an already heightened risk of cardiovascular events in these patients. In addition to being less likely to be referred to nephrologists, medication therapy also differs among patients with CKD. For example, patients with CKD are less likely than those without CKD to receive treatment with standard cardiovascular therapies even when indicated.7 Despite this evidence, physicians are less likely to prescribe beta-blockers, heparin, and aspirin to patients with CKD even in the setting of acute myocardial infarction.9 In addition, patients with CKD are less likely to have adequate control of hypertension than their clinic counterparts who have normal kidney function.9 These discrepancies in care, the determinants of these discrepancies and the exceedingly poor cardiovascular outcomes in the vulnerable CKD population mandate a re-evaluation of our existing processes of care.

Etiologic connections for the simultaneous development of cardiac and kidney diseases are supported by a range of observations. The increased cardiovascular risk in patients with CKD is likely partly a function of the prevalence of traditional risk factors in these patients, such as hypertension, diabetes, dyslipidemia, older age, left ventricular hypertrophy, and the metabolic syndrome.1 But risk models, such as the Framingham prediction model, that employ cardiovascular risk factors identified in the general population are not sufficient to accurately predict the risk for cardiovascular complications in patients with CKD.10 A high prevalence of nontraditional risk factors in CKD is also evident, and conjecture exists for the role of uremic toxins, anemia, abnormalities in bone mineral metabolism and in chronic systemic inflammation.11,12 In one example of the role played by nontraditional risk factors, the CKD Prognosis Consortium recently evaluated more than 1.2 million patients with CKD.13 This analysis demonstrated a graded and additive risk of cardiovascular and all-cause mortality with albuminuria (albumin-to-creatinine ratio >10 mg/g) and with estimated glomerular filtration rates less than 60 mL/min/1.73 m².13 The 2002 National Kidney Foundation K/DOQI Guidelines suggested that all patients with CKD should be considered the “highest risk” group for cardiovascular disease, regardless of the underlying traditional risk factors.14 Thus, either as a result of the inclusion of patients with high degree of comorbid illnesses or because of the influence of the metabolic environment, the presence of CKD identifies a population at high risk.

Optimal care for patients with CKD is complex and reducing the excess cardiovascular risk may be, best managed using team-based, comprehensive, multifactorial risk reduction strategies.16-18 Although each patient’s care should be individualized,19 patient outcomes may be improved with a combination of simultaneous control
of blood pressure, glucose (among those with diabetes), and lipids; use of antiplatelet agent therapy when indicated; and lifestyle modifications that include smoking cessation, a healthy diet, exercise, and weight reduction among those who are overweight or obese. In addition to addressing these traditional cardiovascular risk factors and specific cardiovascular comorbidities, comprehensive CKD care should also include protocols for laboratory and clinic visits; attention to CKD-associated comorbidities, such as anemia and metabolic bone disease; a vaccination program; and an education program that includes both general CKD and education for ESRD treatment options. In the context of multiple other conditions, CKD is a complex condition that requires multiple care tasks to be addressed.

Despite the promise of simultaneously targeting multiple risk factors and comorbidities, coordinating care in clinical practice is challenging, and broad implementation of an ideal program has been limited in the CKD population. Optimal management requires team-based approaches with multidisciplinary expertise and coordinated involvement from internists, nephrologists, other specialists (including cardiologists, diabetologists, neurologists, etc.), nutritionists, behavioralists, nurses, educators, and pharmacists at various times during the clinical course and across the spectrum of CKD severity. Although such people routinely work together in health care, several barriers prevent explicit efforts to develop interprofessional, multidisciplinary team-based care. Establishing cohesive and high-functioning teams requires dedicated effort and resources. If the potential benefits to patients and team members are not outweighed by the investments in the effort required, then other incentives may be necessary. When considering various specialties, colocalization to minimize patient barriers to access may be difficult or infeasible. Finally, common barriers include other logistical obstacles, lack of experience or expertise, deficient infrastructure, cultural silos, resistance to change, and inadequate or absent reimbursement.

Although these numerous challenges impede translation of multidisciplinary approaches to clinical practice, new efficient intervention paradigms are emerging that may better provide the comprehensive, multidisciplinary care teams that support patients and their providers to better manage the complex clinical entity of CKD. Team-based approaches include those delivered through integrated delivery systems, patient-centered medical homes, and accountable care organizations. Such multidisciplinary approaches are able to deliver high-quality care by identifying high-risk individuals using registries, increasing patient engagement and self-management, managing complex patients with co-ordinated multispecialty input, and optimizing management with decision support at the point of care. Until recently, such integrated approaches have evolved primarily within integrated delivery systems because of an alignment of incentives that support the additional investments necessary to provide team-based comprehensive care. Poor care coordination among providers and across systems of care has been identified as a contributing factor to poor outcomes among patients with CKD. However, recent evolution of financing mechanisms for chronic disease care has increased the focus toward greater population-based accountability through capitated payment models. Simultaneously, several novel approaches to facilitate care coordination and collaboration are emerging to support team-based care.

Perhaps the most important collaborative relationship in the management of CKD is between PCPs and nephrologists. PCPs deliver the majority of care for patients with CKD, but patients with severe CKD require and are often also managed by nephrologists. Nephrologist involvement has been associated with improved health outcomes, and greater coordination of care between PCPs and nephrologists is necessary to address knowledge deficits among PCPs regarding management. Addressing communication barriers, in particular, may help improve CKD care and outcomes. Within vertically integrated health care systems, comprehensive CKD care with facilitated PCP-nephrologist collaboration has been successful including the application of telemedicine. Improvements in interactive communication between PCP and nephrologists across other health care settings have the potential to help improve CKD care more broadly.

Once a patient with CKD is properly identified and referred to a nephrology subspecialty team, coexisting conditions often warrant concomitant input from other medical disciplines. To date, the results from interventions applying multidisciplinary team-based care have been mixed. In community-based patients with CKD, the impact of nurse-coordinated care teams ranges from improvements in medication prescribing for cardiovascular risk factors without discernible differences in rate of estimated glomerular filtration rate decline to attenuation in the decline of kidney function and improved kidney outcomes but without significant improvements in myocardial infarction, stroke, or cardiovascular death. Although some other multidisciplinary clinics have also been associated with slower declines in kidney function, others have been associated with reductions in risk for all-cause mortality (including a trend toward reduction in risk for all-cause and cardiovascular-specific hospitalizations). Because the link between abnormal kidney function (or CKD) and cardiovascular disease is so strong, it seems plausible that any improvements in care that reverse or improve kidney function may also reduce the risk of cardiovascular events and death. Although the evidence for this hypothesis is evolving, a movement toward considering cardiovascular disease as an essential component of CKD care continues to grow. Accordingly, greater coordination of care between nephrologists and other subspecialists involved in optimizing vascular health is essential to provide appropriate care among those with more advanced disease with various interacting comorbid conditions. In fact, referral patterns and the distribution of resources support this need. Once a patient in the United States is identified as having CKD, that individual is more likely to be seen in follow-up by a cardiologist than a nephrologist. Without interdisciplinary communication, care for patients often becomes fragmented resulting in lost opportunities to adequately educate patients and manage their complex and interacting comorbid conditions.
In this issue of *Advances in Chronic Kidney Disease*, we highlight the types of cardiac, vascular, and neurologic diseases that are commonly manifest in patients with CKD. In addition to describing the increased risk of these complications in the vulnerable CKD population, the contributing authors summarize the unique pathophysiological processes involved in those with CKD. Together, this distinguished group of authors represents 4 diverse but inter-related specialties, including nephrology, cardiology, hypertension, and neurology. First, Drs Garmilla and Hirsch highlight the high morbidity and mortality among those with peripheral artery disease and CKD. They then call for improved collaboration between vascular specialists and nephrologists to work together in PAD-CKD care teams to improve the suboptimal care that is currently provided. Next, Drs Roberts and McCullough concisely review the patterns of care and complications related to acute coronary syndromes among patients with CKD. In their thoughtful update of the medical management of acute coronary syndromes, they highlight that collaborative care teams are critical to individualize treatment decisions until greater evidence is available. Then, Dr Pun details the unique pathophysiology of sudden cardiac death and associated triggers among patients with kidney disease. In an insightful review of various management strategies, he highlights the importance of collaboration between specialists such as cardiologists, nephrologists, electrophysiologists, and surgeons, to provide a balanced view of therapeutic options while preserving vascular access and avoiding vascular complications. Next, Drs Vemulapalli, Tyson, and Svetkey detail the pathophysiology and related treatments for apparent treatment-resistant hypertension. They conclude by presenting novel interventional therapies that require collaboration between their respective subspecialties. Finally, Drs El Husseini, Kaskar, and Goldstein provide a detailed review of the pathophysiology of stroke in the context of patients with kidney disease, including the unique challenges posed by atrial fibrillation. After a thorough review of treatment for acute stroke and stroke prevention, they note that greater coordination of care across specialties may improve adherence to treatment guidelines. In the end, we hope that this presentation will stimulate greater interdisciplinary dialogue that helps to promote new collaborative approaches to care. Rather than care delivered in silos by individual disciplines, optimal care for patients with CKD requires collaborative, interdisciplinary care that recognizes the interplay between CKD and cardiovascular diseases.

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References


