The Consequences and Costs of Chronic Kidney Disease Before ESRD

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Given the large number of US patients with end-stage renal disease (ESRD) and the attendant costs to the health care system, the renal community over the past decade has largely focused on patients with ESRD, a focus reinforced by the availability of a remarkable data source in the United States Renal Data System (USRDS). Our community has addressed adequacy of dialysis, appropriate treatment of anemia, dialysis access, and other similar issues. Similarly, the main focus of clinical trials in patients with chronic kidney disease (CKD) before ESRD has been on prevention of progression to ESRD. This focus has undeniably been beneficial to our patients. We have seen a decline in the incidence of ESRD due to glomerulonephritis and probably of type 1 diabetes mellitus (1), a marked improvement of the fraction of ESRD patients receiving appropriate doses of dialysis and achieving better hematocrits, and a parallel decline in the mortality among patients with ESRD (1).

But with this predominant focus on ESRD has come a degree of inattention to the consequences of CKD short of ESRD (2,3). Over the past two years, there has been a remarkable resurgence of attention to the patient with CKD before ESRD, fostered in large measure by the publication by the National Kidney Foundation (NKF) of its K/DOQI Guidelines for Chronic Kidney Disease (4), which have given us for the first time a coherent system for classifying and studying CKD. Some of the recent conclusions about CKD have been startling.

First, review of the data from wave III of the National Health and Nutrition Evaluation Survey (NHANES) (5) has shown us that 11% of US adults have CKD, a fraction dwarfing the 0.22% of adults that had ESRD in 2000. Next, we learned that for many patients with CKD, premature death was an outcome 5 to 11 times more likely than ESRD (6). With respect to this latter point, we have learned that, in comparison with the improved achievement of guidelines for management of ESRD, our management of the nonrenal aspects of CKD care has not met standards set by various guidelines (1).

In this issue of *JASN*, Smith et al. (7) use data from the Kaiser Permanente Northwest (KPNW) Region health maintenance organization and report on the costs of medical care for their patients with CKD compared with those without CKD. They report that patients with CKD and no comorbidities had medical costs averaging $18,000 over the 5.5 years of the study versus $9800 among non-CKD patients without comorbidities. The increment in costs for a patient with comorbidities was greater in those with ($18,000) than without ($14,200) CKD. Since a higher fraction of CKD patients had comorbidities (90% compared with 59% in patients without CKD), the total average yearly health care cost for CKD patients was 1.8 times that for non-CKD patients ($6245 compared with $3386). Health care use increased for CKD patients in all categories examined—numbers of hospitalizations, outpatient visits, and prescriptions—and at all levels of CKD from K/DOQI stage 2 to stage 4.

Can these data be extrapolated from the KPNW managed care population to the rest of the United States in the absence of detailed data about patients with CKD in the US population? There are surely major differences. The demography of the Northwest is quite different from that of the entire United States, and the fraction of prevalent patients with stage 3 disease—the most frequent in both the KPNW and the NHANES population—was considerably smaller in the KPNW (2.5%) than in the NHANES sample (4.3%) (5). But these data from an HMO providing virtually total care to its panel of patients provide the most complete and best-detailed study to date of the health care costs of the pre-ESRD CKD patient.

The USRDS has also studied Medicare patients with CKD short of ESRD over age 67 yr, using diagnostic codes derived from billing data to identify the patients (1). Lacking clinical data, the ascertainment of CKD is incomplete, with a prevalence of only 3.4% compared with the 11% in the NHANES data, but quite similar to the 3.1% found in the KPNW study. Thus, the USRDS and KPNW patients appear to represent for the most part patients with stage 3 CKD. The USRDS study estimates (8) that the annual Medicare costs of the CKD patient ($16,476) are about 2.7 times greater than those for patients without CKD ($6060). (Note that the USRDS patients are somewhat older than in the KPNW study.) The average costs for a dialysis patient were $62,676, or 10.3 times that of a non-CKD patient.

Taken together, these two studies offer an insight into the health care costs of CKD that neither one separately would do as well. Among the 3.1 to 3.4% of the older population identified by these two studies with CKD, the average cost of medical care is between 1.8 and 2.9 times that in a non-CKD population, while that of a dialysis patient (0.36% in this age population, while that of a dialysis patient (0.36% in this age
group) is 10.3 times as great. From these figures, one can estimate that the CKD patients, though accounting for only about 3.3% of the Medicare patients, account for about 5.5 to 8.0% of the Medicare budget or about 1.6 to 2.4 times the total cost of the dialysis patients.

Interestingly, the clinical characteristics and outcomes in the KPNW and USRDS patients are also remarkably similar. The fraction of KPNW patients with comorbidities was 90% and 59% in the CKD and non-CKD populations. In the USRDS analysis, the fraction with concomitant cardiovascular disease was 80% and 44% in the CKD and non-CKD populations. In the KPNW analysis, the fraction of patients dying was 11 times greater than the fraction reaching ESRD, whereas the number of deaths in the USRDS study was about 8.7 times the number of patients reaching ESRD.

In sum, the CKD patients identified in the KPNW and USRDS studies are identified as a group of patients at high risk for death, with a high rate of comorbidities, that justify careful study and close attention to management of risk factors. That even this incomplete subset of CKD patients consumes some 1.6 to 2.4 times the health care resources used by the dialysis population may finally motivate the nation’s payors to fund the required studies and to focus on quality of preventive care for patients with CKD as carefully as they do on patients with ESRD.

See related article, “Cost of Medical Care for Chronic Kidney Disease and Comorbidity among Enrollees in a Large HMO Population,” on pages 1300–1306.

References