End Stage Renal Disease on the Rise in the United States

Between 1990 and 2001, the number of chronic kidney disease patients in the United States increased 104%, 194% in those with diabetes.

BY LAURA SUAREZ, ASSOCIATE EDITOR

The prevalence of end stage renal disease (ESRD) in the United States is on the rise, and it is most common in diabetic patients. According to the Centers for Disease Control and Prevention (CDC), the number of diabetic patients with ESRD increased 194% between 1990 and 2001.[1]

ESRD, also called chronic renal disease, is marked by the slow decline of kidney functions. Kidney failure progression is very gradual, and symptoms of progression may not be noticed until kidney functions are one-tenth that of a normal kidney.

To assess the state-specific prevalence of ESRD in the United States between 1990 and 2001, the CDC analyzed data from the Renal Data Extraction and Referencing (RenDER) system. The largest increase in prevalence occurred in diabetes-related cases, according to RenDER, which pooled data from sources like the Centers for Medicare and Medicaid Services, and included information from all people treated for ESRD. In 1990, 171 per million people with diabetes had ESRD, and by 2001, ESRD was present in 503 per million people with diabetes.

The states with the highest number of diabetes-related ESRD cases were the District of Columbia, Hawaii and New Mexico. However, the incidence of ESRD in diabetic patients increased in all 50 states, according to the CDC report.

The total number of people with ESRD in the United States increased 104% over the 11-year period, data from RenDER indicated. Approximately 697 cases per million were recorded in 1990, and in 2001, 1,424 cases of ESRD per million people were recorded. Again, all 50 states experienced an overall increase in ESRD prevalence. The highest rates were seen in the District of Columbia, Delaware and Hawaii.

As the ninth leading cause of death in the United States, chronic kidney disease (CKD) affects 19 million adults. An estimated 400,000 of those people have ESRD, according to the CDC.

LEADING CAUSE OF ESRD

The leading cause of ESRD is diabetes, and the American Diabetes Association (ADA) estimated that 43% of new cases each year develop from diabetes complications. The second leading cause of ESRD is hypertension, and other common causes include genetic and autoimmune diseases and birth defects, according to the CDC.

"The high prevalence of ESRD among diabetic [patients] is due to a number of factors including the aging population, increased survivals of diabetic [patients] and the obesity epidemic," said Mohamed G. Atta, MD, assistant professor of medicine at Johns Hopkins School of Medicine, in an interview with *Diabetic Microvascular Complications Today*.

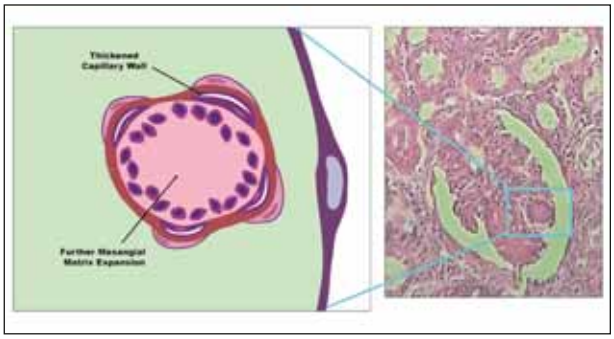

Figure 1. In the final stage of diabetic nephropathy, glomerulosclerosis and systemic hypertension are present. Glomerular filtration ceases, as the glomeruli are crowded out by expansion. The arterioles also become occluded.

Between 10% and 21% of people with diabetes will develop kidney disease in their lifetime, according to the ADA. In 2000, 41,046 diabetic patients with ESRD started renal replacement treatment. When treatment is started, patients are considered to have progressed to ESRD, Dr. Atta said. An additional 129,183 patients had a kidney transplant or started dialysis that year, as estimated by the ADA.

PREDICTORS OF CKD PROGRESSION

According to a study published in *Diabetes Care*, predictors have been identified that indicate the rate at which CKD progresses in type 2 diabetic patients. The study, which included data from 85 patients who had type 2 diabetes and CKD, showed that CKD developed faster in those patients who did not use insulin therapy versus those who did (*P*=.0022). Hypoalbuminemia, anemia and hypertension also increased the progression of kidney failure. The study concluded that insulin therapy may delay the progression of CKD in type 2 diabetic patients.[2]

Eiji Ishimura, MD, PhD, study investigator and associate professor of nephrology at Osaka City University Graduate School of Medicine in Japan, said in an interview that insulin therapy is equally important as controlling hypertension, anemia and health to prevent renal failure progression.

"Although the mechanism is unknown, insulin therapy may improve nutritional status via improvement of blood sugar control. Insulin has a vasodilative effect of peripheral circulation, possibly leading to renoprotective effect," he said.

EARLY DETECTION

The key to preventing diabetic nephropathy is early detection, Dr. Atta said. Patients should be regularly screened for microalbuminuria, and risk factors like hypertension, dyslipidemia and hyperglycemia – commonly found in nephropathy – should also be aggressively treated, he said.

According to the 2004 United States Renal Data System Annual Data Report,[3] diabetic patients should have their HbA1c tested two to four times every year, and their lipid levels should be tested once a year. They should also have a pneumonia vaccination and be revaccinated once every 6 years.

It is also important for diabetic patients with kidney disease to seek therapy for anemia and poor nutrition, Dr. Ishimura added. Taking an angiotensin-converting enzyme (ACE) inhibitor or an angiotensin receptor blocker (ARB) can also prevent its progression of CKD to ESRD.

People with type 1 diabetes are 12 times more likely than type 2 patients to develop ESRD, according to the ADA.

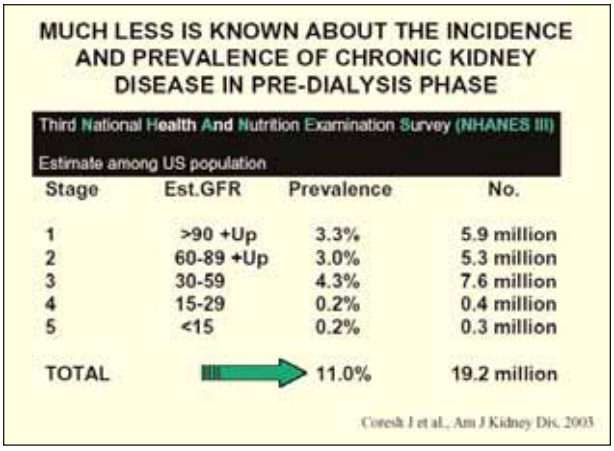

Figure 1. Estimated incidence and prevalence of CKD in the US.

American-Indians with diabetes are six times more likely than non-Hispanic whites with diabetes to develop the disease. Diabetic Mexican-American patients are 4.5 to 6.6 times more likely and diabetic black patients are 2.6 to 5.6 times more likely than non-Hispanic white diabetic patients to develop ESRD.

ESRD THERAPY

In patients who undergo therapy for ESRD, only 3% to 4% regain kidney function. Diabetic patients have a lower chance than any other group to regain function, and have a 0.58 probability of returning to dialysis compared to a 0.24 probability in nondiabetic patients.

People who have the highest probability of regaining kidney function with ESRD therapy are those aged 20 to 44 years, are men or white. ■

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Visit the following Web site for more information: The American Diabetes Association at www.diabetes.org

1. Pirtle CJ, Schoolwerth AC, Giles WH et al. State-specific trends in chronic kidney failure - United States, 1990-2001. MMWR. 2004;53:918-920.

2. Hideki U, Ishimura E, Shoji T, et al. Factors Affecting Progression of Renal Failure in Patients with Type 2 Diabetes. *Diabetes Care.* 2003;26: 1530-1534.

3. U.S. Renal Data System, USRDS 2004 Annual Data Report: Atlas of End-Stage Renal Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Bethesda, MD, 2004.