By 2050, One-Third of U.S. Could Have Diabetes

BY MIRIAM E. TUCKER

FROM POPULATION HEALTH METRICS

Over the next 40 years, the total prevalence of diabetes in the United States is expected to increase from its current level of about 1 in 10 adults to as many as 1 in 3 by 2050.

The estimate, which includes both diagnosed and undiagnosed diabetes, comes from a new statistical modeling of data from the 2000 Census and the Centers for Disease Control and Prevention (CDC). The projected increase in diabetes prevalence is attributed to the aging of the U.S. population, increasing size of higher-risk minority populations, and declining mortality among people with diabetes, said Dr. James P. Boyle and his associates, of the CDC's Division of Diabetes Translation and Emory University, Atlanta.

"Our estimates of diabetes prevalence paint a sobering picture of the future growth of diabetes … . The projected loss in quality of life and the projected costs of providing health care could be significant. Increased efforts in primary prevention of diabetes can help to decrease loss in quality of life and the future cost of providing care for people with diabetes," the investigators said in their paper, published in the journal Population Health Metrics (www.pophealthmetrics.com).

Previous projections of the prevalence, incidence, and total number of diabetes cases in the United States are outdated because they relied on 1990 census projections, which overestimated current mortality rates and did not account for the increasing size of the Hispanic and foreign-born U.S. populations at higher risk for diabetes.

VITALS

Major Finding: The prevalence of diagnosed or undiagnosed diabetes would increase from 14% in 2010 to between 25% and 33%, depending on low or high assumptions of incidence and mortality.

Data Source: Statistical modeling based on data from the 2000 U.S. Census and CDC diabetes statistics.

Disclosures: The authors declared no competing interests.

In contrast, the current analysis included 2000 Census–based estimates of the 2007 population and estimates of mortality rates, births, and migration from 2008 through 2050, along with CDC data on diabetes incidence rates among adults aged 18-79 years during 1980-2007.

Models were based on historical incidence of newly diagnosed diabetes per 1,000 persons from 1980 through 2007, with "low" incidence being the 2.5th percentile and "high" incidence defined as the 97.5th percentile. Historically, the incidence of diabetes in the U.S. ranged from 3 cases per 1,000 population in 1980 to 8 per 1,000 in 2007. The "middle incidence" scenario—reflecting recent rate increases—projects an increase of 8 cases per 1,000 in 2008 to 15 cases per 1,000 in 2050.

According to the estimated projection, the prevalence of diagnosed or undiagnosed diabetes would increase from 14% in 2010 to 25% in 2050 under a low incidence/low mortality risk scenario, 21% with low incidence/high mortality, 33% with middle incidence/low mortality risk and 28% for middle incidence/high mortality.

Assuming a hypothetical intervention such as universal lifestyle modification reaching 100% of those at high risk for diabetes (that is, those with impaired fasting glucose), the annual incidence of diabetes would still be reduced only by 25%.

"Our analysis suggests that widespread implementation of reasonably effective preventive interventions focused on high-risk subgroups of the population may not eliminate, but might considerably reduce, future increases in diabetes prevalence," Dr. Boyle and his associates noted.

The authors declared that they have no competing interests. ■

Paricalcitol Cut Renal Risk in Diabetic Nephropathy Patients

BY SHARON WORCESTER

FROM THE LANCET

Selective vitamin D receptor activation with paricalcitol lowers residual albuminuria and could provide renal protection in patients with diabetic nephropathy – including those with a high sodium diet – when added to renin-angiotensin-aldosterone system (RAAS) inhibition therapy, according the findings of the randomized, controlled VITAL study.

Participants in the multinational, double-blind VITAL study were type 2 diabetes patients who had residual albuminuria – and who thus were at risk of progressive renal failure – despite receiving stable doses of ACE inhibitors or angiotensin receptor blockers (ARBs). They were enrolled between February 2008 and October 2008.

Of 281 patients enrolled in the study and randomized to receive either placebo, 1 mcg, or 2 mcg of paricalcitol for 24 weeks, along with their usual care for diabetes and cardiovascular protection, those in the 2-mcg group had the greatest – and the only statistically significant – percentage change in geometric mean urinary albumin-to-creatinine ratio (UACR) at final measurement during treatment, compared with the 1-mcg and placebo groups (-20%, compared with -16% and -3%, respectively).

The between-group difference vs. placebo was -18% and -11% for the 2-mcg and 1-mcg groups, respectively, Dr. Dick de Zeeuw of the University of Groningen, the Netherlands, and his colleagues reported online in the Lancet.

UACR was reduced significantly by treatment week 4 in the 2-mcg group, and the reduction was sustained during the entire treatment phase, peaking at -28% at week 12. The estimated glomerular filtration rate (eGFR) also decreased substantially by week 4 in the 2-mcg group vs. placebo and remained stable during treatment. An early reduction in systolic blood pressure fluctuated throughout treatment, the investigators found (Lancet 2010[doi:10.1016/S0140-6736(10)61032-X]).

In a post hoc analysis, it was shown that the greatest reduction in UACR was in 29 patients on 2 mcg paricalcitol who had urinary sodium excretion of more than 178 mmol in 24 hours.

No serious adverse events deemed to be related to study drug occurred during the course of the study.

"We have shown that 24 weeks' treatment with 2 mcg paricalcitol daily reduced residual albuminuria in patients with type 2 diabetic nephropathy who were on stable doses of ACE inhibitors or ARBs, particularly in those with high dietary sodium intake," the investigators wrote, adding that the effect on albuminuria, systolic blood pressure, and eGFR all occurred within 4 weeks, and that the reductions in UACR and eGFR were "fairly stable during the treatment phase."

These measurements returned toward baseline after drug withdrawal, indicating that the effects were real and reversible, they said.

The mechanisms of action for paricalcitol for lowering albuminuria appear to be multiple; activation of the vitamin D receptor, which is currently licensed for the prevention and treatment of secondary hyperparathyroidism, intervenes in pathways with well-known associations with renal and vascular progressive disease, they explained.

Additional study to assess the composite end point of doubling of serum creatinine, end stage renal disease, and death is needed for final verification of paricalcitol's renoprotective effects," they added.

Despite some study limitations, including the use of albuminuria as a surrogate marker of renal disease progression, the lack of measurement of true GFR and ambulatory blood pressure in the study, and fairly small sample size, the findings suggest paricalcitol could be "an important adjunctive treatment providing optimum management to renal osteodystrophy with little hypercalcemia and lowering residual albuminuria.

"Additionally, findings of our study suggest that paricalcitol lowers albuminuria, even when dietary sodium intake is high, which is important because resistance to RAAS intervention occurs in people with high dietary sodium intake and adherence to low sodium diets is desirable but difficult, especially in those with diabetic nephropathy who already have restricted diets," they said.

The VITAL study was sponsored by Abbott. Dr. de Zeeuw disclosed that he has been a consultant for, and his institution has received honoraria from, Abbott, Amgen, AztraZeneca, Bristol-Myers Squibb, Novartis, Noxxon, Johnson & Johnson, Hemcue, and Merck Sharp & Dohme. Five of the authors on the study are employed by Abbott and own stock and have stock options in Abbott. ■

VIEW ON THE NEWS

Dealing With Vitamin D Deficiency

The findings from the VITAL study add to existing data demonstrating the potential antiproteinuric actions of paricalcitol when added to standard therapies, Dr. Merlin C. Thomas and Dr. Mark E. Cooper wrote in an accompanying editorial.

They also underscore the fact that patients with diabetes, and particularly those with chronic kidney disease, "in whom the urinary loss of protein-associated vitamin D magnifies reduced activation of vitamin D by the proximal tubule and reduced expression of the vitamin D receptor," have increased rates of vitamin D deficiency.

For these patients it "seems rational to replace vitamin D," they wrote (Lancet 2010 [doi:10.1016/S0140-6736(10)61301-3]).

Selective analogues that restore vitamin D receptor-signaling without risking hypercalcemia or hyperphosphatemia – as paricalcitol appears to do in the VITAL study – might be of particular benefit, they said, adding that trials in patients with diabetes "should now test whether such analogues can ultimately improve mortality and cardiovascular outcomes, as suggested in studied of patients with end-stage renal disease."

DR. THOMAS AND DR. COOPER *are with the Baker IDI Heart and Diabetes Institute, Melbourne, Australia. Dr. Thomas is also with Monash University in Melbourne. Both reported having no disclosures.*