Early blood glucose control lengthens life in people with type 1 diabetes

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A report in *JAMA* led by the University of Pittsburgh Graduate School of Public Health details how intensive control of blood glucose leads to a longer lifespan in people with type 1 diabetes. Credit: Pitt/UPMC

People with type 1 diabetes who intensively control their blood glucose (blood sugar) early in their disease are likely to live longer than those who do not, according to research funded by the National Institutes of Health. The findings are the latest results of the Diabetes Control and Complications Trial (DCCT) and its follow-up, the Epidemiology of Diabetes Control and Complications (EDIC) study. Results were published online Jan. 6 in the *Journal of the American Medical Association*.

"The outlook for people with type 1 diabetes continues to improve," said

Catherine Cowie, Ph.D., of NIH's National Institute of Diabetes and

Digestive and Kidney Diseases (NIDDK), the primary funder of the study. "These results show that by tightly controlling their blood glucose, people with type 1 diabetes can live longer."

Type 1 diabetes typically occurs in younger people and was formerly called juvenile-onset diabetes. In type 1 diabetes, the body does not make insulin, and people with type 1 need to take daily insulin to live.

Beginning in 1983, the DCCT/EDIC study enrolled 1,441 people between ages 13 and 39 with recent-onset type 1 diabetes. In the DCCT, half were assigned at random to intensive blood glucose control designed to keep blood glucose as close to normal as safely possible, and half to the conventional treatment at the time. Both groups were similar in age. The DCCT ended in 1993 when the intensive control group was found to have substantially less eye, nerve and kidney disease. All participants were taught intensive blood glucose control and followed during the ongoing EDIC. Blood glucose control has been similar in both groups since DCCT ended.

Researchers found 107 deaths among DCCT/EDIC participants, who were followed an average of 27 years from enrollment. There were 64 deaths in the group that had initially received standard treatment and 43 deaths in the intensive treatment group, a 33 percent reduction in deaths. The most common causes of death - not all necessarily related to diabetes - were cardiovascular diseases (22 percent), cancer (20 percent), acute diabetes complications - where blood glucose became dangerously high or low (18 percent) - and accidents/suicide (17 percent).

More people in the conventional treatment group than the intervention group died from diabetic kidney disease (six vs. one). The study also found that higher average glucose levels and increased protein in the urine - a marker of diabetic kidney disease -were the major risk factors for death.

"These results build on earlier studies, which suggested that increased protein in the urine largely accounts for shorter lifespans for people with type 1 diabetes," said the study's lead author, Trevor Orchard, M.D., a professor at the University of Pittsburgh Graduate School of Public Health. "These results further emphasize the importance of good early glucose control, as this reduces the risk for increased protein in the urine in general, as well as diabetic kidney disease."

Since the 1993 publication of the findings, the DCCT intensive treatment has become standard practice for type 1 diabetes. The new findings show that reductions in diabetes complications resulting from tight glucose control translate into longer lifespans.

"Thanks to the findings over the years from the landmark DCCT/EDIC study, millions of people with diabetes may prevent or delay debilitating and often fatal complications from the disease," said NIDDK Director Griffin P. Rodgers, M.D. "NIH's mission is to help improve lives through biomedical research. These kinds of results provide hard evidence that what we do helps people live longer, healthier lives."

Diabetes affects more than 29 million Americans, most of whom have type 2 diabetes, often associated with overweight or obesity. Another NIH study found that in older adults with longstanding type 2 diabetes and high cardiovascular disease risk, very intensive glucose control to near normal levels actually increased mortality. In contrast, the DCCT/EDIC studied intensive glucose control in younger people with type 1 diabetes earlier in the course of their disease and found intensive control had a prolonged benefit in reducing mortality.

More information: Paper doi:10.1001/jama.2014.16107

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