MedicalXpress

First identification of nicotine as main culprit in diabetes complications among smokers

March 27 2011

Scientists today reported the first strong evidence implicating nicotine as the main culprit responsible for persistently elevated blood sugar levels — and the resulting increased risk of serious health complications — in people who have diabetes and smoke. In a presentation at the 241st National Meeting & Exposition of the American Chemical Society (ACS), they said the discovery also may have implications for people with diabetes who are using nicotine-replacement therapy for extended periods in an attempt to stop smoking.

"This is an important study," said Xiao-Chuan Liu, Ph.D., who presented the results. "It is the first study to establish a strong link between nicotine and diabetes complications. If you're a smoker and have diabetes, you should be concerned and make every effort to quit smoking."

Nearly 26 million people in the United States and 260 million more worldwide have diabetes. Those complications — which include heart attacks, stroke, kidney failure, and nerve damage — are why diabetes is the sixth leading cause of death in the United States, and the third leading cause in some minority groups, according to the National Institutes of Health. Treating those complications takes $1 out of every $10 spent on health care each year.

Liu cited past research showing that good control of blood sugar levels is the key to preventing complications. The gold standard for monitoring

long-term blood sugar levels in people with diabetes is the hemoglobin A1c (HbA1c) blood test. Used in conjunction with daily home blood sugar monitoring, the HbA1c test reveals the average amount of sugar in the blood during the last several weeks. High test results mean that diabetes is not well controlled and there is an increased risk of complications.

Doctors have known for years that smoking increases the risk of developing complications. Studies also show that smokers with diabetes have higher levels of HbA1c than nonsmokers with diabetes. However, nobody knew the exact substance in cigarette smoke responsible for the elevation in HbA1c. Liu and colleagues suspected it may be nicotine and set out to check nicotine's effects on HbA1c. Using human blood samples, they showed that concentrations of nicotine similar to those found in the blood of smokers did, indeed, raise levels of HbA1c.

"Nicotine caused levels of HbA1c to rise by as much as 34 percent," said Liu, who is with California State Polytechnic University in Pomona, Calif. "No one knew this before. The higher the nicotine levels, the more HbA1c is produced."

Doctors could use data from this study as a new basis for encouraging patients with diabetes to quit smoking, Liu said. What about nicotine patches, electronic cigarettes, and other stop-smoking products? Liu pointed out that people tend to use those products for only brief periods, and that the benefits of permanently stopping smoking may outweigh any risk from temporary elevations in HbA1c. However, the study may raise concern over the long term use of such products, he added.

Provided by American Chemical Society

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