www.medscape.com
Smoking Causes Diabetes; Doctors Should Help Patients Quit
Miriam E. Tucker
January 23, 2014

Active smokers have a 30% to 40% higher risk of developing type 2 diabetes compared with nonsmokers, according to new data published in the Surgeon General's 50-year anniversary report on smoking.

The Health Consequences of Smoking — 50 Years of Progress , announced at the White House last Friday by current acting Surgeon General Boris Lushniak, MD, MPH, highlights diabetes as one of several new diseases causally linked to smoking.

While the 2010 Surgeon General's report on smoking had discussed associations between smoking and impaired glycemic control, the development of diabetes, and diabetic complications, it was not clearly established at that time that any link was independent of other factors, such as physical inactivity and poor diet.

But newer studies have controlled for those and other confounders and have also demonstrated a dose-response relationship, as well as a reduction in diabetes risk following smoking cessation. So now, the Surgeon General report concludes: "The evidence is sufficient to infer that cigarette smoking is a cause of diabetes."

"The link between smoking and diabetes is really interesting," Serena Tonstad, MD, PhD, MPH, professor at the School of Public Health, Loma Linda University, California, told Medscape Medical News.

Dr. Tonstad stressed that the lack of attention paid to smoking cessation in clinical encounters with patients who have diabetes or prediabetes is "a major concern."

"I believe that most of the consultation time goes to blood sugar regulation, medications, and diet. These findings from the report underscore the importance of giving attention to smoking cessation also. There are unfortunately very few data regarding smoking cessation in persons with diabetes," she noted.

Epidemiologic and Biological Evidence

The new report includes a meta-analysis, which updates a 2007 systemic review by adding a further 24 studies. All were prospective cohort studies, and none included individuals who already had diabetes at baseline. In all, the meta-analysis included over 3.9 million subjects, of whom 140,813 subsequently developed diabetes.

The various studies adjusted for many potential confounders, including age, body mass index, physical activity, diet, alcohol consumption, family history of diabetes, gender, race/ethnicity, and educational level.

Compared with nonsmokers, the smokers had a pooled risk ratio for developing type 2 diabetes of 1.37. Stronger associations were seen in studies that used blood glucose measures to assess the presence of diabetes, rather than in those that relied on patient or physician reports.

A dose-response analysis provides further proof of direct causation. Compared with never-smokers, the relative risk for developing diabetes increased with smoking intensity from 1.14 for former smokers to 1.25 for light smokers (0 – 19 or 0 – 15 cigarettes/day in the various studies) to 1.54 for heavy smokers (> 15 or > 20), all statistically significant.

A third line of evidence for causation comes from 4 studies on smoking cessation. One review found improved insulin sensitivity among individuals who quit smoking, despite weight gain. Another large study found that the risk of incident type 2 diabetes among those who quit smoking actually increased in the short term but fell to that of never-smokers by 12 years after cessation, while another found that the risk fell to that of never-smokers after 5 years for women and 10 years for men.

Due to "limited evidence," however, the report does not discuss the effects of passive smoking on diabe-tes or the adverse effects of smoking on the development of diabetic complications.

But the new Surgeon General's report does provide several possible biologic mechanisms for the causal connection between smoking cigarettes and the development of type 2 diabetes. For one, smoking promotes central obesity, a well-established risk factor for insulin resistance and diabetes. This effect may be related to higher cortisol concentrations and the differential effect of smoking on sex hormones, the data indicate.

Smoking also increases inflammatory markers and oxidative stress, both implicated in the development of insulin resistance and abnormal glucose metabolism.

And both human and animal studies have found functional nicotinic receptors on pancreatic islet and beta cells. Nicotine could, at least in part, reduce the release of insulin via islet-cell receptors. Animal studies also suggest that prenatal or neonatal exposure to nicotine can cause beta-cell dysfunction and apoptosis, according to the report.

"The Most Powerful of All Lifestyle Interventions"

"Smoking-cessation advice takes just a few minutes but is the most powerful of all lifestyle interventions," Dr. Tonstad, who is also head physician at the department of endocrinology, morbid obesity, and preventive medicine, preventive cardiology section, Oslo University Hospital, Norway, told Medscape Medical News.

But fear of weight gain is often a barrier for both patients and physicians, she noted. "I have heard physicians say, 'Let's get diabetes and weight under control before attacking smoking.' Most patients want to do that too. Both physicians and patients are afraid of

weight gain. Certainly there are a few pounds of weight gain with cessation, but a focus on exercise and not eating carbs during that period could help."

Dr. Tonstad, who was not involved in writing the new Surgeon General's report but whose work is cited in it, is currently conducting a study in Norway to investigate which diet works best to prevent weight gain among smokers.

She also stresses that physicians should always offer pharmacological assistance to patients who smoke, "as it doubles or triples the chances of success on a given quit attempt."

Although there is virtually no literature on the use of pharmacologic antismoking treatments specifically in people with diabetes or prediabetes, Dr. Tonstad says there are "no major problems" with the currently available ones. Nicotine-replacement therapy by gum, patch, pill, or other forms is effective. Buproprion also works, although there is a caution in the label regarding patients on insulin or other glucose-lowering medications.

She told Medscape Medical News that, in her opinion, varenicline (Chantix, Pfizer) is the most efficacious of the smoking-cessation drugs, with no contraindications for people with diabetes. She is due to present results of a Pfizer-funded study on its efficacy specifically in patients with diabetes at the upcoming meeting of the Society for Research on Nicotine and Tobacco.

She added this final additional advice for doctors trying to counsel patients to quit smoking: "Reassure the patient that even though a small weight gain can occur, still it is advantageous to stop. Try to personalize the message by pointing out specific risk factors that improve, such as insulin sensitivity, risk of heart attack, risk of stroke." And importantly, "Follow-up should be arranged, even if just a telephone call to the office nurse," she concludes.

Dr. Tonstad has received honoraria for lectures and consulting from Pfizer, as well as from some other makers of smoking-cessation aids.

The Health Consequences of Smoking — 50 Years of Progress. published online January 17, 2014. Report

Send comments and news tips to news@medscape.net.

Cite this article: Smoking Causes Diabetes; Doctors Should Help Patients Quit. Medscape. Jan 23, 2014.