FACT SHEET: TOBACCO AND ENDOCRINE PROBLEMS

Tobacco and Diabetes

1. One of the most important findings from studies relating tobacco and diabetes was that only a very few informants thought that tobacco use was related to diabetes and those who did so thought that only very high levels of tobacco use (exceeding 25 cigarettes a day) might pose a risk to diabetes.[1]
2. Cigarette smoking, both active and passive, is an independent modifiable risk factor for the development of impaired fasting glucose (IFG),[2] type 2 diabetes mellitus (T2DM), and diabetes complications.[3] The risk was greater for heavy smokers and lower for former smokers compared with active smokers, consistent with a dose-response phenomenon.[2]
3. Cigarette smoke may have a direct toxic effect on the endothelial lining of blood vessels, which may lead to increased insulin resistance, and smoking is also associated with chronic inflammation, which is shown to be predictive of T2DM. Smoking may also mediate disturbed glucose metabolism by promoting or inducing alteration in fat distribution.[2]
4. The effect of smoking on CVD among diabetes patients is dose-dependent. The combined CVD risk of both smoking and diabetes is nearly 14 times higher than the risk of either smoking or diabetes alone.[4]
5. Smoking was associated with subclinical atherosclerosis in persons with diabetes and smoking interacts with duration of diabetes to accentuate atherosclerosis.[5]
6. Smoking cessation is proven effective to reduce the incidence and complications of diabetes.[6]
7. Smoking cessation helps to prevent and control diabetic complications. It improves metabolic and glycemic control and reduces the risk of CVD, peripheral artery disease, proteinuria and renal failure, neuropathy, and also retinopathy in some sub-groups.[7]
8. Smoking cessation decreases the cost for diabetic hospitalization, as the major cost incurred for diabetes is in the management of diabetic complications, rather than the treatment of diabetes itself.[8]

Tobacco and Other Metabolic Disorders

1. Although smokers weighed significantly less than nonsmokers, the waist-to-hip ratio (a measure of central adiposity), was significantly higher in smokers than in nonsmokers. Despite decreased relative adiposity in smokers, centripetal adiposity is increased.[9]
2. Cigarette smokers (both active and passive) were found to have significantly increased serum levels of TC, LDL, VLDL, and TG, and significantly decreased serum levels of HDL and apolipoprotein-Al (apo-A1).[10,11,12]
3. A dose-response relationship has been demonstrated between the number of smoked cigarettes and the concentration of blood lipids with men and women smoking 25 or more cigarettes/day, having significantly elevated VLDL and TG

levels and significantly lower HDL levels as compared to non-smokers and ex-smokers.[13]

4. Cigarette smoking is associated with an elevated ratio of total cholesterol (TC) to high-density lipoprotein cholesterol (HDL). The TC/HDL ratio is a powerful predictor of the risk of atherosclerotic cardiovascular disease.[14]
5. Smoking increases centripetal accumulation of body fat indirectly through increased androgenicity, which may lead to increased accumulation of adipose tissue in the abdomen rather than in the femoral-gluteal area.[9]
6. Effects of smoking and drinking on waist-to-hip ratio were found to be independent and additive.[15]
7. The association of smoking with waist-to-hip ratio was found to be stronger in women than men.[15]
8. Catecholamines released during smoking enhance lipolysis and raise plasma free fatty acid (FFA) concentrations.[13]
9. Smoking is also an independent determinant of low paraoxonase activity in patients with acute coronary events.[13]
10. Smoking cessation was found to reduce the susceptibility of LDL to oxidation.[13]
11. Weight gain and increased appetite were cited as important reasons for relapse following attempts to quit smoking among Swedish women.[16]

References:

1. Thresia CU, Thankappan KR, Nichter M. Smoking cessation and diabetes control in Kerala, India: an urgent need for health education. Health Educ Res. 2009; 24(5):839–45. [Epub ahead of print] Available at: http://her.oxfordjournals.org/cgi/reprint/cyp020v1 (accessed: June 19, 2009).
2. Rafalson L, Donahue RP, Dmochowski J, Rejman K, Dorn J, Trevisan M. Cigarette smoking is associated with conversion from normoglycemia to impaired fasting glucose: The Western New York Health Study. Ann Epidemiol. 2009; 19:365–71.
3. Eliasson B. Cigarette smoking and diabetes. Prog Cardiovasc Dis. 2003; 45:405–13.
4. Al-Delaimy WK, Manson JE, Solomon CG, Kawachi I, Stampfer MJ, Willett WC, et al. Smoking and risk of coronary heart disease among women with type 2 diabetes mellitus. Arch Intern Med. 2002; 162:273–9.
5. Karim R, Buchanan TA, Hodis HN, Li Y, Mack WJ. The association of smoking and subclinical atherosclerosis in type 2 diabetes: modification by duration of diabetes. Diabet Med. 2005; 22:81–7.
6. Wannamethee SG, Shaper AG, Perry IJ. Smoking as a modifiable risk factor for type 2 diabetes in middle-aged men. Diabetes Care. 2001; 24:1590–5.
7. Yudkin JS. How can we best prolong life? Benefits of coronary risk factor reduction in diabetic and non-diabetic subjects. BMJ. 1993; 306:1313–8.
8. Pagano E, Bo S, Petrinco M, Rosato R, Merletti F, Gregori D. Factors affecting hospitalization costs in type 2 diabetic patients. J Diabetes Complications. 2009; 23:1–6.

9. Troisi RJ, Heinold JW, Vokonas PS, Weiss ST. Cigarette smoking, dietary intake, and physical activity: effects on body fat distribution—the Normative Aging Study. Am J Clin Nutr. 1991; 53:1104–11.
10. McCall MR, van den Berg JJ, Kuypers FA, Tribble DL, Krauss RM, Knoff LJ, et al. Modification of LCAT activity and HDL structure. New links between cigarette smoke and coronary heart disease risk. Arterioscler Thromb Vasc Biol. 1994; 14:248–53.
11. Craig WY, Palomaki GE, Johnson AM, Haddow JE. Cigarette smoking-associated changes in blood lipid and lipoprotein levels in the 8-to 19-year-old age group: a meta-analysis. Pediatrics. 1990; 85:155–8.
12. Neufeld EJ, Mietus-Snyder M, Beiser AS, Baker AL, Newburger JW. Passive cigarette smoking and reduced hdl cholesterol levels in children with high-risk lipid profiles. Circulation. 1997; 96:1403–07.
13. Tsiara S, Elisaf M, Mikhailidis DP. Influence of smoking on predictors of vascular disease. Angiology. 2003; 54:507–30.
14. Feldman J, Shenker IR, Nussbaum M, Jacobson MS, Etzel RA, Spierto FW, et al. Passive smoking alters lipid profiles in adolescents. Pediatrics. 1991; 88:259–64.
15. Laws A, Terry RB, Barrett-Connor E. Behavioral covariates of waist-to-hip ratio in Rancho Bernardo. Am J Public Health. 1990; 80:1358–62.
16. Lissner L, Bengtsson C, Lapidus L, Bjorkelnd C. Smoking initiation and cessation in relation to body fat distribution based on data from a study of Swedish women. Am J Public Health. 1992; 82:273–5.