



REVIEW ARTICLE

Review on Glycemic Abnormalities on Coronary Artery Disease

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ABSTRACT

Diet has a significant relationship with the risk of coronary heart disease (CHD). Traditionally the effect of diet on CHD was measured with the biomarker for low-density lipoprotein (LDL) cholesterol. However, LDL is not the only or even the most important biomarker for CHD risk. A suitably integrated view of the mechanism by which diet influences the detailed CHD pathogenetic pathways is therefore needed in order to better understand CHD risk factors and help with better holistic CHD prevention and treatment decisions.

Key words: Coronary heart disease, revascularization, histocompatibility leukocyte antigen.

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1. Introduction

These include increased length of stay, wound infections, mortality, and major cardiac events. The American Diabetes Association (ADA) now has three criteria to identify dysglycemia, which include a fasting plasma glucose (FPG), an oral glucose tolerance test (OGTT), and more recently added A1c. The relationship between pre-surgical glucose abnormalities and postoperative hyperglycemia is currently unclear. Some studies have shown elevated A1c levels affect postprocedure outcomes

in patients with and without diabetes, especially after cardiac surgery (CS) and post coronary revascularization.

Causes

A very high blood sugar level can lead to a life threatening complication called diabetes ketoacidosis, which can cause coma in severe cases. Some of the causes of hyperglycemia include over-eating, a low level of physical activity, stress, and major injury or surgery.

Signs and symptoms

Temporary glycemc abnormalities is often benign and asymptomatic. Blood glucose levels can rise well above normal for significant periods without producing any permanent effects or symptoms. However, chronic hyperglycemia at above normal levels can produce a very wide variety of serious complications over a period of years, including kidney damage, neurological damage, cardiovascular damage, damage to retina or damage to feet and legs. Diabetic neuropathy may be a result of long-term hyperglycemia.

Type 1 diabetes mellitus

- Type 1 diabetes mellitus is characterized by absolute insulin deficiency. In type 1A, a cellular-mediated autoimmune destruction of beta cells of the pancreas occurs. The disease process is initiated by an environmental factor that is, an infectious or noninfectious agent in genetically susceptible individuals.
 - Some genes in the histocompatibility leukocyte antigen (HLA) system are thought to be crucial. A stress-induced epinephrine release, which inhibits insulin release (with resultant hyperglycemia), sometimes occurs and may be followed by a transient asymptomatic period known as "the honeymoon." Lasting weeks to months, the honeymoon precedes the onset of overt, permanent diabetes.
 - Amylin, a beta-cell hormone that is normally cosecreted with insulin in response to meals, is also completely deficient in persons with type 1 diabetes mellitus. Amylin exhibits several glucoregulatory effects that complement those of insulin in postprandial glucose regulation. Idiopathic forms of type 1 diabetes also occur, without evidence of autoimmunity or HLA association; this subset is termed type 1B diabetes.
- #### **Type 2 diabetes mellitus**
- In a state of health, normoglycemia is maintained by fine hormonal regulation of peripheral glucose uptake and hepatic production.
 - Type 2 diabetes mellitus results from a defect in insulin secretion and an impairment of insulin action in hepatic and peripheral tissues, especially muscle tissue and adipocytes.
 - A postreceptor defect is also present, causing resistance to the stimulatory effect of insulin on glucose use. As a result, a relative insulin deficiency develops, unlike the absolute deficiency found in patients with type 1 diabetes.
 - The specific etiologic factors are not known, but genetic input is much stronger in type 2 diabetes than in the type 1 form.
 - Impaired glucose tolerance (IGT) is a transitional state from normoglycemia to frank diabetes, but patients with impaired glucose tolerance exhibit considerable heterogeneity. Type 2 diabetes, or glucose intolerance, is part of a dysmetabolic syndrome (syndrome X) that includes insulin resistance, hyperinsulinemia, obesity, hypertension, and dyslipidemia. Current knowledge suggests that the development of glucose intolerance or diabetes is

initiated by insulin resistance and worsened by the compensatory hyperinsulinemia.

- The progression to type 2 diabetes is influenced by genetics and environmental or acquired factors, such as a sedentary lifestyle and dietary habits that promote obesity. Most patients with type 2 diabetes are obese, and obesity is associated with insulin resistance.
- Central adiposity is more important than increased generalized fat distribution.
- In patients with frank diabetes, glucose toxicity and lipotoxicity may further impair insulin secretion by the beta cells.

Gestational diabetes mellitus

- Gestational diabetes mellitus (GDM) was previously described as any degree of glucose intolerance in which onset or first recognition occurs during pregnancy.
- The definition was limited by imprecision. Women diagnosed with diabetes in the first trimester are now classified as having type 2 diabetes. GDM is diabetes diagnosed in the second or third trimester of pregnancy that is not clearly overt diabetes.
- Insulin requirements are increased during pregnancy because of the presence of insulin antagonists, such as human placental lactogen or chorionic somatomammotropin, and cortisol; these promote lipolysis and decrease glucose use.

Coronary artery disease

Coronary artery disease, also called coronary heart disease, is a heart disease. ("Coronary" means "the blood vessels of the heart".) Coronary heart disease causes plaque to build up inside the coronary arteries. This causes the coronary arteries to become narrower. An artery is a blood vessel - a tube that carries blood. After the heart supplies blood that is full of oxygen and nutrients, the arteries carry the blood to different parts of the body. The coronary arteries are very important: they supply blood to the heart muscle. So when the coronary arteries become narrower, less blood gets to the heart muscle.

Signs and symptoms coronary artery disease

Chest pain that occurs regularly with activity, after eating, or at other predictable times is termed stable angina and is associated with narrowings of the arteries of the heart. Angina that changes in intensity, character or frequency is termed unstable. Unstable angina may precede myocardial infarction. In adults who go to the emergency department with an unclear cause of pain, about 30% have pain due to coronary artery disease.

2. Pathophysiology

Limitation of blood flow to the heart causes ischemia (cell starvation secondary to a lack of oxygen) of the myocardial cells. Myocardial cells may die from lack of oxygen and this is called a myocardial infarction (commonly called a heart attack). It leads to heart muscle damage, heart muscle death and later myocardial scarring without heart muscle regrowth. Chronic high-grade stenosis of the coronary arteries can induce transient ischemia which leads

to the induction of a ventricular arrhythmia, which may terminate into ventricular fibrillation leading to death.

Diagnosis

Stress test, Exercise radioisotope test myocardial scintigraphy), Echocardiography for symptomatic patients, stress echocardiography can be used to make a diagnosis for obstructive coronary artery disease. The use of echocardiography, stress cardiac imaging, and/or advanced non-invasive imaging is not recommended on individuals who are exhibiting no symptoms and are otherwise at low risk for developing coronary disease. The diagnosis of "Cardiac Syndrome X" - the rare coronary artery disease that is more common in women, as mentioned, an "exclusion" diagnosis. Therefore, usually the same tests are used as in any patient with the suspicion of coronary artery disease.

Management

Treatment of coronary artery disease is aimed at controlling symptoms and slowing or stopping the progression of disease. The method of treatment is based on many factors determined by your symptoms, a physical exam, and diagnostic testing. In many cases, if the blockage is less than 70 percent and not severely limiting blood flow, medications may be the first line of treatment, The names of your medications, what they are for, how often and at what times to take your medications, Your doctor or nurse should review your medications with you. Keep a list of your medications and bring them to each of your doctor visits. If you have questions about your medications, ask your doctor or pharmacist. High Blood Cholesterol and Triglyceride Levels

Cholesterol High blood cholesterol is a condition in which your blood has too much cholesterol—a waxy, fat-like substance. The higher your blood cholesterol level, the greater your risk of coronary heart disease (CHD) and heart attack. Cholesterol travels through the bloodstream in small packages called lipoproteins. Two major kinds of lipoproteins carry cholesterol throughout your body:

Low-density lipoproteins (LDL).

LDL cholesterol sometimes is called "bad" cholesterol. This is because it carries cholesterol to tissues, including your heart arteries. A high LDL cholesterol level raises your risk of CHD.

High-density lipoproteins (HDL).

HDL cholesterol sometimes is called "good" cholesterol. This is because it helps remove cholesterol from your arteries. A low HDL cholesterol level raises your risk of CHD.

High Blood Pressure

Blood pressure is the force of blood pushing against the walls of your arteries as your heart pumps blood. If this pressure rises and stays high over time, it can damage your heart and lead to plaque buildup. All levels above 120/80 mmHg raise your risk of CHD. This risk grows as blood pressure levels rise. Only one of the two blood pressure numbers has to be above normal to put you at greater risk of CHD and heart attack.

Diabetes and Prediabetes

Diabetes is a disease in which the body's blood sugar level is too high. The two types of diabetes are type 1 and type 2.

In type 1 diabetes, the body's blood sugar level is high because the body doesn't make enough insulin. Insulin is a hormone that helps move blood sugar into cells, where it's used for energy. In type 2 diabetes, the body's blood sugar level is high mainly because the body doesn't use its insulin properly. Over time, a high blood sugar level can lead to increased plaque buildup in your arteries. Having diabetes doubles your risk of CHD.

Overweight and Obesity

The terms "overweight" and "obesity" refer to body weight that's greater than what is considered healthy for a certain height. More than two-thirds of American adults are overweight, and almost one-third of these adults are obese. The most useful measure of overweight and obesity is body mass index (BMI). You can use the National Heart, Lung, and Blood Institute's (NHLBI's) online BMI calculator to figure out your BMI, or your doctor can help you. Overweight is defined differently for children and teens than it is for adults. Children are still growing, and boys and girls mature at different rates. Thus, BMIs for children and teens compare their heights and weights against growth charts that take age and gender into account. This is called BMI-for-age percentile.

3. Treatment

Treatment for High Blood Pressure and High Blood Cholesterol:

Treatment for high blood pressure and high blood cholesterol often begins earlier in people who have diabetes than in those who don't. People who have diabetes also may have more aggressive treatment goals. For example, your doctor may prescribe medicines called statins even if your blood cholesterol levels are in the normal range. Your doctor also may prescribe statins if you're older than 40 and have other heart disease risk factors. Target goals for LDL cholesterol (sometimes called "bad" cholesterol) and high blood pressure also are lower for people who have diabetes than for those who don't. Studies suggest that most people who have diabetes will need more than one blood pressure medicine to reach their goals. Research also has shown that some people who have diabetes may benefit more from certain blood pressure and cholesterol medicines than from others. One example is a group of cholesterol medicines called bile acid sequestrants (such as cholestyramine). This type of medicine may offer advantages for people who have type 2 diabetes. It appears to improve blood.

4. Conclusion

In observational studies, reinstitution of anticoagulation after ICH was associated with a lower risk of thromboembolic complications and a similar risk of ICH recurrence. Randomized clinical trials are needed to determine the true risk-benefit profile of anticoagulation resumption after ICH. The authors were intrigued by the possible negative effects of HGL diets on a patient's risk for CHD as well as the over emphasis of LDL cholesterol. As LDL is not the only or even the most important biomarker for CHD risk, a more detailed integrated view of diet and the CHD mechanism as well as its biomarkers were attempted. The integrative view highlights the increased

5. References

- [1] Giugliano D, Marfella R, Coppola L, et al. (1997). "Vascular effects of acute hyperglycemia in humans are reversed by L-arginine. Evidence for reduced availability of nitric oxide during hyperglycemia". *Circulation*. **95** (7): 1783–90.
- [2] Kannel WB. Some lessons in cardiovascular epidemiology from Framingham. *Am J Cardiol* 1976; **37** : 269-82.
- [3] Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004; **364** : 937-52.
- [4] Gupta R, Joshi P, Mohan V, Reddy KS, Yusuf S. Epidemiology and causation of coronary heart disease and stroke in India. *Heart* 2008; **94** : 16-26.
- [5] Kannel WB, McGee DL. Diabetes and cardiovascular disease. The Framingham study. *JAMA* 1979; **241** : 2035-8.
- [6] Haffner SM, Lehto S, Ronnema T, Pyorala K, Laakso M. Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. *N Engl J Med* 1998; **339** : 229-34.
- [7] Donahoe SM, Stewart GC, McCabe CH, Mohanavelu S, Murphy SA, Cannon CP, et al. Diabetes and mortality following acute coronary syndromes. *JAMA* 2007; **298** : 765-75.
- [8] Stamler J, Vaccaro O, Neaton JD, Wentworth D. Diabetes, other risk factors, and 12-yr cardiovascular mortality for men screened in the Multiple Risk Factor Intervention Trial. *Diabetes Care* 1993; **16** : 434-44.
- [9] Franco OH, Steyerberg EW, Hu FB, Mackenbach J, Nusselder W. Associations of diabetes mellitus with total life expectancy and life expectancy with and without cardiovascular disease. *Arch Intern Med* 2007; **167** : 1145-51.
- [10] Laakso M, Kuusisto J. Epidemiological evidence for the association of hyperglycaemia and atherosclerotic vascular disease in non-insulin-dependent diabetes mellitus. *Ann Med* 1996; **28** : 415-8.
- [11] Haffner SM. Epidemiology of insulin resistance and its relation to coronary artery disease. *Am J Cardiol* 1999; **84** : 11J-14J.
- [12] International Diabetes Federation (IDF). Diabetes atlas 4th ed. 2009. Available at:
- [13] Gupta R, Misra A, Pais P, Rastogi P, Gupta VP. Correlation of regional cardiovascular disease mortality in India with lifestyle and nutritional factors. *Int J Cardiol* 2006; **108** : 291-300.
- [14] Mohan V, Jaydip R, Deepa R. Type 2 diabetes in Asian Indian youth. *Pediatr Diabetes* 2007; **8** (Suppl 9): 28-34.