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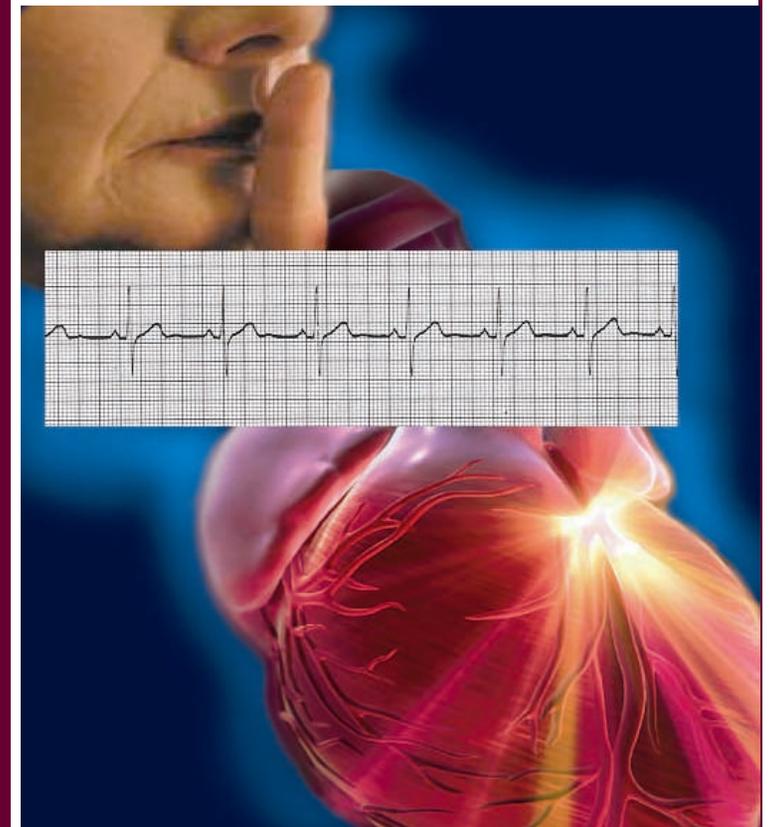


Christian S. Yacono, PA-S

Asymptomatic Coronary Artery Disease (CAD)/Events in the Type II Diabetic

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A Patient's Awareness Guide to a Silent Killer





Preface

Goals and Intents of this Pamphlet

- A:**
To provide a method of building awareness with respect to the danger of asymptomatic CAD/events.

- B:**
To provide the Type II diabetic population with a tool that will allow for a better understanding of what is needed to avoid preventable ischemic events.

- C:**
To promote better quality and quantity (influence morbidity and mortality) of life in the above noted patient population.

Topics Discussed

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Introduction to Heart Disease in the Type II Diabetic

How does diabetes affect my heart?

There are various mechanisms by which diabetes attacks the heart, invoking its deadly effects. The following is a basic description of the pathologic changes that may take place in those who suffer from this disease:

- 1.) Tendency toward high amounts of fat (cholesterol) in the blood. This is a known contributor to cholesterol plaque build-up within the walls of your blood vessels.
- 2.) Poor capability to break down already formed blood clots. This is caused by overproduction of an enzyme that prevents clot breakdown, called plasminogen activator-inhibitor-1 (PAI-1).
- 3.) Diminished ability to adequately control movement of blood vessels and flow of blood through them. When blood vessels increase their internal thickness and/or lose nerve function, they are unable to accommodate the heart's need for more blood flow.
- 4.) The effects of poor blood flow and high blood sugar on the nerves that supply your heart. As mentioned above, this can lead to poor response to the heart's demand for more oxygen (blood flow). Also, this may be responsible for the lack of sensation when a heart attack ensues (will be discussed more later on).
- 5.) The detrimental effects of higher insulin levels on blood vessels. This results in additional "hardening" of the arteries.

***Please note that the above factors work together in a collaborative effort to render the diabetic more vulnerable to heart disease.

Important Facts/Statistics

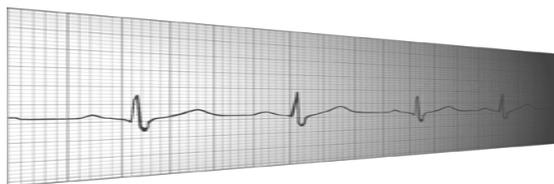
- 14.5 million in the U.S. are currently living with Type II diabetes mellitus (90% of all diabetes cases).
- Coronary artery disease (CAD) represents the leading cause of death in America.
- CAD is the most common and costly vascular complication of diabetes; it is, furthermore, the major cause of death in the Type II diabetic population.
- Type II diabetics are at the same risk for a heart attack as non-diabetics who have already had a heart attack.
- Those who are not yet diabetic (“borderline”) are at increased risk of cardiovascular disease even before the diagnosis.
- Diabetes has been noted to be the only disease that causes women to have heart disease rates similar to those of men.
- The number of those Type II diabetics affected by asymptomatic CAD is not clearly known, only estimated (one study demonstrated significant CAD in 20.9% of the study group; another gave ranges between 9% and 48%).

What are the symptoms of heart attack?

Typical : pain/tightness (chest, left arm), lightheadedness/passing out, nausea/vomit, difficulty breathing/shortness of breath, sweating, pale skin, sensation of heart beating faster/harder than usual (palpitations).

Atypical : pain/tightness (jaw, back, mid-upper abdomen), cough, anxiety, fatigue.

Absent
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- Koistinen M.J., Airaksinen K.E.J., Linnaluoto M.M.K., Heikkilä J., Torniaainen P., & Ahonen A. (1996). No Difference in Cardiac Innervation of Diabetic Patients with Painful and Asymptomatic Coronary Artery Disease. *Diabetes Care*, 19(3), 231 – 235.
- Langer A., Freeman M., Josse R.G., & Armstrong P.W. (1995). Metaiodobenzylguanidine Imaging in Diabetes Mellitus: Assessment of Cardiac Sympathetic Denervation and Its Relation to Autonomic Dysfunction and Silent Myocardial Ischemia. *Journal of the American College of Cardiology*, 25(3), 610 – 618.
- Masharani U. & Karam J.H. (2002). Diabetes and Hypoglycemia. *Current Medical Diagnosis and Treatment 2002*, 41st ed. New York: Lange Medical Books/McGraw-Hill, 1203 – 1250.
- Matsubara K., Yokota M., Miyahara T., Sobue T., Iwase M. & Saito H. (1995). Left Ventricular Performance during Exercise Testing in Patients with Silent and Symptomatic Myocardial Ischemia. *American Heart Journal*, 129(3), 459 – 464.
- Mattock M.B., Barnes D.J., Viberti G., Keen H., Burt D., Hughes J.M., Fitzgerald A.P., Sandhu B., & Jackson P.G. (1998). Microalbuminuria and Coronary Heart Disease in NIDDM: An Incidence Study. *Diabetes*, 47(11), 1786 – 1792.
- Resnick H.E. & Howard B.V. (2002). Diabetes and Cardiovascular Disease. *Annual Review of Medicine*, 53, 245 – 267.
- Sigurdsson E., Thorgeirsson G., Sigvaldason H., & Sigfusson N. (1995). Unrecognized Myocardial Infarction: Epidemiology, Clinical Characteristics, and the Prognostic Role of Angina Pectoris. *Annals of Internal Medicine*, 122(2), 103-106.
- U.S. Preventive Services Task Force. (1996). Screening for Asymptomatic Coronary Artery Disease. *Guide to Clinical Preventive Services*, 2nd Edition. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion.
- Wingard D.L. & Barrett-Connor E. (1995). Heart Disease and Diabetes. *Diabetes in America/National Diabetes Data Group*, 2nd ed. Bethesda, MD: National Institutes of Health/National Institutes of Diabetes & Digestive and Kidney Diseases, 429 – 448.

References

- Anonymous—multiple contributors. (1997). Prevalence of Unrecognized Silent Myocardial Ischemia and Its Association with Atherosclerotic Risk Factors in Noninsulin-Dependent Diabetes Mellitus: Milan Study on Atherosclerosis and Diabetes (MiSAD) Group. *American Journal of Cardiology*, 79(2), 134 – 139.
- Anonymous—multiple contributors. (1993). The Effect of Intensive Treatment of Diabetes on the Development and Progression of Long-Term Complication in Insulin-Dependent Diabetes Mellitus: The Diabetes Control and Complications Trial (DCCT) Research Group. *The New England Journal of Medicine*, 329(14), 977-986.
- Beck M.O., Silveiro S.P., Friedman R., Clausell N., & Gross, J.L. (1999). Asymptomatic Coronary Artery Disease Is Associated With Cardiac Autonomic Neuropathy and Diabetic Nephropathy in Type 2 Diabetic Patients. *Diabetes Care*, 22(10), 1745 – 1747.
- Haffner S.M., Lehto S., Ronnema T., Pyorala K., & Laakso M. (1998). Mortality from Coronary Heart Disease in Subjects with Type 2 Diabetes and in Non-diabetic Subjects with and without Prior Myocardial Infarction. *The New England Journal of Medicine*, 339(4), 229 – 234.
- Hanefeld M., Schmechel H., Schwanebeck U., & Lindner J., The DIS Group. (1997). Predictors of Coronary Heart Disease and Death in NIDDM: The Diabetes Intervention Study Experience. *Diabetologia*, 40(14), S 123 – S 124.
- Hanefeld M., Fischer S., Julius U., Schulze J., Schwanebeck U., Schmechel H., Ziegelsch H.J., & Lindner J., The DIS Group. (1996). Risk Factors for Myocardial Infarction and Death in Newly Detected NIDDM: The Diabetes Intervention Study, 11-Year Follow-up. *Diabetologia*, 39(12), 1577 – 1583.
- Hu F.B., Stampfer M.J., Haffner S.M., Solomon C.G., Willett W.C., & Manson J.E. (2002). Elevated Risk of Cardiovascular Disease Prior to Clinical Diagnosis of Type 2 Diabetes. *Diabetes Care*, 25(7), 1129 – 1134.
- Janand-Delenne B., Savin B., Habib G., Bory M., Vague P., & Lassmann-Vague V. (1999). Silent Myocardial Ischemia in Patients with Diabetes: Who to Screen.



Asymptomatic (“Painless”) CAD

How do painless heart attacks come about?

The current thoughts on the pathology of the disease are three-fold with respect to the estimated cause:

- 1.) Differences in in areas of blood flow to the heart and the effects on nerves supplying the heart (exercise tolerance and nuclear scan studies). Current opinions are controversial, however, this may play a role in decreasing the interpretation of pain with heart attack.
- 2.) Variation in pain thresholds
- 3.) Genetic predisposition

Potential indicators of asymptomatic CAD in Type II diabetes are *protein in the urine* (small amount of protein in the urine [microalbuminuria] has been noted to be an independent risk factor for CAD in the Type II diabetic—diabetic nephropathy) and *heart rate variability with testing* (autonomic neuropathy).

Who is susceptible?

- Those with potential indicators (diabetic nephropathy and autonomic neuropathy).
- The elderly: asymptomatic heart attacks increase with age despite the presence of diabetes.
- Those with Metabolic Syndrome: a constellation of signs noted in Type II diabetes characterized by elevated blood glucose, elevated insulin, high blood pressure, and elevated blood cholesterol; this all results from profound insulin resistance leading to a greater production of insulin in the body (or need for more insulin to be administered) in order to control blood glucose. This is extraordinarily damaging as higher insulin levels give rise to more accelerated CAD/events (heart attack) due to greater salt retention (worsening blood pressure) and higher cholesterol (particularly triglycerides) levels among other things. Synonyms for metabolic syndrome are “Syndrome X”, CHAOS, and insulin resistance syndrome (IRS).



Prevention/Contact Information

What steps can be taken to prevent this?

CAD Prevention: The Bigger Picture

- 1.) Blood Pressure: according to the recently released “Seventh Report of the Joint National Committee (JNC 7) on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure” by the National High Blood Pressure Education Program, those with diabetes should maintain a blood pressure <130/80.
- 2.) Cholesterol: the National Cholesterol Education Program’s (NCEP) latest release (Adult Treatment Panel III [ATP III]) recommends maintaining cholesterol levels in diabetic patients as follows: LDL <100, HDL >40, triglycerides <200, and total cholesterol <200.
- 3.) Smoking: cessation is advocated.
- 4.) Blood Glucose Levels: the American Diabetes Association (ADA) recommends that before meal glucose levels should be 80 - 120, night time levels should be 100 - 140, and hemoglobin A1C levels (the 3 month monitoring test) should be <7.
- 5.) Exercise/Diet and Weight Control: it should be advocated to consume a diet low in saturated fat and cholesterol, with limitation of concentrated sweetened foods (e.g., candy bars) and those high in starch (e.g., potatoes). Also, it has been noted that eating several small meals throughout the day (rather than 3 large meals) will avoid large after-meal spikes in blood glucose and insulin which can be detrimental. In addition, before beginning any exercise program, you should consult your doctor, who may wish to perform a stress test on you prior to beginning the program.
- 6.) Medications: continue to take your medications consistently as directed by your doctor.
- 7.) Consistent Follow Up: be sure to regularly follow up with your doctors regarding your condition. This includes your primary care doctor (s), as well as your endocrinologist, cardiologist, and ophthalmologist (where applicable).

Screening

Who should be screened for asymptomatic CAD regularly?

- Population deemed high risk according to ALFEDIAM:
 - Those with peripheral arterial disease.
 - Those with protein in the urine.
 - Those with cardiovascular risk factors other than diabetes (e.g., smoking, high cholesterol/blood pressure, etc.)
 - Age \geq 65 years.
- Population deemed high risk according to the ADA:
 - Male gender.
 - Presence of retinopathy (eye problem particularly associated with diabetes).
 - Family history of CAD.
 - ABOVE ALL: arterial disease with a high number of cardiovascular risk factors.
- Others at risk: those demonstrating a particular abnormality on their resting electrocardiogram (ST-T changes).

Screening Measures (according to the U.S. Preventive Services Task Force [USPSTF] and the American Diabetes Association [ADA]).

- Resting electrocardiogram (ECG).
- Exercise stress testing

Important Contact Information

- **American Diabetes Association (ADA):**
Phone—1-800-DIABETES (1-800-342-2383).
Web—www.diabetetes.org.
Address—1701 Beauregard St., Alexandria, VA 22311.
- **American Heart Association (AHA):**
Phone—1-800-AHA-USA-1 (1-800-242-8721).
Web—www.americanheart.org.
Address—7272 Greenville Ave., Dallas, TX 75231
- **National Institutes of Health (NIH)/National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK):**
Phone—1-800-860-8747
Web—www.niddk.nih.gov.
Address—Office of Communications and Public Liaison,
NIDDK, NIH, Building 31, room 9A04 Center Drive,
MSC 2560, Bethesda, MD 20892-2560.

Dr. Kelli Yacono is an internist in Bryn Mawr, Pennsylvania and is affiliated with one hospital. She has been in practice between 11-20 years. Tools & Resources. Doctor Discussion Guide. Appointment Checklist. Questions to Ask Your Doctor. Symptom Diary. Specialty. Dr. Yacono is affiliated with the following Hospitals. Affiliation usually means this doctor has admitting privileges at that hospital. Bryn Mawr Hospital. Bryn Mawr, PA. #16 in Pennsylvania. See Hospital. See Doctors at Bryn Mawr Hospital. Christian s. yacono, M.h.s., p.a.-c. 320 Sycamore Avenue Apt. B. Folsom, PA 19033 Tel: (610) 237-6373 ~ Mobile: (610) 331-7847. Email: cyacono@medical-pa.com. SUMMARY Physician Assistant (P.A.) with outstanding academic and clinical performance recently completed graduate degree at an accredited program. Interests include general internal medicine, cardiology/critical care, nephrology, and emergency medicine. Christian S. Yacono practices cardiac electrophysiology at the Hospital of the University of Pennsylvania and is an adjunct faculty member in the PA program at Drexel University, both in Philadelphia, Pa. At the time this manuscript was written, Stephanie Eider was a student in the PA program at Drexel University. She now practices primary care at Potomac Physician Associates in Germantown, Md. The authors have disclosed no potential conflicts of interest, financial or otherwise. Journal of the American Academy of PAs: February 2017 - Volume 30 - Issue 2 - p 29-34. doi: 10.1097/01.JAA.00005117