



What is Diabetes Mellitus?

Special Points of Interest:

- Diabetes affects more than 25 million Americans.
- Type 2 Diabetes is also known as “Adult Onset Diabetes” because it typically affects people later in life; however, in recent years, teens and younger children have been being diagnosed with Type 2 Diabetes at an alarming rate.

Introduction

Diabetes is a group of disorders of the endocrine (glands that make hormones and secrete them into the bloodstream) system. It afflicts over 25 million Americans. Its effects can be devastating, leading to complications which include: heart disease, hypertension, blindness, kidney disease, neuropathy, and amputation. Since it is so common and its complications

are so serious, it is important that patients, caregivers and family members gain a basic understanding of how this disease can produce these other serious health problems. If a person understands how a disease affects him/her and why it is so dangerous, he/she will be more likely to be compliant with the doctor’s treatment plan, including diet and exercise.

Definition

The term, “Diabetes” refers to a group of diseases in which the body cannot regulate the amount of sugar in the blood (one of the diseases termed “Diabetes” has nothing to do with blood sugar; this will be explained

later). The pancreas produces a hormone called insulin, which acts like a key that “unlocks” the body’s cells to allow glucose (or blood sugar) to enter them so that they have energy to do their work. “Diabetes” is an ancient

Greek word meaning “excessive discharge of urine” or “to siphon.” Later we’ll examine the connection between blood sugar and urinating excessively.

Types

Type 1 Diabetes has also been called “Juvenile Diabetes.” It describes cases in which an individual’s immune system destroys the cells that produce insulin, thus eliminating insulin production. This occurs early in life, and the person is dependent on insulin injections for a lifetime. This type of Diabetes cannot (as of yet) be prevented, since it is genetic in nature. The symptoms begin usually in childhood or young adulthood. Only 5%-10% of people with Diabetes have this type.

Type 2 Diabetes, also called “Adult Onset Diabetes,” occurs because at some point in life a person’s body no longer responds to the insulin being produced. This is called “insulin resistance” and can result because of genetics, obesity, or having high blood sugar levels for a long time. It usually develops after adulthood, but can occur in children. Most people with Diabetes (90%-95%) have this type.

Gestational Diabetes is a condition in which a pregnant woman who has never had diabetes before can develop insulin resistance because hormones from the baby’s placenta block the mother’s insulin. This happens late in pregnancy, after the baby has been formed, so the risk of birth defects is low. But, the glucose from the mother’s bloodstream can cross the placenta (her insulin cannot), causing the baby’s pancreas to work harder and secrete more insulin. The baby’s cells receive more glucose than they need, the extra energy is stored as fat, and the baby usually is larger than normal. This can predispose the baby to being obese as a child and to develop Type 2 Diabetes as an adult.

Diabetes Insipidus is a condition in which there is a problem with the production of antidiuretic hormone in the hypothalamus, or with its storage and release from the pituitary gland, or there is a problem with the kidneys’ ability to respond to

Types (cont. from Page 1)

antidiuretic hormone. Antidiuretic hormone (ADH) causes the kidneys to reabsorb fluid from the bloodstream if the body has an inadequate amount. This is why a person's urine is concentrated when he/she is low on fluids. The hypothalamus also makes the person feel thirsty so that he/she will drink more fluid and restore the balance. In Diabetes Insipidus, because ADH is not present, the kidneys do not conserve fluid but rather

keep excreting it. Though the person keeps drinking more fluid, he cannot adequately replace what is lost because the kidneys keep excreting it in large amounts. Thus, Diabetes Insipidus has nothing to do with maintaining normal blood sugar levels. From this point on, we shall focus on the effects of the types of Diabetes dealing with blood sugar.

What happens in Diabetes

“Diabetes Mellitus causes “junk” to build up along the walls of the blood vessels, making their openings smaller, so that less blood can get through.”

Because insulin either is not being produced or there is resistance to it, the walls of the body's cells do not open up to allow the glucose to enter, and they cannot receive the food they need for energy. So the body thinks that it is starving. The cells aren't getting any food, so a complaint is sent to the brain, and the brain responds by making the person hungry. This is one of the classic symptoms of Diabetes, called “Polyphagia”: the person is always hungry, and eats more than usual. Even though there is plenty of sugar available in the bloodstream, the body thinks it's starving because it can't use that sugar, so it responds by wanting to eat more, believing that this will solve the problem. But it won't. All that sugar lingering in the blood is not good, either.

When a person's blood sugar is too high, the immediate effects can be drowsiness and sluggishness. Sometimes the person will be very difficult to arouse. Over the long term, too much glucose in the blood can be irritating to the blood vessel walls, damaging the endothelial cells that line the blood vessels, leading to atherosclerosis. The excess blood sugar also leads to the creation of advanced glycation end products (AGE's), considered to be “cellular trash,” which attach to and bind with proteins, lipids, blood cells, collagen, and elastin, causing inflammation of the vessel walls and basically “gumming up” the vascular system. Excess blood sugar interferes with the production of nitric oxide, a vasodilator. This causes the blood vessels to become constricted for a long time, eventually becoming “stuck” in that state, and the pressure against the already narrowing vessel walls increases. The end result of all of this is that circulation becomes impaired, and this is why Diabetes Mellitus creates so many widespread, dangerous conditions. Remember, everything in the body depends on adequate blood flow!

To simplify: Diabetes Mellitus causes “junk” to build up along the walls of the blood vessels, making their openings smaller, so that less blood can get through. It also prevents the blood vessels from expanding, which would normally allow more

blood through. The result is that the passageway for blood to get to all the body's organs and tissues becomes smaller and smaller, and eventually becomes blocked off altogether!

When the tiny blood vessels in the eyes and kidneys become too narrow for the blood to reach all the cells of those organs, blindness and kidney failure can result. Because the lower legs and feet are the farthest body parts from the heart, they can often be affected as well. Impaired circulation leads to nerve damage (a condition known as “neuropathy,” causing pain or numbness). Prolonged pressure on areas of the feet can lead to skin breakdown because the blood flow to those tissues is poor and they do not heal well, and a person with neuropathy may not even feel the skin irritation or the open area on his leg or foot. Once the skin is broken, it may take a long time to heal, again because the blood flow (tissue perfusion) is poor. This can lead to infections and even gangrene (tissue death), leading to amputation (surgical removal of a limb). This is why diabetics need to inspect their feet every day. Impaired blood flow to the brain can lead to a stroke or heart attack, either of which can result in death.

The body does the best it can in order to deal with the excessive glucose and try to protect itself. The kidneys, whose job it is to filter waste from the blood (thus forming urine), start working overtime to get rid of the glucose and restore normal blood sugar levels. So they make more urine. A lot more. This results in the person urinating more frequently and in higher volumes, another classic symptom of diabetes called Polyuria (poly=many or much; uria=urine). This can lead to dehydration, so the body has a way to try to fix it: the person becomes excessively thirsty, prompting him/her to try to drink enough liquid to replace what has been lost or excreted. It is nature's attempt to restore balance. The human body is truly an amazing thing; it will always try to repair itself, as we have seen here with its response to Diabetes.

Recall that the word “Diabetes” means “excessive discharge of urine” or “siphon.” Many centuries ago the disease was not completely understood (it is still not, or we would have discovered a cure), and so they named it for one of its most prominent symptoms, and that is still the term we use today.

DIABETES TEST

Name: _____

Role/Title: _____

Agency: _____

Date: _____

Please provide contact information (email address, fax number, or mailing address) where you would like your certificate to be sent:

You must submit your completed test, with at least a score of 80%, to receive **1/2 hour** of training credit for this course.

- * To submit via fax, please fax the test and evaluation to 814-728-8887. Please fax only the test and evaluation, not the entire training packet.
- * To submit via email, please send an email to HCQUNW@MilestonePA.org. Please put "Diabetes Test" in the subject line, and the numbers 1—5, along with your answers, job title, and agency in the body of the email, OR scan the test and evaluations pages and email as attachments.
- * To submit via mail, send the test and evaluation pages to Milestone HCQU NW, 247 Hospital Drive, Warren PA 16365.

Knowledge Assessment:

1. Kidney problems are not a complication of diabetes. True False
2. Diabetes is a disease in which the body cannot regulate the amount of salt in the blood. True False
3. Excessive urination is a way the body tries to get rid of excessive sugar in the blood. True False
4. One classic symptom of diabetes is eating more than usual. True False
5. Too much sugar in the bloodstream can irritate the vessel walls and damage them. True False

References:

http://www.ehow.com/list_5915985_signs-symptoms-hyperglycemia-hypoglycemia.html, 9/7/12

www.diabetes.org, 10/18/12

Diabetes.webmd.com, 9/7/12

Etymonline.com, 12/4/12

<http://circ.Ahajournals.org/content/114/6/597.long>, 12/4/12

EVALUATION OF TRAINING

Training Title: Diabetes Date: _____

- | | |
|--|--|
| <input type="checkbox"/> Direct Support Professional | <input type="checkbox"/> Provider Administrator/
Supervisor |
| <input type="checkbox"/> Program Specialist | <input type="checkbox"/> Provider Clinical Staff |
| <input type="checkbox"/> Consumer/Self-Advocate | <input type="checkbox"/> Family Member |
| <input type="checkbox"/> Support Coordinator | <input type="checkbox"/> Support Coordinator Supervisor |
| <input type="checkbox"/> PCH Staff/Administrator | <input type="checkbox"/> County MH/MR/IDD |
| <input type="checkbox"/> FLP/LSP | <input type="checkbox"/> Other (please list): _____ |

Please circle your PRIMARY reason for completing this home-study training:

- It's mandatory interested in subject matter need training hours convenience

Please circle the best response to each question.

5 = **Strongly Agree** 4 = Agree 3 = Undecided 2 = Disagree 1 = **Strongly Disagree**

- | | | | | | |
|---|---|---|---|---|---|
| 1. As a result of this training, I have increased my knowledge. | 5 | 4 | 3 | 2 | 1 |
| 2. I learned something I can use in my own situation. | 5 | 4 | 3 | 2 | 1 |
| 3. This training provided needed information. | 5 | 4 | 3 | 2 | 1 |
| 4. The training material was helpful and effective. | 5 | 4 | 3 | 2 | 1 |
| 5. Overall, I am satisfied with this training. | 5 | 4 | 3 | 2 | 1 |
| 6. I am glad I completed this training. | 5 | 4 | 3 | 2 | 1 |

Suggestions for improvement: _____

Additional information I feel should have been included in this training: _____

I would like to see these topics/conditions developed into home-study trainings: _____