A Link Between Stress And Diabetes

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A Link Between Stress And Diabetes

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Abstract

Evidence suggests that stressful experiences might affect diabetes, in terms of both its onset and its exacerbation. In this article, the authors review some of this evidence and consider ways in which stress might affect diabetes, both through physiological mechanisms and via behavior. They also discuss the implications of this for clinical practice and care. In recent years, the complexities of the relationship between stress and diabetes have become well known but have been less well researched. Some studies have suggested that stressful experiences might affect the onset and/or the metabolic control of diabetes, but findings have often been inconclusive. In this article, we review some of this research before going on to consider how stress might affect diabetes control and the physiological mechanisms through which this may occur. Finally, we discuss the implications for clinical practice and care. Before going any further, however, the meaning of the term stress must be clarified because it can be used in different ways. Stress may be thought of as a physiological response to an external stimulus, or b) a psychological response to external stimuli, or c) stressful events themselves, which can be negative or positive or both. In this article, we address all three aspects of stress: stressful events or experiences (sometimes referred to as stressors) and the physiological and psychological/behavioral responses to these.

Article

Stress
Stress can be physical or mental. It can complicate diabetes by distracting you from proper care or affecting blood glucose levels directly. Learning to relax and making lifestyle changes can help reduce mental stress.

Stress results when something causes your body to behave as if it were under attack. Sources of stress can be physical, like injury or illness. Or they can be mental, like problems in your marriage, job, health, or finances.

When stress occurs, the body prepares to take action. This preparation is called the fight-or-flight response. In the fight-or-flight response [1], levels of many hormones shoot up. Their net effect is to make a lot of stored energy — glucose and fat — available to cells. These cells are then primed to help the body get away from danger.

In people who have diabetes, the fight-or-flight response does not work well. Insulin is not always able to let the extra energy into the cells, so glucose piles up in the blood.

How Stress Affects Diabetes
Stress may sometimes unmask diabetes, by causing blood glucose levels to rise [2]. This is often seen after a heart attack or stroke, where raised blood sugar levels may be encountered for the first time. In people who have diabetes, the fight-or-flight response does not work well. Insulin is not always able to let the extra energy into the cells, so glucose piles up in the blood [3]. Making things worse, many sources of stress are not short-term threats. For example, it can take many months to recover from surgery. Stress hormones that are designed to deal with short-term danger stay turned on for a long time. As a result, long-term stress can cause long-term high blood sugar levels. Many long-term sources of stress are mental. Like physical stress, mental stress can be short term from taking a test to getting stuck in a traffic jam. It can also be long term, from working for a demanding boss to take care of an aging parent. In mental stress, the body pumps out hormones to no avail. Physical stress, such as illness or injury, causes higher blood glucose levels in people with either Type of diabetes. Stress blocks the body from releasing insulin in people with Type 2 diabetes. The diagnosis of diabetes usually comes as a shock and is certainly a stressful time [3, 4]. Changes in lifestyle including stoppage of smoking, diet and learning to manage injections may all contribute in addition to the worry regarding chronic illness [5]. In people who have diabetes, stress can alter blood sugar levels. It does this in two ways. First, people under stress may not take good care of themselves. People who are anxious are under pressures and may lose appetite and skimp on eating, or reach for not-so healthy quick fixes like candy or chips and sometimes seek refuge in food and drink. This can take the form of chocolates, sweets and crisps, often in between meals. The intake of alcohol may be increased. Many people who are under stress turn to food as a source of ‘comfort’. This pattern of ‘comfort eating’ can often play havoc with blood sugar level. Further anxiety leads to less exercise. The results can be disastrous for people with diabetes. They may forget, or not have time, to check their sugar
levels or plan good meals. Second, stress hormones may also alter blood sugar levels directly as it antagonizes the action of insulin. While in most people glucose levels go up with mental stress, while in others can go down. Diabetic mice under physical or mental stress have elevated glucose levels. The effects in people with Type 1 diabetes are more mixed. People with Type 1 diabetes may develop elevated blood glucose levels and ketoacidosis. Those with Type 2 diabetes usually gain weight and develop obesity and often blood sugar levels are raised [3]. Inflammatory signaling pathways can also become activated by metabolic stresses originating from inside the cell as well as by extra-cellular signaling molecules. It has been demonstrated that obesity overloads the functional capacity of the endoplasmic reticulum and that this endoplasmic reticulum stress leads to the activation of inflammatory signaling pathways and thus contributes to insulin resistance. Additionally, increased glucose metabolism can lead to a rise in mitochondrial production of reactive oxygen species. Reactive oxygen species production is elevated in obesity, which causes enhanced activation of inflammatory pathways [6]. Physical stress, such as illness or injury, causes higher blood sugar levels in people with either type of diabetes. For some people with diabetes, controlling stress with relaxation therapy seems to help. It is more likely to help people with Type 2 diabetes than people with Type 1 diabetes. Stress blocks the body from releasing insulin in people with Type 2 diabetes, so cutting stress may be more helpful for these people. People with Type 1 diabetes do not make insulin, so stress reduction does not have this effect. Reducing stress can help people with Type 1 diabetes take better care of them. Some people with Type 2 diabetes may also be more sensitive to some of the stress hormones. Relaxing can help by blunting this sensitivity. In people with Type 2 diabetes, mental stress often raises blood glucose levels. It is easy to find out whether mental stress affects glucose control. Many glucose meters have the capability to enter personal notes and data when one performs checks, or jot it down in a stress journal [3]. Once one begins recording stress levels, most people with diabetes figure out pretty quickly what makes his blood sugar to go up. People with diabetes should stay conscious of eating well and exercising regularly. It's a good idea to check blood glucose levels more frequently when ill or under stress and to drink plenty of fluids as so as not to get dehydrated. Something else that affects peoples responses to stress coping style. Coping style is how a person deals with stress. People who use them tend to have less blood sugar elevation in response to mental stress [2]. Hyperglycemia induces the overproduction of oxygen free radicals and consequently increases the protein oxidation and lipid oxidation. A significance difference in the mean plasma concentration of total antioxidant status was observed in diabetic patients. A statistically significant higher values of protein carbonyl groups and MDA as lipid peroxides were observed in diabetic patients with slight reduction in the synthesis of nitric oxide. It is interesting to note that there was a decrease in the antioxidant levels with corresponding increased protein and lipid oxidation. Decreased levels of proteins albumin, transferrin, ceruloplasmin and heptoglobulins and variable GC globulin fractions in diabetes were found compared to normal healthy controls [7]. Depression and Diabetes Depression can actually be dangerous to diabetics because of its long-term effects in keeping stress levels high. Depression is higher among diabetics than the general population. Watkins also notes, “There is some suggestion that the stress of depression itself may lead to hyperglycemia in diabetics.” A number of studies, she suggests, point out the correlation between stress levels and diabetes, including a 1997 study that suggests that “Type I patients with a history of psychiatric illness might be at increased risk for developing diabetic retinopathy” and that patients with a psychiatric history have a higher than average glycylated hemoglobin, which is "a measure of long-term diabetic control [8]. Effects of Stress on Diabetic's Lifestyle The compacted effects of stress on diabetes are due to the emotional and psychological problems preventing diabetics from managing their illness more effectively. People who deal with short- and long-term stressors often have a loss of appetite or engage in unhealthy eating patterns, usually snacking on unhealthy foods or overeating to relieve stress or depression, and discontinue exercising. These lifestyle changes, along with the actual stressors, help raise blood sugar levels that seriously impact a diabetic’s health [8]. Managing Stress and Diabetes Learning to Relax For some people with diabetes, controlling stress with relaxation therapy seems to help, though it is more likely to help people with type 2 diabetes than people with type 1 diabetes. This difference makes sense. Stress blocks the body from releasing insulin in people with type 2 diabetes, so cutting stress may be more helpful for these people. People with type 1 diabetes don't make insulin, so stress reduction doesn't have this effect. Some people with type 2 diabetes may also be more sensitive to some of the stress hormones. Relaxing can help by blunting this sensitivity [4, 9, 10].
There are many ways that can help keep one relax: Yoga, meditation, or deep breathing. Progressive relaxation therapy, in which one practice tensing and relaxing major muscle groups in sequence. A study published in the journal Diabetes Care showed that just five weekly sessions of a relaxation therapy can reduce blood sugar levels significantly. Learn cognitive behavior therapy. In addition to learning to relax, this therapy helps in re--evaluating what is worthy of aggravation in the first place by helping in change of behavior and teaching, how to view life through more appropriately colored glasses. Talk to a therapist. Talking about the problems is a reliable way to alleviate the stress that stems from them. Step back from the situation. If possible, be away from the stressor. Keep up the healthy eating and exercise routine. Exercise can help lower blood sugar, so a stressful phase is not the time to forgo the stair stepper. Eliminate caffeine. Caffeine can impair body's ability to handle sugar and increase the amount of stress hormones, which may increase blood sugars. Ask doctor about an anti-anxiety medication. Take up a relaxing hobby.

Dealing with Diabetes-Related Stress
Some sources of stress are never going to go away, no matter what one do. Having diabetes is one of those. Still, there are ways to reduce the stresses of living with diabetes. Support groups can help. Knowing other people in the same situation helps in lonely feeling. Making friends in a support group can lighten the burden of diabetes-related stresses. Dealing directly with diabetes care issues can also help. Think about the aspects of life with diabetes that are the most stressful. It might be taking the medication, or checking blood glucose levels regularly, or exercising, or eating. If one need help with any of these issues, ask a member of the diabetes team for a referral. Sometimes stress can be so severe that patient feels overwhelmed. Then, counseling or psychotherapy might help. Talking with a therapist may helps in gripping with problems. Learn new ways of coping or new ways of changing behavior. Conclusion It's hard to dispute that most of us live life at breakneck speed. Stress is a feeling that's created when one reacts to particular events. It's the body's way of rising to a challenge and preparing to meet a tough situation with focus, strength, stamina, and heightened alertness. The events that provoke stress are called stressors, and they cover a whole range of situations- physical, like injury or illness. Or they can be mental, like problems in marriage, job, health, or finances. The body gears up to take action in response to stress. This preparation is called the fight or flight response. In the fight or flight response, levels of many hormones like catecholamines, cortisol and growth hormone shoot up. Their net effect is to make a lot of stored energy, glucose and fat available to cells. Insulin is not always able to let the extra energy into the cells, so glucose piles up in the blood. These results in increase propensity of various diseases and diabetes may be an outcome of stress, which further sets in a vicious cycle of stress-diabetes relationship. The most helpful method of dealing with stress is learning how to manage the stress that comes along with any new challenge, good or bad. Stress-management skills work best when they're used regularly, not just when the pressure's on. Knowing how to "de-stress" and doing it when things are relatively calm can help one get through challenging circumstances that may arise.

References


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