

## Urological Issues in Diabetes

*“Let food be your medicine and medicine be your food.”*

Hippocrates

Many diseases and disabilities are related to the quantity and quality of the foods we eat and the amount of exercise we get or don't get. The most prevalent form of diabetes, Type 2, is a classic example of an avoidable disease that occurs because of lifestyle indiscretions. Type 2 diabetes is now occurring in epidemic proportions and, sadly, can have catastrophic consequences including: heart disease, strokes, blindness, kidney failure requiring dialysis and vascular disease resulting in amputations. This disease has the capability of dramatically decreasing the quantity and quality of our lives.

There are over 25 million diabetics in the USA, and the incidence is rapidly spiraling upwards, particularly because of poor dietary choices and insufficient exercise. Diabetes causes elevated blood glucose (i.e., sugar) and occurs on the basis of a defect in the body's ability to produce the pancreatic hormone *insulin* or use the insulin (insulin resistance). The function of insulin is to regulate glucose and move it into our cells so that it can be used for energy and metabolism. When insulin is unavailable or the body has developed resistance to its effect, blood glucose levels rise uncontrollably with potential dire health complications.

Common presenting symptoms of diabetes are frequent urination, thirst, extreme hunger, weight loss, fatigue and irritability, recurrent infections, blurry vision, cuts that are slow to heal, and tingling or numbness in the hands or feet. However, the most common symptom may unfortunately be...no symptom at all.

There are two distinct types of diabetes. These were formally called *juvenile* diabetes and *adult-onset* diabetes, but because of the increasing incidence of obesity in children (such that children are now developing adult-onset diabetes), they have been renamed Type 1 and Type 2. Type-1 diabetes is not linked to obesity and is responsible for about 5% of diabetes. It is an autoimmune condition in which the body's immune system destroys its own insulin-producing cells, thus severely limiting or completely terminating all insulin production, and is often inherited. It is managed by insulin injections or an insulin pump. 95% of diabetes in the USA is Type-2 diabetes, also known as *diabesity* (diabetes caused by obesity). This form of diabetes is typically on the basis of *insulin resistance*, due predominantly to environmental factors including overeating and sedentary living. Unlike Type-1, Type-2 diabetics produce plenty of insulin, but their bodies cannot process the insulin and are resistant to its actions. Anybody who has excessive abdominal fat is on the pathway from insulin resistance towards diabetes.

While Type-1 diabetes is treated primarily with insulin replacement, diet and exercise are also necessary for its management. With Type-2 diabetes, it is imperative to pursue a lifestyle modification, including dietary changes that avoid certain diabetic-promoting foods and replacement with healthier foods. Diabetics should refrain from high glycemic index foods (those that are rapidly absorbed) including sugars and refined white carbohydrates and instead should consume high-fiber vegetables, fresh fruits, and whole-grain products. Regular exercise is equally as important as good dietary habits, and the combination of healthy eating, physical activity, and weight loss can often adequately address Type-2 diabetes. When lifestyle measures cannot be successfully implemented, there are different classes of medication that can be used to manage the diabetes, although lifestyle modification should always be the initial approach, since lifestyle (in large part) *caused* the problem and is capable of *improving/reversing* it. At times, when diet, exercise and drugs have not been able to control the diabetes, bariatric (weight loss) surgery might be needed to control and even potentially eliminate the diabetes.

As a urologist (a urinary tract specialist), it is not uncommon for me to make the initial diagnosis of diabetes. This is because diabetics often presents with the complaint of urinary frequency, a symptom typically treated by urologists. Sleep-disruptive nighttime frequency is a particularly disturbing symptom and is often a major complaint that brings patients into my office. Because diabetes causes high levels of blood glucose, this results in glucose in the urine, which causes a diuretic effect (lots of urine production). In a typical scenario, a patient will come in to the office complaining of new onset of significant urinary frequency; his urinalysis on dipstick shows glucose (normally there should be no glucose in the urine) and his serum glucose is elevated (normally < 100); this patient will be promptly sent to their internist for management of Type-2 diabetes.

Additionally, many uncircumcised men who present to my office with foreskin problems have diabetes. In fact, when a man has foreskin issues such as the foreskin being stuck down over the head of the penis and is not able to be pulled back (phimosis), the first thing I do is to dipstick the urine for glucose.

Aside from urologists having the occasion to make the initial diagnosis of diabetes, we also have ample opportunity to treat many diabetic patients because of the urological problems that can occur as a result of the diabetes, including urinary infections, bladder conditions, and sexual problems such as erectile dysfunction. Additionally, recent studies have indicated that diabetes greatly increases the risk of kidney stones. Although many of these symptoms are common with the aging process in the absence of diabetes, the presence of diabetes hastens them, causing earlier onset and increased severity of these issues.

In general terms, the complications of diabetes occur because of damage to blood vessels and nerves. Diabetes accelerates *atherosclerosis*, a condition in

which fatty plaques get deposited within the walls of arteries, compromising blood flow and the vital delivery of oxygen and nutrients to tissues. Diabetic “small blood vessel” disease can lead to *retinopathy* (visual problems leading to blindness), *nephropathy* (kidney damage leading to dialysis), and *neuropathy* (nerve damage causing loss of sensation in the hands and feet). Diabetic “large vessel disease” can cause *coronary artery disease*, *stroke*, and *peripheral vascular disease*. Diabetes increases the risk of infections because of poor blood flow and impaired function of the infection-fighting white blood cells. It is important to know that diabetic control can lower the chances of the early onset and severity of the aforementioned problems.

Many diabetics have urological problems on the basis of neuropathy that affects the bladder. These issues include *impaired sensation* in which the bladder becomes “numb” and the patient gets no signal to urinate and *impaired bladder contractility* in which the bladder muscle does not function properly, causing inability to empty the bladder completely. Other diabetics develop *involuntary bladder contractions* (overactive bladder), causing such symptoms as urgency, frequency and incontinence. The good news here is that there are effective, non-invasive means of managing diabetic voiding dysfunction.

Diabetics have many more urinary tract infections than the general population because of many factors including improper functioning of the infection-fighting white blood cells, glucose in the urine (a delightful taste treat for bacteria) and compromised blood flow to the kidneys and bladder. Diabetics have a greater risk of asymptomatic *bacteriuria* and pyuria (the presence of white cells and bacteria in the urine without a frank infection), *cystitis* (bladder infections), and *pyelonephritis* (kidney infections). Impaired bladder emptying further complicates the potential for infections. Diabetics have more serious complications of pyelonephritis including *kidney abscess*, *emphysematous pyelonephritis* (infection with gas-forming bacteria), and *urosepsis* (a very serious systemic infection originating in the urinary tract requiring hospitalization and intravenous antibiotics). *Fournier’s gangrene* (necrotizing fasciitis) is a soft tissue infection of the male genitals that often requires emergency surgery (that can be very disfiguring) and has a very high mortality rate. Over 90% of patients with Fournier’s gangrene are diabetic. Diabetic patients also have an increased prevalence of infections with surgical procedures, particularly those involving prosthetic implants, such as penile implants, artificial urinary sphincters, and mesh implants for pelvic organ prolapse.

Satisfactory sexual functioning is predicated upon good blood flow and an intact nerve supply to the genitals and pelvis. Diabetics often develop sexual problems because of the combination of neuropathy and blood vessel disease. Men commonly have a reduced sex drive and have difficulty achieving and maintaining erections. Diabetes has clearly been linked with testosterone deficiency that can worsen libido and sexual function. Because of the neuropathy, many diabetic males have retrograde ejaculation, a situation in

which semen goes backwards into the bladder and not out the urethra. Female diabetics are not spared from sexual problems either and commonly have reduced desire, decreased arousal, and vaginal lubrication issues.

In summary, diabetes is a serious chronic illness with potentially devastating complications. Type-1 diabetes is relatively rare and unavoidable, but is eminently manageable with insulin replacement. Type-2 diabetes is now epidemic and its prevalence has increased dramatically coincident with the expanding American waistline. Type-2 is avoidable and can be improved/reversed through integration of healthy eating habits, weight management, and exercise.

Many people—myself included—do not relish seeing doctors, because such visits can be frightening, invasive, and sometimes uncomfortable. It is a simple fact that healthy people do not need to consult doctors very often, aside from routine “wellness” visits. The corollary is if you don’t want to see doctors very often, stay healthy. To stay healthy you need the right lifestyle—avoiding tobacco, maintaining a satisfactory weight, eating healthy foods and drinking in moderation, avoiding stress, and getting plenty of exercise as well as adequate sleep. If your lifestyle is not up to par, remember that it is never too late to change. Your health is ultimately your own responsibility, but as doctors, it is our responsibility to help educate you and guide you towards the pathway of healthy habits and lifestyle—there is simply no magic bullet other than this. Lifestyle modifications can be amazingly restorative to your health and overall well being. And simply put, there is absolutely nothing else that transcends being healthy.