Understanding How Diabetes Affects the Pancreas

by COLLEEN KELLY

The Pancreas and Diabetes

According to the American Diabetes Association, there are approximately 30.3 million Americans with diabetes. This accounts for about 9.4 percent of the United States population. Of that 30.3 million, about 23.1 million are diagnosed cases – leaving approximately 7.2 million cases undiagnosed.

The costs associated with diabetes is staggering. $245 billion in total costs was related to diabetes in 2012 - $176 billion related to direct medical expenses, and about $69 billion related to reduced productivity.

And these numbers keep increasing; there are approximately 1.5 million new Americans diagnosed with diabetes yearly – which means higher total costs associated with diabetes.

As a certified diabetes educator (CDE), with the ever-increasing number of people with diabetes, I hear a lot of questions. Several of those questions revolve the pancreas.

What does the pancreas have to do with diabetes? And once the pancreas begins to lose its functionality, can that functionality be regained?

How Does Diabetes Affect the Pancreas?

The pancreas plays a large role in regulating glucose levels – the secretion of both insulin and glucagon assist with this. In fact, the pancreas is responsible for insulin secretion.

When we do not have diabetes, the *islets of Langerhans* (more commonly known as the *pancreatic islets*) secrete the proper amount of insulin to reduce blood glucose levels.

In the case of type 1 diabetes, these cells are destroyed as a result of the body's immune system. In the case of type 2 diabetes, the body becomes insulin resistant. More and more insulin is produced to reduce glucose levels.

Can the Pancreas Start Working Again in Type 2 Diabetics?

It is a well-established fact that due to autoimmunity, type 1 diabetes causes the pancreas to stop producing insulin. For the person with type 1 diabetes, there is little that can be done to begin producing insulin again. There have been hundreds of islet cell transplants performed, but results have been lackluster at best, as scientists have been unable to turn off the process that continues to destroy the cells.

For the person with type 2 diabetes, there may be a little more that can be done. A Seattle study found that beta cells that were subject to high glucose levels (glucose levels of approximately 288 mg/dl) lost their ability to function rapidly.

However, when the beta cells were switched to a low glucose environment (approximately 15 mg/dl), most of the beta cells resumed normal insulin production. There was a caveat, however – the longer the beta cell had been in the solution, the longer it took to recover. Occasionally, the damage was irreversible, but there was no specific timeframe when this was found to happen.

In yet another study, people in Britain who consumed approximately 600 calories per day had beta cell recovery. It is worthwhile to note that the participants had been diagnosed with type 2 diabetes recently.

Natural Ways to Repair the Pancreas

The most natural way, experts believe, to repair the pancreas is to let the pancreas "rest." A 2008 article in *Diabetologia* said that the pancreas could be allowed to rest by reducing its demand for insulin – and this can be done by administering certain medications, such as metformin, glitazones, or insulin.

Eating fewer carbohydrates is another option. Why does this work? Well, if you're consuming carbs, your body breaks down the carbohydrate into glucose – and it then requires insulin to metabolize the glucose.

It is also important to mention that diabetes is a progressive disease – while it may be possible to recover beta cells in some people, they may not recover in others. For example, those people who have had type 2 diabetes for a long time may not be able to recover beta cell function.

Relationship Between Pancreatitis and Diabetes

Pancreatitis is an inflammation of the pancreas. It can develop acutely, meaning that it can cause inflammation for several days, or chronically, meaning that it can cause inflammation long-term.

As the pancreas and diabetes have a seemingly intimate relationship, you would think that they are directly related. This is sometimes the case – but not always. The two leading causes of pancreatitis is alcohol and gallstones. However, there are a number of diabetes medications that can lead to pancreatitis:

- GLP-1 receptor agonists: exenatide (Byetta/Bydureon), liraglutide (Victoza), lixisenatide (Lyxumia), dulaglutide (Trulicity), semaglutide (Ozempic).
- Dipeptidyl peptidase inhibitors (DPP-4's): sitagliptin (Januvia), vildagliptin (Galvus), saxagliptin (Onglyza), and linagliptin (Tradjenta).

Other causes of pancreatitis include an autoimmune response, a genetic mutation of MCP-1 gene, and having hypertriglyceridemia – high amounts of the blood fat, triglycerides, circulating in the blood.

Certain medications are also known to contribute to pancreatitis (aside from the diabetes medications listed above), and these include thiazide diuretics, estrogens, and corticosteroids.

Pancreatitis Symptoms

The following are symptoms of pancreatitis. If you have these symptoms, you should seek medical attention immediately.

Symptoms of acute pancreatitis:

- Intense pain in the upper abdomen.
- Nausea and vomiting.
- Diarrhea.
- Fever.

The following are symptoms of chronic pancreatitis.

- Regular upper abdominal pain.
- Stomach cramping.
- Jaundice.
- Foul smelling stools.
- Unexplained weight loss.
- Bloating and gas.

Treatment of Pancreatitis

Treatment of pancreatitis is typically hospitalization, as intravenous fluids are often required. Pain is often excruciating. Thus strong painkillers may be administered.

You'll typically be placed on an "NPO" status, which means "nothing by mouth." The rationale is that your pancreas needs to rest and recover. By giving your pancreas the chance to rest, the inflammation can "cool down." During this time, you'll be receiving those intravenous fluids we discussed.

When it is time to eat again, your diet will be advanced slowly – first a clear liquids diet, then a bland diet, then finally, your regular diet.

Procedures may be performed if there is an underlying cause of your pancreatitis, such as a gallstone. If a medication is causing your pancreatitis, it will likely be discontinued.