New techniques in medicine

New hope burns for diabetics

A new procedure that burns away abnormal cells in the duodenum lining is helping insulin-resistant patients control their diabetes, writes Judy Hobson

BURNING OFF abnormal cells in the lining of the duodenum allows new ones to form, and these release hormones which improve the patient's ability to process blood sugar.

Despite trying many medications and changing their diet, patients with type 2 diabetes can still find it very difficult to manage their condition. In fact, it is estimated that less than half are able to adequately control their blood glucose levels, which puts them at increased risk of kidney failure, nerve damage, blindness, stroke and heart attack.

Of the 3.3 million people with diabetes in this country, 90 per cent, according to the charity Diabetes UK, have type 2, which is linked to being overweight.

Thanks to observing how weight-loss surgery can dramatically improve type 2 diabetes, scientists have been able to develop a new 60-minute technique to treat the condition. Using a process known as hydrothermal ablation, they can rejuvenate the lining of the patient's duodenum, thereby altering signalling in the gut which has been shown to significantly improve the patient's glycaemic control.

Francesco Rubino, professor of metabolic and bariatric surgery at King's College London and a consultant surgeon at King's College Hospital, has been investigating the link between gastrointestinal surgery and diabetes remission since the Nineties.

He says: "What we found was that within days of having surgery, sometimes even before patients were discharged from hospital, their diabetes had improved dramatically. The effect was rapid and occurred even before there was any weight loss, so we realised something else was going on.

"We conducted experiments on animals and this helped us to establish that if we bypassed the duodenum – the upper part of the small intestine – there was an effect on the diabetes."

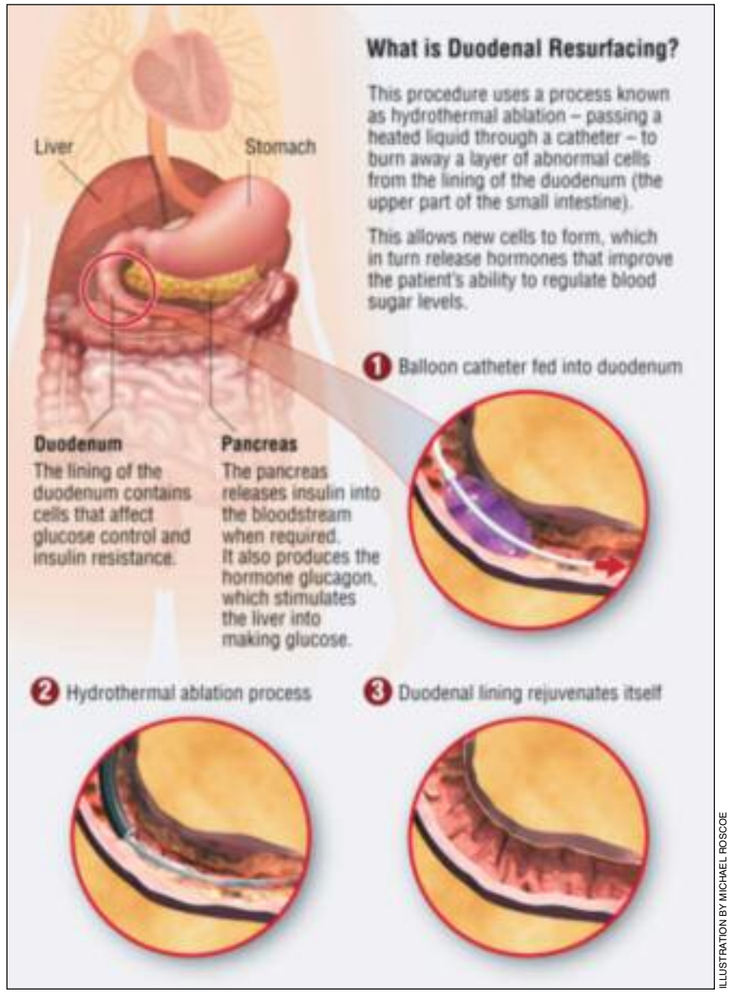

ILLUSTRATION BY MICHAEL ROSCOE

The duodenum, the professor points out, plays an important role in digestion and in regulating sensitivity to insulin.

"It's the site of the hormones that help regulate blood sugar levels. If something goes awry, the patient develops diabetes. We know that signals from the duodenum can interfere with the body's ability to respond to insulin. By ablating the lining of the duodenum, we're able to silence these signals and rejuvenate its surface."

The beauty of the new procedure, called Revita duodenal mucosal resurfacing treatment, lies in the fact that it is not as drastic as weight-loss surgery but manages to mimic its effects.

Prof Rubino adds: "It offers hope to those with type 2 diabetes who find it difficult to control their condition in spite of taking many medications and changing their lifestyle. It is a tremendous achievement and looks as if it also has the potential to help those with type 1. When obese patients with type 1 have had gastric bypass surgery, they've been able to reduce their dependence on insulin by 50 per cent."

Currently the procedure is the subject of a multi-centre European trial looking at its durability and comparing it with other available treatments. Patients from King's College Hospital and University College Hospital in London are participating.

Prof Rubino says: "We've already proved it's safe and that patients with type 2 experience a meaningful improvement in their condition. We now want to confirm it is as efficacious as gastric bypass surgery. If we can do that, this could well become a treatment option for the many people with type 2 who aren't candidates for such surgery or are reluctant to have it."

Under current NICE guidelines, weight loss surgery can only be offered to patients with a BMI (Body Mass Index) of 30 and to those of Asian descent with one of 27.5.

The professor adds: "As gastrointestinal surgery isn't suitable as a mass treatment for the millions with diabetes, a less invasive approach like this which reproduces the same effects gives us a great opportunity to improve diabetes care."

Ablation is not a new idea and has been used before on the oesophagus but this is the first time it has been used on the duodenum.

First, a tiny deflated balloon is inserted into the area via a fine catheter tube fed down the throat. Once in place, the silicone balloon is inflated and very hot water is pumped in.

He explains: "The balloon is refilled and reinserted every other minute so that the 80°C temperature we need for ablation is maintained. With the aid of an endoscopic camera, the surgeon is able to ensure he doesn't burn too big an area, compromise a muscle or cause scar tissue. When the procedure was first carried out, it was done under general anaesthetic but now we're doing it under deep sedation." Patients in the trial remain in hospital overnight, but Prof Rubino believes ultimately the procedure will be done as day surgery.

In September 2015, the Diabetes Surgery Summit recommended that surgery was introduced into the standard care of patients with type 2 diabetes.

New international guidelines for its treatment advocate that the manipulation of the stomach or intestines be considered as a treatment for those unable to control their diabetes by other means.

Developments such as this procedure could also help scientists searching for the cause of diabetes and possibly help them to find a cure. Professor Rubino says: "We now know that the dramatic effects of surgery on diabetes are not just the consequence of weight loss.

"Research suggests surgery can increase the production of certain bile acids that make cells more sensitive to insulin and can increase the uptake of glucose, thus lowering blood glucose levels.

"After trying one treatment after another to no avail, many people with type 2 diabetes grow disheartened. Just knowing that there is a possibility of experiencing a major improvement in their condition will be empowering and give hope to millions of them."

Russell Pearson: Pioneering ablation patient

"I'm so lucky I was in the right place at the right time"

More than a year after becoming the first patient in the UK to undergo hydrothermal ablation to help control his diabetes, Russell Pearson feels as though he's won the lottery. The 62-year-old former university dean from Loughton in Essex says: "I feel so very lucky that I was in the right place at the right time."

As well as type 2 diabetes, Russell has Barrett's Oesophagus, a condition caused by severe acid reflux that is treated with antacids and has to be monitored at regular intervals.

It was during one of his check-ups for this condition at University College Hospital London that his gastroenterologist Dr Rehan Haidry told him he would be an ideal patient to participate in a trial he was conducting into the use of a new procedure to treat diabetes.

Russell, who is a magistrate and serves on the board of Chelmsford Prison, had been suffering from diabetes for more than nine years. Despite taking three 850mg tablets of the oral anti-diabetic drug Metformin a day, cutting his alcohol intake and watching his diet, his blood sugar levels remained very high. He weighed 17st 2lb, had a BMI of 29.8 and his HbA1c levels were 7.9 per cent.

He says: "Every night I'd get cramp in my legs and feet and they'd feel very hot even when it was cold. I was thirsty the whole time."

Initially when his GP diagnosed his diabetes Russell was put on a 250mg tablet of Metformin a day, but this soon became two a day.

Russell says: "Even though I cut out chocolate biscuits and didn't drink as much alcohol, my blood sugar levels didn't improve and so I kept having to be put on a higher dose of Metformin.

"Before the procedure I was taking three 850mg tablets a day and was starting to worry not being able to control my diabetes. Would I go blind or lose a limb? So when Dr Haidry asked if I would like to have the new experimental procedure, I readily agreed."

The lining of his duodenum was ablated in September 2015.

"I didn't experience any pain or soreness. For the next ten days, however, I was put on a very strict dietary regime to allow my duodenum time to recover. I could only have water, black tea and coffee for the first four days. Then I was allowed clear soups and very soggy Weetabix.

"After the tenth day I could eat normally again. It made me really appreciate my first steak dinner."

Following the procedure, Russell's HbA1c levels dropped to 5.9 and his medication was reduced to one tablet per day. His weight dropped and he is now 14st 6lb.

He says: "I'm still shedding weight and I anticipate that at my next check-up I'll be taken off Metformin altogether. The knowledge that I'm no longer in danger of losing a limb or my eyesight has given me a new lease of life. I feel as though I've won the lottery. I'd definitely recommend this procedure to anyone who like me has had a real struggle controlling their diabetes. It's simple yet effective."