Research shows testosterone therapy can lead to remission in men with Type 2 diabetes

July 30 2020, by Barbara Branning

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The findings from a recent study by a University at Buffalo researcher and others could prove to be a game-changer for men with Type 2 diabetes.

The single-site study, conducted over 11 years in Bremerhaven, Germany, found that testosterone therapy reversed Type 2 diabetes in a one-third of the study participants.

"The occurrence of this syndrome is common and with appropriate testosterone replacement, obesity insulin resistance and diabetes may be reversible," said Paresh Dandona, MD, Ph.D., SUNY Distinguished Professor in the Department of Medicine in the Jacobs School of Medicine and Biomedical Sciences at UB. He co-authored the study, titled "Remission of type 2 diabetes following long-term treatment with injectable testosterone undecanoate in patients with hypogonadism and type 2 diabetes: 11-year data from a real-world registry study."

The prospective, registry-based study was published in the online journal *Diabetes, Obesity and Metabolism* in June. Dandona also presented the data to the Annual Mohan Diabetes Foundation Symposium in Chennai, India, on July 25, where he was given the organization's Lifetime Achievement Award.

Type 2 diabetes, also known as Type 2 diabetes mellitus, results from a combination of insulin resistance and insufficient production of insulin, causing high blood sugar. The condition is common, with more than 3 million new cases per year in the United States. Reduced testosterone concentrations are found in 33% of men with Type 2 diabetes.

The discovery of this syndrome of hypogonadism in Type 2 diabetes was made by Dandona's group at UB in 2004. This group then extended the prevalence of this syndrome to include 25% of non-diabetic obese men in 2010. Thus, diabetes and obesity became the main cause of male hypogonadism. The group went on to demonstrate that such patients have additional insulin resistance that reverses with testosterone treatment in 2016.

Testosterone deficiency, which is also called "male hypogonadism," contributes to reduced response of insulin to glucose, increased insulin resistance and eventually the onset of Type 2 diabetes.

The objective of the researchers' study was to determine if men with Type 2 diabetes who also exhibit hypogonadism, when treated with testosterone in addition to their regular diabetes treatment, would demonstrate improved glycemic control and insulin sensitivity and possibly eventually experience remission of Type 2 diabetes.

The investigators observed 356 men in a single urology practice clinic over 11 years. All patients received standard diabetes treatment, which included mandatory educational courses and materials. In addition, 178 men with a mean age of 62 years, received 1,000 milligrams of subcutaneously injected, slow-release testosterone every 12 weeks after an initial six-week interval. The 178 subjects, mean age 64 years, who opted out of the testosterone therapy served as the control group.

The researchers took numerous measurements, including height, weight, waist circumference, blood pressure, hemoglobin, fasting glucose, HbA1c (the average amount of glucose in blood over a 6 or 12 week period), insulin, heart rate, lipids, highly sensitive C-reactive protein and total testosterone among others. They also assessed quality of life using the Aging Males' Symptoms scale. Erectile function was also assessed, using the International Index of Erectile Function. Assessment of these clinical metrics was performed at least twice a year, and data over 11 years were analyzed.

The results showed that the men treated with testosterone had "significant progressive and sustained reductions in their body weight, fasting glucose, HbA1c and fasting insulin over the treatment period," the authors wrote. In the control group, fasting glucose, HbA1c and fasting insulin increased.

One-third (34.3%) of men treated with testosterone saw remission of their diabetes; almost half (46.6%) achieved normal glucose regulation with antidiabetic treatment and a vast majority (83.1%) reached their target level of HbA1c.

Patients in the control group saw no remission of diabetes or reduction in glucose or HbA1c levels were noted.

In addition, there were fewer deaths, myocardial infarctions, strokes, and diabetic complications in the group treated with testosterone.

The research indicates that long-term treatment with testosterone is potentially a novel additional therapy for men with Type 2 diabetes and hypogonadism, the authors wrote.

"The clinical significance of these results is further enhanced by the fact that one-third of men with Type 2 diabetes have hypogonadism. Hence, physicians encounter men with hypogonadism and diabetes very frequently. It is remarkable that while Type 2 diabetes mellitus leads to hypogonadism, treatment of hypogonadism results in remission of diabetes itself," the authors wrote.

Going forward, prospective randomized controlled trials are needed to confirm the data. One such trial is currently in progress.

More information: Karim Sultan Haider et al. Remission of type 2 diabetes following long-term treatment with injectable testosterone undecanoate in patients with hypogonadism and type 2 diabetes: 11-year data from a real-world registry study, *Diabetes, Obesity and Metabolism* (2020). DOI: 10.1111/dom.14122