Young type-2 diabetic men suffer low testosterone levels, study shows

August 27 2008

Young men with type 2 diabetes have significantly low levels of testosterone, endocrinologists at the University at Buffalo have found -- a condition that could have a critical effect on their quality of life and on their ability to father children.

This study follows research published earlier by these scientists reporting that one-third of middle-aged men with type 2 diabetes have low testosterone levels, requiring treatment for erectile dysfunction.

"These new findings have several clinical implications besides the impairment of sexual function in these young men," said Paresh Dandona, Ph.D., UB Distinguished Professor in the Department of Medicine and senior author on both studies.

"The lack of testosterone during these critical years may lead to diminished bone mass and the lack of development or lose of skeletal muscle. In addition, these patients may gain more weight (with an average body mass index of 38 they already were obese) and become more insulin resistant.

"Also, patients with low testosterone and type 2 diabetes have been shown to have very high concentrations of C reactive protein," he added, "which increases their risk of developing atherosclerosis and heart disease above and beyond the risk associated with diabetes."

Results of the new study appear in the online edition of *Diabetes Care*

and will be published in an upcoming edition of the journal.

Anil Chandel, M.D., UB clinical assistant instructor and medical resident working with Dandona, is first author.

The current study was conducted in 38 men with type 1 diabetes and 24 men with type 2 diabetes who were referred to the Diabetes-Endocrinology Clinic of Western New York at Millard Fillmore Hospital of Kaleida Health, where Dandona is chief of the Division of Endocrinology.

The average age of men in the type 1 and type 2 groups was 26 and 27, respectively, with a range of 18-35 years.

Results showed that type 2 diabetics had half the amount of total and free testosterone in their blood as their type 1 counterparts. Free testosterone is the amount of the hormone not bound by protein molecules that can affect bodily functions.

Using the amount of free testosterone considered normal in men in general, eight out of the 24 type 2 diabetics had below-normal concentrations. However, using the normal range for men of their age, 14 out of the 24, or 58 percent of the young type 2 diabetics had lower than normal testosterone levels. Type 1 diabetics, meanwhile, had normal levels of total and free testosterone for their age group.

Patients with below-normal testosterone also had low levels of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), which are released by the pituitary gland and are essential for testosterone secretion and normal fertility. Low levels of all three hormones results in a syndrome known as hypogonadotropic hypogonadism.

"While obesity contributes to the association of type 2 diabetes and hypogonadotropic hypogonadism (HH), the association is not dependent entirely on obesity," said Dandona. "In our first study of diabetic men, we found that 31 percent of lean type 2 diabetics also had HH, so it is likely that factors other than obesity contribute to HH, possibly insulin resistance. Type 2 diabetic patients generally have higher insulin resistance, while all obese men are not insulin resistant.

"Whether obesity or insulin resistance is the major determinant of HH has to be addressed in future studies, and the pathogenesis of HH needs to be defined," he said. Dandona's group currently is investigating these questions.

Source: University at Buffalo