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Study finds that weight loss after obesity surgery can rapidly restore testosterone production in morbidly obese men

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New research presented at this year's European Congress on Obesity (ECO) in Vienna, Austria (23-26) May shows that weight reduction following a sleeve gastrectomy (obesity surgery), which reduces the size of the stomach, can rapidly reverse obesity-related hypogonadism in morbidly obese men, restoring normal levels of testosterone and sex drive. The study was conducted by Prof Marco Rossato and colleagues at the University of Padova, Italy.

Obesity in men is associated with hypogonadism; a condition in which production of testosterone is reduced, while estrogen levels are elevated. These effects seem to be the result of excess body fat interfering with sex steroid metabolism which leads to increased aromatisation of androgens (such as testosterone) into estrogens within the adipose tissue itself. It follows that weight loss should improve this hormonal imbalance, and contribute to a reversal of hypogonadism.

Research conducted so far has been limited to evaluating the effects of weight loss on male hypogonadism a long time after the reduction in body fat has occurred, so it was not known how rapidly hormones began to return to normal in human subjects. The goal of this study was to investigate levels of sex steroids immediately after rapid weight loss in a group of obese men who had undergone bariatric surgery, to determine how quickly those changes occurred.

The authors selected a group of 29 obese men with an average age of 40.5 years and an average body mass index (BMI) of 43.4kg/m2 (morbidly obese is defined as >40kg/m2). Blood tests were performed to measure total plasma testosterone, the sex hormones dihydrotestosterone (DHT), estradiol, luteinising hormone (LH), follicle-stimulating hormone (FSH), as well as sex hormone binding globulin (SHBG), prostatic-specific antigen (PSA), and leptin in subjects before and one month after they underwent a sleeve gastrectomy to reduce the size of the stomach. As a control, the team studied a group of 19 healthy age-matched, non-obese male subjects.

The study found that among the obese subjects, 51.6% had hypogonadism and of those who had subnormal total testosterone, those with metabolic syndrome (45.2%) showed lower plasma testosterone than men without metabolic syndrome. BMI and waist circumference were found to be negatively correlated with total testosterone and plasma LH levels. Obese males had lower plasma testosterone than healthy subjects (10.8 vs. 15.7 nmol/L), higher estradiol levels (124.4 vs. 78.8 pmol/L), lower LH and FSH levels (3.6 and 2.5 vs 5.2 and 5.9 IU/L respectively). No differences were observed between the two groups in their DHT and PSA levels.

One month after the sleeve gastrectomy, obese subjects showed a significant weight reduction, averaging 17.2 kg and the proportion with hypogonadism had fallen to 11.6%. Average testosterone levels increased by 85%, to a level greater than that observed in the healthy control group (18.9 vs 15.7 nmol/L). Estradiol levels fell by 35% while PSA levels rose by 70%.

The study demonstrates that while obese males show an elevated prevalence of hypogonadism, this is rapidly reversed (within one month) after significant weight loss following bariatric surgery. Testosterone levels are increased significantly while estradiol levels fall due to the

rapid and significant loss of fat mass and the consequent decrease in aromatization of androgens to estrogens that typically occur in adipose tissue.

The authors note that: "The clinical significance of the rapid increase in PSA plasma levels observed one month after bariatric surgery is still obscure and has to be confirmed on a larger number of subjects and after a longer period of observation after surgery and weight reduction maintenance".

They suggest that "it could be due to the rapid testosterone increase stimulating the prostate and/or to the rapid reduction in plasma volume after weight loss".

The authors also add a note of caution regarding low PSA levels that can be observed in obese men, since these can underestimate the true levels of PSA that would be seen if these men were normal weight. They say: "If you consider that obese males, as with all people with obesity, have higher prevalence of some type of cancer, including prostate cancer for men, this information could be of importance, since it could lead to doctors potentially missing cases of severe prostate disease in obese men ."

Provided by European Association for the Study of Obesity

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