

Patients with thyrotoxicosis, especially those with Graves' disease, gain weight for up to 9 months after becoming euthyroid with antithyroid drug therapy

Rathi MS, Miles JN, Jennings PE. Weight gain during the treatment of thyrotoxicosis using conventional thyrostatic treatment. *J Endocrinol Invest* 2008;31:505-8.

SUMMARY:

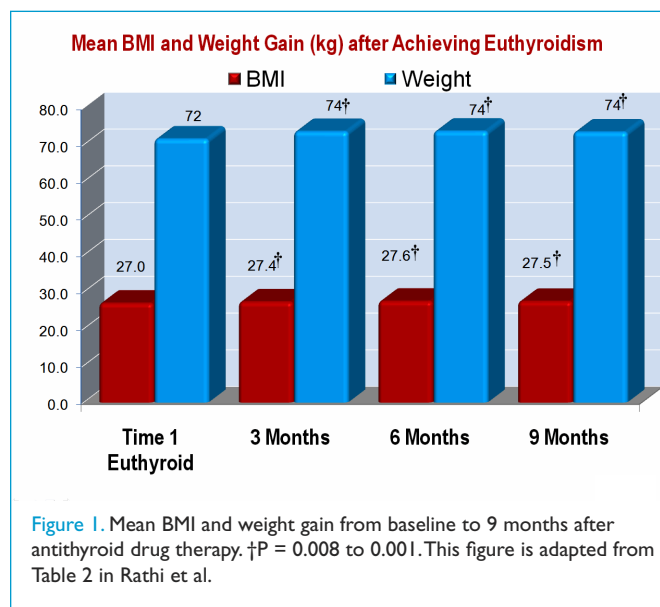
BACKGROUND A common presenting symptom of hyperthyroidism is weight loss. Perhaps even more common is the weight gain that often occurs with reversal of the hyperthyroidism, which may be as great as 26 lb (12 kg). This is generally attributed to the change in body-mass index (BMI; the weight in kilograms divided by the square of the height in meters) that occurs when a patient becomes hypothyroid as a result of treatment. Previous studies of weight gain have included patients treated with radioiodine and surgery. The aim of this study was to determine whether patients with thyrotoxic Graves' disease continue to gain weight after becoming euthyroid in response to treatment with antithyroid drugs. The other aims of the study were to determine the length of time that patients could expect to continue gaining weight and to identify the patients at risk for weight gain.

METHODS This is a retrospective study of 60 consecutive euthyroid patients with Graves' disease or toxic nodular goiter who were rendered euthyroid with antithyroid drugs for at least six months. Body weight, which was determined at the study site, was calibrated to the nearest 0.4 lb (0.2 kg). The following data were taken from the patient's chart: age at the time of diagnosis, gender, weight, height, and the amount of weight loss, smoking history, antithyrotropin (thyroid-stimulating hormone [TSH]) antibody status, and the presence or absence of goiter, Grave's ophthalmopathy, medication, and serum concentrations of free triiodothyronine (FT₃), free thyroxine (FT₄), and serum TSH. Patients were divided into two groups. One comprised patients with Graves' disease based on the presence of a diffuse goiter, Graves' ophthalmopathy, and a significant thyroid peroxidase antibody titer (>1100 IU/L). The other group comprised those with toxic nodular goiter based on the finding of a nodular goiter on physical exam or ultrasonography and absence of signs of Graves' disease. Patients on a block and replacement regimen (antithyroid drug therapy and replacement with thyroid hormone), those in whom transient hypothyroidism developed on treatment, or those who experienced other problems causing weight gain were excluded.

RESULTS The mean age of the study group was 46.13 years (range, 21 to 73) and the male:female ratio was 5:55. In all, 36 patients (60%) had Graves' disease and 24 (40%) had nodular goiter. The mean time to normalization of thyroid function was 6.7 months. At the time of diagnosis, the mean (\pm SEM)

body weight was 149.1 \pm 4.6 lb (range, 101.2 to 275) (67.75 \pm 2.1 kg [range, 46 to 125]) and the mean BMI was 25.8. It took an average of 6.7 months for the patients to become euthyroid, at which time mean body weight was 157.5 lb (range, 101 to 275) (71.61 kg [range, 46 to 125]). Even after becoming euthyroid, patients continued to gain weight at 3, 6, and 9 months. Regardless of prior weight loss, patients gained weight from the time of initial diagnosis until achieving euthyroidism, after which they continued to gain weight for as long as 9 months (Figure 1). Nearly 50% of the patients were overweight or obese at the time of diagnosis (mean BMI, 25.81) and this increased to 61% after patients became euthyroid, but after 9 months only 57.5% were overweight. Multivariate analysis found the following: (1) patients with Graves' disease were more likely to gain weight than those with other causes of hyperthyroidism (BMI, 1.11 and 2.18, respectively); (2) nonsmokers gained significantly more weight than smokers ($P < 0.01$); (3) weight gain was not related to age ($P = 0.94$) or gender ($P = 0.78$); and (4) serum FT₃ and FT₄ levels at presentation were not predictive of weight gain ($P = 0.104$). Prior history of weight loss and initial BMI did not predict weight gain. The amount of time required to achieve euthyroidism was not related to weight gain.

CONCLUSION Patients with thyrotoxicosis, especially those with Graves' disease, gain weight for as long as 9 months after becoming euthyroid with antithyroid drug therapy.



COMMENTARY

This is the first study to examine the effects of antithyroid drug therapy alone on the weight gain that occurs when patients with thyrotoxicosis become euthyroid. Previous studies found that treatment of thyrotoxicosis with surgery, radioiodine, and antithyroid drugs all result in weight gain (1); however, some describe a greater risk of weight gain with surgery as compared with the other two forms of treatment (2). Although the mechanism responsible for a change in BMI is not clear, some have proposed that euthyroid patients are simply gaining the weight they lost as a result of hyperthyroidism.

However, Rathi et al. found no correlation between prior weight losses from hyperthyroidism and the subsequent weight gain observed after patients became euthyroid. Others (1) propose that treatment of hyperthyroidism

slows the metabolic rate, after which patients continue to eat in the same manner as when they were thyrotoxic, and the subsequent slowing of their metabolic rate itself leads to the weight gain. A study by de la Rosa et al. (4) that examined the body composition of patients after treatment of thyrotoxicosis, found that weight gain was the result of an increase in lean body mass, not body fat and mineral content, which also increased, albeit not significantly.

Whatever the mechanism, patients, especially those with Graves' disease, are clearly at risk for weight gain after treatment of hyperthyroidism and should be counseled regarding dietary changes and initiation of an exercise regimen prior to restoration of euthyroidism.

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References

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