



to be learned from the programmatic methodological approaches of the national TB control programme.

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Excessive weight gain following therapy for hyperthyroidism — a major problem

One of the most characteristic presenting features of hyperthyroidism is weight loss, despite an increased appetite. This phenomenon is easily understandable, as hyperthyroidism is accompanied by a rise in metabolic rate, energy expenditure and thermogenesis which is clearly not matched by an increased appetite and caloric intake in the vast majority of patients. Consequently a decrease in adipose tissue and muscle results. (Curiously a small proportion of hyperthyroid patients, fewer than 10%, present with weight gain owing to an increased appetite that exceeds the rise in metabolic rate.¹)

Intuitively, one might assume that restoration of thyroid hormone levels to normal would result in the return of weight to premorbid levels. Unfortunately, the insidious presentation of hyperthyroidism, and inaccurate recall by patients, complicate a true assessment of premorbid weight. Nevertheless, just over half of the respondents to a questionnaire sent to women treated for hyperthyroidism reported experiencing a weight problem over a mean follow-up period of 4 years.² Furthermore, numerous reports, including that by Brunova *et al.*³ in this issue of *SAMJ* (p. 529), corroborate the notion that weight gain following therapy for hyperthyroidism is frequently excessive. A mean increase in weight of between 1.55 and 16.4 kg has been reported following anti-thyroid therapy.^{2,6} Indeed, patients attending our clinic have become aware of this phenomenon, as they commonly express concern that treating their hyperthyroidism will lead to excessive weight gain.

Brunova *et al.* report a retrospective analysis of 160 patients

who were treated for hyperthyroidism; 147 were treated with radioactive iodine, 3 underwent thyroidectomy and the remainder received carbimazole. Hypothyroidism ensued in 86.7% of the former two groups and was treated with thyroxine.³ As the premorbid weight could not be ascertained accurately, the baseline weight was taken as the weight at presentation. Weight gain was noted for 24 months, but it stabilised thereafter. The median weight gain found was 5 kg, 6 months after definitive therapy, 9 kg after 12 months and 12 kg after 24 months. Importantly, 29% of their cohort were overweight at presentation (body mass index (BMI) > 25 kg/m²) and 19.3% were obese (BMI > 30 kg/m²). Two years after treatment, 51.3% had become obese, representing a 32% increase in the prevalence of obesity.

Notable predictors of weight gain in studies of patients treated for hyperthyroidism have included a history of weight loss prior to diagnosis, pre-existing obesity, a diagnosis of Graves' disease and the development of hypothyroidism, even transiently.⁵ In contrast, patient age, sex and mode of therapy have not been predictive.^{2,5} Brunova *et al.* described similar major factors associated with increased weight gain, i.e. the diagnosis of Graves' disease, need for thyroxine therapy and poor control of thyroid function on such replacement therapy.³ Yet the extent of weight gain and the rise in the prevalence of obesity was greater than reported by others. For example, Dale and colleagues, who also did not know patients' premorbid weight, described a mean weight gain of 5.4 ± 0.5 kg and an 18.5% prevalence of obesity.⁵ Possible explanations for these



differences are the significantly greater proportion of patients who were obese at baseline in the local study, which represents a major risk factor for further weight gain and a higher rate of non-compliance with thyroxine replacement.

A number of mechanisms have been proposed for the weight gain following treatment of hyperthyroidism. Although it has been demonstrated that food energy intake decreases once hyperthyroidism is treated, this reduction may be insufficient relative to the fall in metabolic rate, leading to the overshooting of the pre-morbid weight.⁴ Others have suggested that there is a long-term disturbance in neurochemical regulation of appetite and weight after hyperthyroidism.⁷ Recently, Tigas and colleagues⁸ suggested that circulating tri-iodothyronine (T_3) may be inadequate, when providing thyroxine (T_4) alone in the form of thyroxine in patients rendered hypothyroid following treatment of hyperthyroidism.⁸ However, more research is required before any recommendations can be made that T_3 be replaced together with T_4 rather than the current practice of T_4 replacement alone.

Obesity has become a major public health problem in both developed and developing countries, and it is now recognised as a disease with morbidity comparable to that of hypertension.⁹ As clinicians we should be creating an awareness of the importance of maintaining a healthy weight in all our patients, but particularly in those most at risk of weight gain and obesity. Healthy food choices and performance of regular exercise should be stressed for all. In order to lessen the risk of excessive weight gain among

patients treated for hyperthyroidism, we should ensure that hyperthyroid patients receive appropriate advice to restrict energy intake once on treatment and thus reduce a possible contributor to the ranks of the obese, a method proven to be of benefit.¹⁰ In addition, replacement therapy with thyroxine should be commenced timeously when hypothyroidism arises, and finally thyroid hormone levels (thyroid-stimulating hormone and T_4) should be meticulously maintained within the normal range.

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