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Laparoscopic Gastric Bypass in Patients on Thyroid Replacement Therapy for Subnormal Thyroid Function – Prevalence and Short-Term Outcome

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Background: Hypothyroidism is associated with increased body weight. Weight gain may occur despite normal levels of serum thyroid stimulating hormone (TSH) and thyroxine (T4) achieved by replacement therapy. We evaluated the prevalence of patients on thyroid replacement for subnormal thyroid function who were operated on for morbid obesity and monitored their postoperative weight loss pattern.

Methods: Data was identified from a prospectively accrued database of patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGBP) or laparoscopic adjustable gastric banding (LAGB) for morbid obesity from February 2000 to November 2001. All patients with subnormal thyroid function, diagnosed by past thyroid function tests and treated by an endocrinologist, who were on thyroid replacement therapy, were identified; 5 of these were matched for age, gender, preoperative body mass index (BMI) and surgical procedure (LRYGBP) to 5 non-hypothyroid patients. Weight loss at 3 and 9 months after surgery was compared between the 2 groups.

Results: 192 patients underwent LRYGBP (n=155) or LAGB (n=37). Of the 21 patients (10.9%) on thyroid replacement identified, 14 were primary, 4 were post-ablative, and 3 were post-surgical; 17 underwent LRYGBP. All patients had normal preoperative serum levels of TSH and T4. Comparison of the 2 matched groups of patients revealed no difference in weight loss at 3 and 9 months after surgery (*P*=1.0).

Conclusions: The prevalence of euthyroid patients on thyroid replacement for subnormal thyroid function who undergo surgical intervention for morbid obesity is high. Short-term weight loss in these patients is comparable to normal thyroid patients. Longer follow-up may be necessary to demonstrate the weight loss pattern in this group.

Key words: Hypothyroidism, morbid obesity, gastric bypass, bariatric surgery

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Introduction

The prevalence of hypothyroidism in Western society is 1 to 1.5% of the total population.[1,2] Functional thyroid disorders have long been associated with changes in resting metabolic rate which then result in weight changes.[3,4] Hypothyroidism is one of the most common endocrinologic disorders associated with weight gain. This can be from decreased energy expenditure as well as a leptin-mediated etiology.[5-8] Despite treatment, some hypothyroid patients show continued weight gain with seemingly normal thyroid function tests.[9] We evaluated the prevalence of patients treated with thyroid replacement therapy for subnormal thyroid function who were operated on for morbid obesity and monitored their postoperative weight loss pattern.

Methods

Data was identified from a prospectively accrued database of patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGBP) or laparoscopic adjustable gastric banding (LAGB) for morbid obesity from February 2000 to November 2001. All patients who had documented subnormal thyroid function, diagnosed by thyroid function tests and treated by an endocrinologist, and who were on thyroid hormone replacement therapy were identified; five of these were matched for age, gender, preoperative body mass index (BMI) and surgical procedure (LRYGBP) with five patients with no thyroid dysfunction (Table 1). Weight loss at 3 and 9 months after surgery was compared between the two groups. Statistical analysis was done using a paired t-test, two samples for means.

Results

Of 192 patients undergoing either LRYGBP (n=155) or LAGB (n=37), 21 patients (10.9%) with treated hypothyroidism were identified. The etiology of the subnormal thyroid function had been primary in 14, post-ablative in 4, and post-surgical in 3. In patients who underwent LRYGBP, mean age was 40 years, with mean BMI 52 kg/m^2, and 88% were female; 17 (11%) had treated hypothyroidism. All patients were on thyroid replacement therapy and had normal preoperative serum levels of thyroid-stimulating hormone (TSH) and thyroxine (T4). Comparison of the two matched groups of patients revealed no difference in weight loss at 3 and 9 months after surgery (P=1.0 for both) (Figure 1).

Table 1. Patient demographics

	Hypothyroid patients (n=5)	Normal Thyroid patients (n=5)	*P*-Value
Mean age (years)	49.6	49.8	0.9
Mean preoperative BMI (kg/m^2)	60.4	60.2	0.87
Gender	All females	All females	1.0
Operation	All LRYGBP	All LRYGBP	1.0

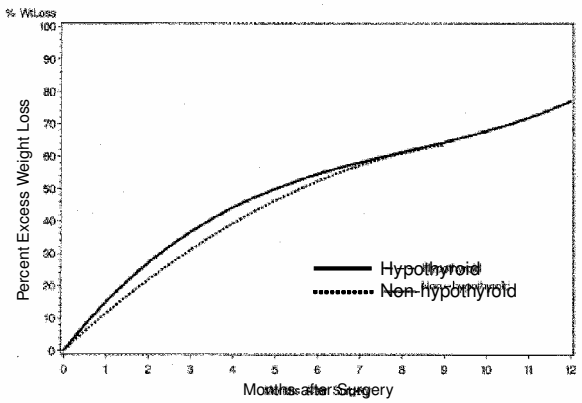

Figure 1. Weight loss after LAGB in treated hypothyroid and normal thyroid patients.

Discussion

The prevalence of euthyroid patients on thyroid replacement therapy for subnormal thyroid function in the morbidly obese population who undergo bariatric surgery has not been previously determined. It is thought that patients are occasionally placed on thyroid supplementation merely because they are obese. However, the documented 11% prevalence in our patient population is high, compared with the general population with similar demographics which is approximately 1%.[10] Studies have shown continued weight gain, despite normal thyroid function tests; these patients rarely return to their pre-morbid weight.[9] Although this phenomenon is not completely understood, it has been postulated that modest underreplacement of T4, not always recognized in laboratory studies, may result in weight gain. Another proposed explanation is the role of triiodothyronine (T3). Replacement therapy for hypothyroid patients contains only levothyroxine, a synthetic T4 replacement; thus, lack of T3 replacement may play a role in the ongoing weight gain in these patients.[11,12] Finally, the circulating leptin level has proven to be proportional to TSH; therefore, the continued weight changes in these patients may be related to alterations in leptin secretion.[13-15]

It is important that hypothyroidism is detected and treated before surgery. Insidious hypothyroidism in patients undergoing major surgery can produce severe derangements of normal physiology, including depression of myocardial function and

decreased hypoxic and ventilatory responses. Therefore, hypothyroid patients should be given thyroid replacement and be brought into the euthyroid range before major surgery.[16,17]

In summary, treated hypothyroidism appears not to be a determining factor in the outcome of obese patients regarding postoperative weight loss. Unfortunately, our study was limited in sample size and length of follow-up. Longer follow-up is necessary to further study the weight loss pattern in this group of patients.

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