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Preoperative Preparation of Graves' Disease with Lithium Carbonate and Lugol's Solution

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ABSTRACT

A 48-year-old woman with Graves' disease' who was prepared with lithium carbonate and Lugol's solution before thyroid surgery, is reported. She was referred for the surgical treatment of the disease, because antithyroid drugs, both methimazole and propylthiouracil, caused adverse effects. She was treated with lithium carbonate and Lugol's solution, then the levels of serum T3 and T4 were normalized within two weeks. Thereafter, she was successfully operated on.

It is suggested that the combination of lithium and Lugol's solution can induce euthyroid state in patients with Graves' hyperthyroidism for a limited duration.

KEY WORDS

Lithium, Lugol's solution, Thyrotoxicosis, Graves' disease

INTRODUCTION

Lithium is known to induce euthyroid state in patients with hyperthyroidism[1]. Prior to thyroid surgery of Graves' disease, control for hyperthyroidism is necessary to avoid the intra-and postoperative thyroid storm. When antithyroid drugs produce adverse effects, lithium carbonate can be used as an alternative to those in preoperative managements of patients with Graves' disease.

CASE REPORT

A 48-year-old woman with Graves' disease was referred for the surgical treatment of the disease, because antithyroid drugs, both methimazole and propylthiouracil, caused an side effect such as skin rush with itching. She had a non-tender, diffuse goiter of grade 3 according to Shichijoh's classification, finger tremor and atrial fibrillation with tachycardia. Ultrasonograms revealed a nodule of 19 mm in diameter in the right thyroid lobe. Laboratory examinations showed increase in the levels of thyroid function as follows ; serum total thyroxine (T4) 13.2 μg/100 mL (normal, 4.6-11.0 μg/100 mL), triiodothyronine (T3) 241 ng/100 mL (normal, 80-190 ng/100 mL), free T4 (FT4) 3.39 ng/100mL (normal, 0.85-1.75ng/100 mL), free T3 (FT3) 12.80 pg/mL (normal, 2.40-4.30 pg/mL) and thyroglobulin 177 ng/mL (normal, < 30 ng/ml). Thyroid stimulating hormone (TSH) was suppressed to below 0.10 μU/mL (normal, 0.27-5.00 μU/mL). Antithyroid peroxidase antibody was positive and TSH binding

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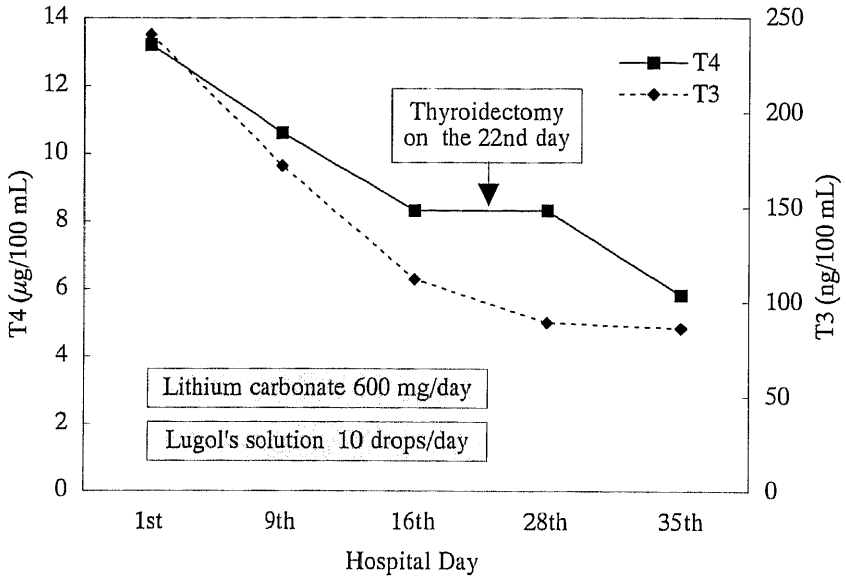
Table. 1. Changes in serum T4 and T3 with administration of lithium carbonate and Lugol's solution.



ibitor immunoglobulin (TBII) was nega-
e. She had been daily administered with
ium carbonate 600 mg and Lugol's solu-
n 10 drops until thyroid surgery. A cal-
m channel blocker, diltiazem 90 mg/day, was
o used for the control of thyrotoxic cardiac
nptoms, since β-blocking agents were con-
indicated because of a history of asth-
tic attacks. Serum T4 and T3 levels were
rmalized two weeks later (Table 1). The
um concentration of lithium was unfortu-
ely determined. No adverse effects of lithium
re observed. A subtotal thyroidectomy was
eventfully performed on the 22nd hospital
y, and surgical outcome was successful
hout postoperative thyroid storm. Thyroid
ction tests 2 months after the surgical treat-
nt were as follows ; FT4 0.69 ng/100 mL, FT3
7 pg/mL and TSH 3.30 μU/mL. Histologi-
examinations of the surgical specimen
ealed hyperplastic changes of the thyroid
nd and existence of an adenomatous nodule
the right lower part.

DISCUSSION

Nowadays subtotal thyroidectomy is not a
hice for the treatment of Graves' disease, and
rarely selected in patients who are allergic to antithyroid drugs and prefer surgery to radioiodine-131 therapy. In the surgical treatment, it is important to precondition the patients in order to avoid adverse reactions caused by surgical invasion. Recently preparation with a β-adrenergic antagonist such as propranolol, with or without iodide, has been used[2,3]. In this manner, however, most patients are hyperthyroid when operated on[4]. It is reasonable to induce the patients into euthyroid state before surgery, otherwise thyroid storm may occur.

Lithium primarily blocks thyroid hormone release and can induce euthyroid state in patients with hyperthyroidism[1]. Therefore, in patients with Graves' disease in whom antithyroid drugs are contraindicated, the administration of lithium carbonate is thought to be effective for preoperative management. Tsunoda et al. reported 12 patients with Graves' disease who were successfully prepared with lithium for thyroid surgery, and in the 9 patients it was used because of the side effects of antithyroid drugs[5]. The interval required for preoperative preparation ranged from 16 to 107 days (mean 52 days) . In their study, all but 2 patients received Lugol's solution for a short period of between 7 and 14 days. Iodide usually

is given for 10 days before surgery[2].

Iodide has been generally used in the preparation of the patients for surgery in order to decrease the blood loss at the time of surgery. Although iodide decrease the blood flow of the thyroid in patients previously treated with antithyroid drugs[6], the reduction of operative blood loss has not been confirmed. Another reason for addition of iodide is its adility to block thyroid hormone release. This effect is shared by lithium, but the mechanism of action may be different from each other. Turner et al. found that lithium did not significantly change the 24-hour I-131 uptake and did increase the thyroid I-131 retention[7]. Therefore, the combination of lithium and iodide is thought to be ideal for the treatment of thyrotoxicosis. In fact, our patient became euthyroid within two weeks with the combination therapy.

In conclusion, lithium can be used to induce euthyroid status in patients with Graves' disease in whom antithyroid drugs show adverse effects, and is a good agent for preoperative management of the disease.

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炭酸リチウムとルゴール液によるグレヴス病の術前治療

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