

The Use of the Iodine-Rich Drug Amiodarone in the Rapid Preoperative Preparation for Thyroidectomy because of Persistent Hyperthyroidism

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Dear Editor,

Hyperthyroidism due to Graves’ disease is primarily treated with antithyroid drugs. Thyroidectomy is mostly considered to provide definitive therapy in case of recurrent or persistent hyperthyroidism. However, carrying out this procedure during hyperthyroidism may result in thyroid storm or a thyrotoxic crisis, conditions known for their high morbidity and mortality. To prevent this during or following thyroidectomy, preoperative preparation to reach euthyroidism is essential.

According to current guidelines, preoperative treatment of (refractory) hyperthyroidism consists of the administration of a thionamide (e.g., methimazole), beta-blocker, glucocorticoid, and an iodine-containing preparation [1]. These treatment protocols are based on blocking thyroid hormone synthesis and secretion (by thionamides and iodine-containing preparations [acute Wolff-Chaikoff effect]); inhibition of peripheral conversion of the biologically inactive prohormone thyroxine (T4) to active triiodothyronine (T3) (by beta-blockers, glucocorticoids, and iodine-containing preparations); and attenuating the peripheral action of thyroid hormones (by beta-blockers). So far, the use of several

iodine-containing preparations has been described in the preoperative preparation of thyrotoxic patients: Lugol’s solution, potassium iodide, and iopanoic acid [2–4]. Panzer et al. [3] reported an average duration of 7 days of preoperative preparation with iopanoic acid, dexamethasone, and methimazole or propylthiouracil before thyroidectomy in 17 Graves’ disease patients. Fischli et al. [2] reported that, after 10 days of preoperative preparation with Lugol’s solution, dexamethasone, and a beta-blocker, 8 out of the 10 studied patients had normal FT3 levels, while the other 2 patients reached normalization of FT3 only after 14 days of treatment.

However, the use of amiodarone, an antiarrhythmic drug containing a high concentration of iodine, has not been described previously in the preoperative treatment of (pediatric) hyperthyroid patients scheduled for thyroidectomy. Amiodarone is known for side effects such as transient or permanent hypothyroidism or thyrotoxicosis [5–7]. Besides acute blocking of thyroid hormone synthesis by its high iodine content (the mechanism behind the transient hypothyroidism), preoperative treatment with amiodarone may restore (tissue)

euthyroidism also via two other mechanisms: (1) inhibition of T4 to T3 conversion, and (2) inhibition of binding of thyroid hormone to thyroid hormone receptor beta 1 by the metabolite desethylamiodarone [5]. Therefore, amiodarone is a potential drug to use in the rapid preoperative preparation of hyperthyroidism. An argument against using amiodarone for this purpose is the risk of inducing hyperthyroidism later on. Since the thyroid gland is surgically removed shortly after amiodarone is started, this is not a risk in this context.

Because of thionamide-resistant Graves’ hyperthyroidism, most probably due to poor compliance, a 17-year-old girl consented to total thyroidectomy as definitive treatment. The girl was admitted to our pediatric surgical ward 4 days prior to surgery for rapid preoperative preparation. The treatment regimen consisted of high-dose thionamide (propylthiouracil 200 mg six times per day); a beta-blocker (propranolol 80 mg three times per day); a glucocorticoid (hydrocortisone 100 mg three times per day); and an iodine-containing preparation (amiodarone 200 mg twice daily). The patient consented to this experimental rapid

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Table 1. Biochemical evaluation of thyroid hormone and TSH levels during rapid preoperative preparation and directly after thyroidectomy in a 17-year-old girl with medical treatment-resistant Graves' hyperthyroidism

	T3 (nmol/L)	FT4 (pmol/L)	TSH (mU/L)
Day 0 – before start of preoperative preparation	7.60	>70.0	<0.01
Day 1	4.00	>70.0	<0.01
Day 2	2.25	>70.0	<0.01
Day 3	2.00	67.9	<0.01
Day 5 (1 day after thyroidectomy)	1.15	>70.0	<0.01
Day 8 (4 days after thyroidectomy)	1.70	30.1	<0.01
Day 10 (6 days after thyroidectomy)	1.60	21.2	<0.01
Local reference values	1.30–2.70	10–23	0.50–5.00

preoperative preparation after being informed about potential side effects of all used drugs. This preoperative treatment regimen was previously used successfully in adult hyperthyroid patients undergoing thyroidectomy in our center. The treatment goal was to achieve a normal plasma T3 concentration just before surgery. Biochemical analysis was performed to evaluate the effect of treatment (Table 1). Normal T3 concentrations were reached within 2 days after initiation of treatment. After thyroidectomy, performed on day 4, treatment with propylthiouracil, hydrocortisone, and amiodarone was stopped. Propranolol was

continued until free T4 was normal, and levothyroxine treatment was started. Since amiodarone treatment is associated with a prolonged QTc time, hypotension and hepatic impairment, the girl underwent cardiac evaluation (including electrocardiograms) and monitoring of blood pressure and liver enzymes before and during the preoperative preparation. No side effects were seen, which was not unexpected since side effects of amiodarone are only seen after a longer duration of treatment.

This case illustrates that iodine-rich amiodarone can be used in the rapid preoperative preparation for thyroidectomy in

hyperthyroid patients. It is hard to quantify the isolated effect of amiodarone in reaching euthyroidism, as it was used in combination with other drugs. Nevertheless, amiodarone may be more effective in restoring euthyroidism than the aforementioned preparations because it acts via three different mechanisms.

Disclosure Statement

The authors have no conflicts of interest, and no competing financial interests exist.

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