



GRAVES' DISEASE

“Block-and-Replace” treatment in children with Graves’ disease

BACKGROUND

Grave’s disease is a condition in which the thyroid gland is overactive and produces too much thyroid hormone (hyperthyroidism). It is caused by antibodies which attack the thyroid and turn it on. Graves’ disease can be treated by antithyroid medication such as methimazole. Methimazole works by blocking the pathway that makes thyroid hormone within the thyroid gland. Unlike many other medications, methimazole is usually started at a higher dose to get the thyroid hormone levels back to normal quickly. The dose then is tapered down to a lower dose to maintain thyroid hormone levels in the normal range. Sometimes, the methimazole dose overshoots and decreases the thyroid hormone levels into the low range, then the dose is decreased and the levels return to the normal range.

Another, less common, way to dose methimazole is known as the block-and-replace method. The block-and-replace method continues the methimazole at the higher dose to completely block the production of thyroid hormone. When the thyroid hormone levels fall into the low range, levothyroxine is added to bring the thyroid hormone levels to back to normal. At one point, this method was thought to increase the remission rate of Graves’ disease. Unfortunately, that has not been found to be true. However, this method can be effective in patients that are poorly controlled on methimazole alone.

There is limited data on the use of the block-and-replace method in children. The current study examined a group of children with poorly controlled Grave’s disease who were managed by the block-and-replace method with methimazole in combination with levothyroxine.

THE FULL ARTICLE TITLE

Vigone MC et al 2019 “Block-and-replace” treatment in Graves’ disease: experience in a cohort of pediatric patients. *J Endocrinol Invest*. Epub 2019 Nov 12. PMID: 31713721.

SUMMARY OF THE STUDY

This was a study of children with Graves’ disease over a 25-year period at a single center in Italy. All of the children were initially started on methimazole alone, but had poor control of their Graves’ disease with wide changes in thyroid labs. These children were switched to the block-and-replace method and were managed by both methimazole and levothyroxine. Thyroid function was determined by fasting blood work at various times. The study included 28 pediatric patients diagnosed at an average age of 9.2 years. The children were initially treated with methimazole for an average duration of 1.5 years before changing to the block-and-replace method. At the time of analysis, patients had been on the block-and-replace method for an average of 2.85 years. The average methimazole dose was 0.3 mg/kg/day and the average levothyroxine dose was 1.12 µg/kg/day.

Only one patient (4%) achieved remission while treated with the block-and-replace method. Rates of normal thyroid hormone levels were significantly higher on the block-and-replace method than methimazole alone. A total of 15 patients (60%) underwent more definitive treatment for their Graves’ disease with surgery (11 patients) or radioactive iodine therapy (4 patients). The block-and-replace method helped delay surgery by 2.9 years and radioactive iodine therapy by 4.9 years.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

In cases in which it is difficult to manage Graves’ disease in children, the block-and-replace method (a moderate dose of methimazole in combination of levothyroxine) may provide improved control of thyroid levels compared to methimazole treatment alone. The block-and-replace method may allow for definitive treatment (surgery or radioactive iodine therapy) of Graves’ disease to be delayed until an older age, but does not appear to increase remission rates.

— Priya Mahajan, MD





GRAVES' DISEASE, continued

ATA THYROID BROCHURE LINKS

Graves' Disease: <https://www.thyroid.org/graves-disease/>

Thyroid Hormone Treatment: <https://www.thyroid.org/thyroid-hormone-treatment/>

Radioactive Iodine Therapy: <https://www.thyroid.org/radioactive-iodine/>

Thyroid Surgery: <https://www.thyroid.org/thyroid-surgery/>

Thyroid Function Tests: <https://www.thyroid.org/thyroid-function-tests/>

ABBREVIATIONS & DEFINITIONS

Graves' disease: the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

Hyperthyroidism: a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

Antibodies: proteins that are produced by the body's immune cells that attack and destroy bacteria and viruses that cause infections. Occasionally the antibodies get confused and attack the body's own tissues, causing autoimmune disease.

Autoimmune thyroid disease: a group of disorders that are caused by antibodies that get confused and attack the thyroid. These antibodies can either turn on the thyroid (Graves' disease, hyperthyroidism) or turn it off (Hashimoto's thyroiditis, hypothyroidism).

Methimazole: an antithyroid medication that blocks the thyroid from making thyroid hormone. Methimazole is used to treat hyperthyroidism, especially when it is caused by Graves' disease.

Euthyroid: a condition where the thyroid gland is working normally and producing normal levels of thyroid hormone.

Levothyroxine (T4): the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

Radioactive iodine (RAI): this plays a valuable role in diagnosing and treating thyroid problems since it is taken up only by the thyroid gland. I-131 is the destructive form used to destroy thyroid tissue in the treatment of thyroid cancer and with an overactive thyroid. I-123 is the non-destructive form that does not damage the thyroid and is used in scans to take pictures of the thyroid (Thyroid Scan).

