

Cochrane for Clinicians

Putting Evidence into Practice

These are summaries of reviews from the Cochrane Library.

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Radioactive Iodine Therapy vs. Antithyroid Medications for Graves Disease

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Clinical Question

How do radioactive iodine therapy and antithyroid medications compare for the treatment of Graves disease?

Evidence-Based Answer

Radioactive iodine therapy and antithyroid medications produce similar health-related quality-of-life outcomes in patients with Graves disease. Radioactive iodine therapy is an appropriate choice for patients who prefer definitive treatment. Antithyroid medications are appropriate in patients attempting to avoid long-term thyroid hormone therapy and should be considered in those with increased risk of Graves ophthalmopathy, such as smokers.¹ (Strength of Recommendation: B, based on inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Graves disease is the most common cause of hyperthyroidism in the United States. Although radioactive iodine therapy is the most commonly used treatment for Graves disease in the United States, patients in Europe and Japan are more likely to receive antithyroid medications or surgical thyroidectomy.^{2,3} This Cochrane review compared radioactive iodine therapy with antithyroid medications for quality-of-life outcomes, improvement or prevention of Graves ophthalmopathy, relapse rates, and cost-effectiveness.¹

This review included two randomized controlled trials (RCTs) involving 425 adults with Graves disease across 11 Swedish outpatient care centers. Among these, 221 patients were randomized to methimazole (Tapazole) therapy for 18 months and 204 were randomized to a single dose of radio-

active iodine therapy. The follow-up period ranged from two to 21 years after treatment completion, depending on the observed outcome. Other RCTs were excluded for reasons such as having a follow-up duration of less than two years (four RCTs), including patients who had received other treatment for Graves disease before the study intervention (one RCT), using inadequate randomization (one RCT), and examining other non-Graves thyroid disorders in the same study (one RCT).

Health-related quality of life as determined by a self-reported 36-item short-form survey was similar between groups. The rate of development or worsening of Graves ophthalmopathy in the radioactive iodine therapy group was almost twice the rate in the methimazole group (relative risk [RR] = 1.94; 95% confidence interval [CI], 1.40 to 2.70).

The only major adverse effect associated with radioactive iodine therapy was post-treatment hypothyroidism, which affected 95% of those receiving radioactive iodine therapy in one study and made lifelong thyroid hormone therapy necessary. Of the participants who received methimazole, 94% achieved euthyroidism without further medications. Those who took methimazole had a higher rate of relapse compared with those receiving radioactive iodine therapy. One study had a relapse rate for methimazole of 34% (RR = 0.6; 95% CI, 0.3 to 1.23); the second study had a relapse rate of 22% (RR = 0.06; 95% CI, 0.01 to 0.23). Other studies have reported relapse rates closer to 50%.^{4,5} Of those in the methimazole group, 11% reported adverse effects such as agranulocytosis and hepatotoxicity that affected their quality of life.

These findings are consistent with those of a 2015 review on Graves disease management that included 52 observational studies, 13 randomized clinical trials, and five systematic reviews.⁴ That review included studies with shorter follow-up intervals and studies that included analysis of Graves

disease as well as additional thyroid disease, such as nontoxic goiter.

The American Thyroid Association recommends all three treatments—antithyroid medications, radioactive iodine, and thyroidectomy—equally in its management guidelines, encouraging physicians to make treatment decisions based on patient-specific needs.⁵ The Cochrane review findings suggest that antithyroid medications may be underutilized in the United States given their lower cost, lower incidence of ophthalmologic complications, and potential avoidance of lifelong thyroid hormone therapy.

The practice recommendations in this activity are available at <http://www.cochrane.org>.

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