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A 1.1 GBq (30 mCi) dose of ^{131}I Is Sufficient for Ablation in the Management of Low-Risk Thyroid Cancer

Schlumberger M, Catargi B, Borget I, Deandreis D, Zerdoud S, Bridji B, Bardet S, Leenhardt L, Bastie D, Schvartz C, Vera P, Morel O, Benisvy D, Bournaud C, Bonichon F, Dejax C, Toubert ME, Leboulleux S, Ricard M, Benhamou E; Tumeurs de la Thyroïde Refractaires Network for the Essai Stimulation Ablation Equivalence Trial. Strategies of radioiodine ablation in patients with low-risk thyroid cancer. N Engl J Med 2012;366:1663-73.

SUMMARY

Background

The optimal strategy for ablation of thyroid remnants after thyroidectomy for differentiated thyroid carcinoma is still debatable. The current paper is a French multicenter, randomized, controlled trial comparing four methods for ablation of thyroid remnants in patients with low-risk thyroid carcinoma who have tumors 1 to 4 cm or positive lymph nodes. Essentially, this is a comparison of 30 mCi (1.1 GBq) versus 100 mCi (3.7 GBq) for ablation in either the hypothyroid state or the euthyroid state facilitated by using rhTSH.

Methods

Each patient had total thyroidectomy. Lymph-node dissection was performed in those with evidence of lymph-node involvement and in some patients with no evidence of lymph-node involvement, depending on local practice Patients with aggressive histologic subtypes and those with posttherapy scans that showed disease outside the neck were excluded. The investigators enrolled 752 patients who were randomly assigned to one of the four treatment strategies: 1.1 GBq given with rhTSH, 3.7 GBq given with rhTSH, 1.1 GBq given during hypothyroidism, and 3.7 GBq given during hypothyroidism. Hypothyroidism was induced by withdrawal of levothyroxine for 28 days or triiodothyronine for 14 days.

The number of dropouts in each group was similar, and the number of patients who could be evaluated in each group varied from 166 to 177. The primary outcome was thyroid ablation assessed at 8 months after radioiodine ablation through the use of neck ultrasonography and determination of the level of rhTSH–stimulated serum thyroglobulin or a diagnostic ^{131}I total-body scan in patients with detectable antithyroglobulin antibody. The criteria for completeness were negative ultrasound, stimulated Tg <1 ng/ml, and negative radioiodine scan in those with positive antibody levels. Secondary outcomes were assessment of hypothyroidism and quality of life using quantitative scales. TNM staging was similar in the four groups. About 18% had positive nodes and another 12% had tumors larger than 2 cm.

Results

Thyroid ablation was considered complete in 92% of the 684 patients. There was no difference in the rates of complete ablation among the four groups.

In regard to secondary outcomes, thyroid hormone withdrawal at the time of ablation was associated with symptoms of hypothyroidism and a poorer quality of life, but there was no difference in these assessments between the groups when analyzed 3 months after ablation when all patients were taking levothyroxine.

Conclusions

The use of a low dose, 1.1 GBq (30 mCi) ^{131}I, is probably sufficient for ablation in the management of low-risk thyroid cancer.

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ANALYSIS AND COMMENTARY

This excellent study shows that 30 mCi ^{131}I is as successful as 100 mCi for ablation of residual thyroid tissue. A major factor that contributes to the success of the low dose is the surgical procedure of complete thyroidectomy. This could account for the higher ablation rate of 92% in this study as compared with lower rate of approximately 80% in older studies (1).

Not surprisingly, hypothyroid symptoms and reduced quality of life occurred in the hypothyroid state, as previously reported (2), but these were reversible with levothyroxine therapy. After preparation with rhTSH, 58.5% had serum Tg ≤1 ng/ml; after thyroid hormone withdrawal, only 38% had Tg ≤1 ng/ml. This finding suggests to me that the stimulatory effect of thyroid hormone withdrawal on residual thyroid cells is much more potent than that of rhTSH, suggesting that there is an advantage to the therapy after withdrawal of thyroid hormone. This must be balanced against the disadvantage of more radiation toxicity related to a higher total body dose for similar ^{131}I doses in patients prepared with thyroid hormone withdrawal as compared with rhTSH (3,4).

Unfortunately the paper does not state whether patients were on a low-iodine diet, a practice that is followed routinely in the United States.

— Jerome M. Hershman, MD

References

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