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THYROID CANCER

Low dose radioactive iodine is as effective as high dose for low-risk thyroid cancer

BACKGROUND

Radioactive iodine therapy has been used as part of the treatment plan for patients with thyroid cancer for decades. At one point, most patients received radioactive iodine therapy after thyroidectomy. Currently, more emphasis is placed on the risk of cancer recurrence after surgery to determine whether radioactive iodine therapy was indicated. There is not good data on whether there are true benefits (ie, improved survival and/or decreased cancer recurrence) from radioactive iodine therapy in lower-risk thyroid cancer patients. Additionally, the best dose of radioactive iodine has not been established for low-risk patients that do get that radioactive iodine therapy. Low doses of radioactive iodine very rarely have lasting side effects whereas higher doses can have long term effects with complications such as dry mouth.

In order to treat with radioactive iodine therapy, TSH levels need to be high to stimulate any remaining thyroid tissue, normal and cancerous, and increase the uptake of radioactive iodine into the cells. There are 2 ways to do this: 1) stop thyroid hormone become hypothyroid for a short time (thyroid hormone withdrawal) or 2) treat with 2 injections of recombinant human TSH (rhTSH, Thyrogen™).

This study compared survival and recurrence after low and higher doses of radioactive iodine after thyroid surgery as well as comparing way the radioactive iodine was delivered (after recombinant TSH vs after thyroid hormone withdrawal).

THE FULL ARTICLE TITLE

Schlumberger M et al 2018 Outcome after ablation in patients with low-risk thyroid cancer (ESTIMABL1): 5-year follow-up results of a randomised, phase 3, equivalence trial. Lancet Diabetes Endocrinol 6:618–626. Epub 2018 May 26. PMID: 29807824.

SUMMARY OF THE STUDY

This was a randomized clinical trial at 24 centers in France from 2007-2010 that enrolled patients >18 years of age with low risk thyroid cancer and had a total thyroidectomy. Patients either got thyroid withdrawal or rhTSH stimulation before radioactive iodine treatment. Patients had serial neck ultrasounds and serum thyroglobulin levels performed. Patients were considered to have no evidence of the cancer if the neck ultrasound was negative and the thyroglobulin level was undetectable.

No patient died of thyroid cancer during the follow up period. At the last follow-up, 715 (98%) of the 726 patients had no evidence of the cancer. Of the other 11 patients: 4 had ultrasound/imaging evidence of thyroid cancer (2 had spread to the lung, 1 had spread to the neck lymph nodes and 1 had both); 5 had detectable serum thyroglobulin concentrations on levothyroxine treatment ranging from 1.2 to 4.2 ng/ml and no other evidence of the cancer; and 2 with serum thyroglobulin of <1 ng/ml and indeterminate findings on neck ultrasonography that were not submitted to biopsy. Of these 11 patients with persistent cancer, 6 received low dose radioactive iodine (5 after rhTSH, 1 after withdrawal) and 5 received high dose radioactive iodine (2 after rhTSH and 3 after withdrawal).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Low dose radioactive iodine ablation therapy is equivalent to higher doses in patients with low risk thyroid cancer in terms of recurrence and survival. Additionally, the mode of TSH stimulation does not impact outcomes as well. This is important because patients with low risk thyroid cancer can be reassured that both rhTSH stimulation as well as low radioactive iodine doses provide good outcomes while simultaneously decreasing the likelihood of side effects for patients.

— Melanie Goldfarb, MD

THYROID CANCER, continued

ATA THYROID BROCHURE LINKS

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

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/

ABBREVIATIONS & DEFINITIONS

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).

Cancer metastasis: spread of the cancer from the initial organ where it developed to other organs, such as the lungs and bone.

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a *total thyroidectomy*. When less is removed, such as in removal of a lobe, it is termed a *partial thyroidectomy*.

Total thyroidectomy: surgery to remove the entire thyroid gland.

Thyroglobulin antibodies: these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.

Thyroglobulin: a protein made only by thyroid cells, both normal and cancerous. When all normal thyroid tissue is destroyed after radioactive iodine therapy in patients with thyroid cancer, thyroglobulin can be used as a thyroid cancer marker in patients that do not have thyroglobulin antibodies.

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*) or to take pictures of the whole body to look for thyroid cancer (*Whole Body Scan*).

Thyroid Remnant Ablation: destruction of the small amount of thyroid tissue that remains after surgery (thyroidectomy) with the use of radioactive iodine.

Recombinant human TSH (rhTSH): human TSH that is produced in the laboratory and used to produce high levels of TSH in patients after an intramuscular injection. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan. The brand name for rhTSH is Thyrogen™.

Thyroid Hormone Withdrawal (THW): this is used to produce high levels of TSH in patients by stopping thyroid hormone pills and causing short-term hypothyroidism. This is mainly used in thyroid cancer patients before treating with radioactive iodine or performing a whole body scan.

Lymph node: bean-shaped organ that plays a role in removing what the body considers harmful, such as infections and cancer cells.

Cancer recurrence: this occurs when the cancer comes back after an initial treatment that was successful in destroying all detectable cancer at some point.

Clinical trials: when a new drug is developed, it must undergo an extensive series of steps, called phases, to prove that it is more effective in patients than the drugs that are currently available to treat the condition. A **Phase I** trial tests a new drug or treatment in a small group of people for the first time to evaluate its safety, determine a safe dosage range and identify side effects. A **Phase II** trial gives the drug to a larger group of people to see if it is effective and to further evaluate its safety. A **Phase III** trial gives the drug to large groups of people to confirm its effectiveness, monitor side effects, compare it to commonly used treatments and collect information that will allow the drug or treatment to be used safely.