

# Radioiodine Therapy



Prepared  
by the American  
Association of Clinical  
Endocrinologists (AACE), a  
not-for-profit national organization of  
highly qualified specialists in hormonal and  
metabolic disorders whose primary professional  
activities focus on providing high-quality specialty care to  
patients with endocrine problems such as thyroid disease.



## What is radioiodine therapy?

If you have an overactive thyroid gland or have been diagnosed with thyroid cancer, your endocrinologist may prescribe radioactive iodine (radioiodine) as part of your overall treatment. You, your family, and your coworkers may have some questions about this therapy.

## Background

The thyroid gland produces hormones that regulate the body's metabolism. In order to produce these hormones, the thyroid gland requires large amounts of iodine, which is found in seafood, table salt, bread, and various other foods. Iodine is an essential ingredient in the creation of thyroid hormone. Each molecule of thyroid hormone contains either 4 (T<sub>4</sub>) or 3 (T<sub>3</sub>) molecules of iodine. Most overactive thyroid glands are quite hungry for iodine, and it was discovered in the 1940's that the diseased thyroid could be "tricked" into destroying itself by simply feeding it radioactive iodine. Your endocrinologist can also use radioiodine to treat some types of thyroid cancer. Fortunately, the radioiodine treatment itself will not cause you to feel bad, and very little radiation exposure occurs to the rest of the body.

Radioiodine has been used for more than 50 years in the treatment of thyroid diseases with remarkably few undesirable effects. However, problems may rarely occur when very large doses are given, including decrease in taste sensation and irritation of the salivary glands, the gastrointestinal tract, or the urinary bladder. No increase has been seen in either the occurrence of malignant tumors in patients treated with radioiodine or the number of birth defects in children born later to women who have received this type of treatment.



## Hyperthyroidism (overactive thyroid)

Before the development of current treatment options, the death rate from hyperthyroidism was as high as 50%. Now several effective treatments (antithyroid drugs, surgery, and radioiodine) are available, and death from hyperthyroidism is rare. Deciding which treatment is best depends on what caused the hyperthyroidism, its severity, and other conditions present. Endocrinologists are experienced in the management of thyroid diseases and can confidently diagnose the cause of hyperthyroidism and prescribe and manage the best treatment program for each patient.

In the 50+ years and hundreds of thousands of patients (including a former President of the United States and his wife!) in which radioiodine has been used, no serious complications have been reported. Since the treatment appears to be extraordinarily safe, simple, and reliably effective, it is considered by most thyroid specialists in the United States to be the treatment of choice for those types of hyperthyroidism caused by overproduction of thyroid hormones.

Radioactive iodine is given by mouth, usually in capsule form, and is quickly absorbed from the bowel. It then enters the thyroid cells from the bloodstream and gradually destroys them. Although the radioactivity from this treatment is largely gone from the body within a few days, its effect on the thyroid gland usually takes between 1 and 3 months

to develop, and maximal benefit is usually noted within 3 to 6 months.

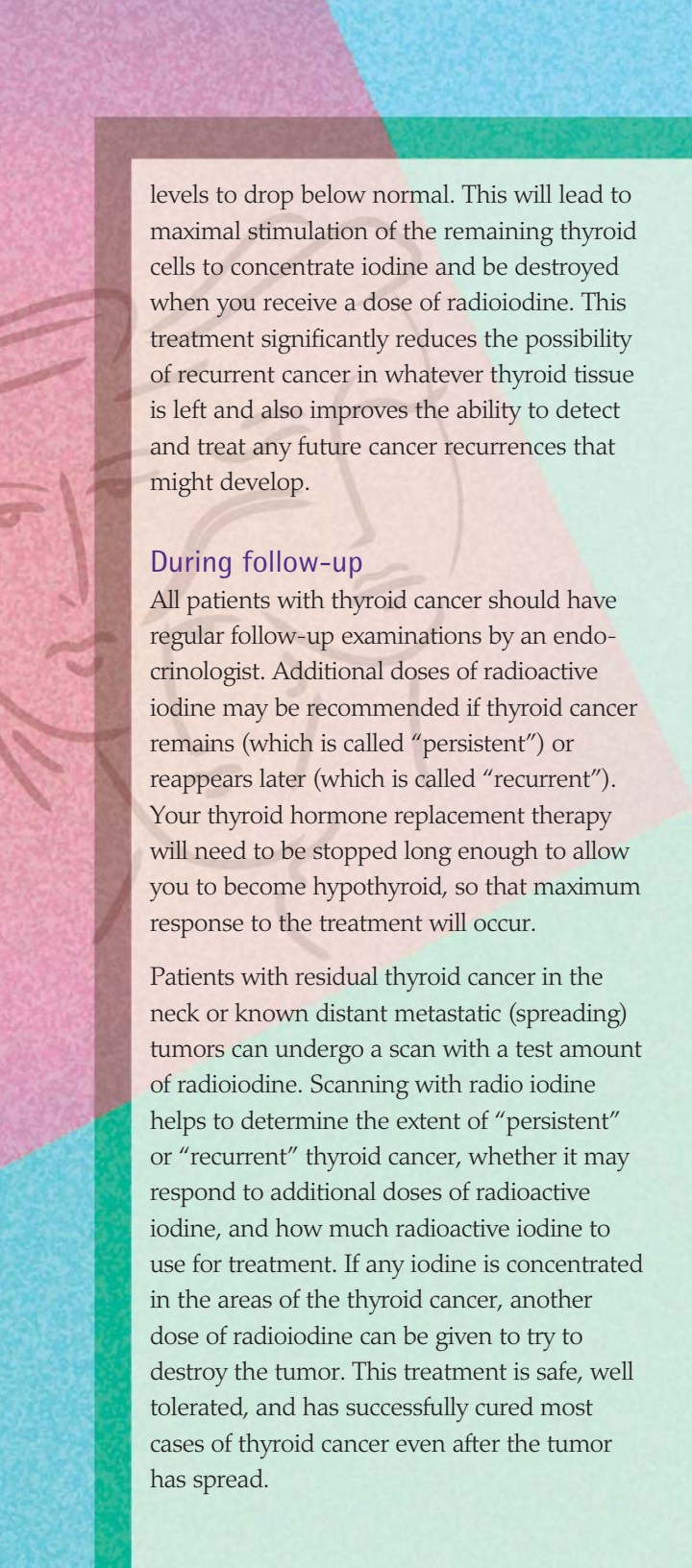
It is not possible to reliably destroy part but not all of the diseased thyroid gland, since the effects of the radioiodine are slowly progressive on the thyroid cells. Therefore, most Endocrinologists strive to completely destroy the diseased thyroid gland with a single dose of radioiodine. This results in the intentional development of an underactive thyroid state (hypothyroidism), which is easily, predictably and inexpensively corrected by lifelong daily use of oral thyroid hormone replacement therapy. Although every effort is made to calculate the correct dose of radioiodine for each patient, not every treatment will successfully correct the hyperthyroidism, particularly if the goiter is quite large, in which case a second dose of radio iodine is occasionally needed.

## Thyroid cancer

The two most common types of thyroid cancer (papillary and follicular) can usually be treated with radioiodine because the cells are able to take up some iodine. Radioiodine is used in treating thyroid cancer in the following 2 general situations:

### After removal of the thyroid

An experienced thyroid surgeon can remove most of the thyroid with a very low risk of surgical complications, and radioiodine can be used to destroy the remainder of the gland, since it might harbor additional microscopic clusters of cancer cells. In that case, you will be advised not to use thyroid hormone replacement for several weeks after the operation, in order to allow the thyroid



levels to drop below normal. This will lead to maximal stimulation of the remaining thyroid cells to concentrate iodine and be destroyed when you receive a dose of radioiodine. This treatment significantly reduces the possibility of recurrent cancer in whatever thyroid tissue is left and also improves the ability to detect and treat any future cancer recurrences that might develop.

### During follow-up

All patients with thyroid cancer should have regular follow-up examinations by an endocrinologist. Additional doses of radioactive iodine may be recommended if thyroid cancer remains (which is called “persistent”) or reappears later (which is called “recurrent”). Your thyroid hormone replacement therapy will need to be stopped long enough to allow you to become hypothyroid, so that maximum response to the treatment will occur.

Patients with residual thyroid cancer in the neck or known distant metastatic (spreading) tumors can undergo a scan with a test amount of radioiodine. Scanning with radio iodine helps to determine the extent of “persistent” or “recurrent” thyroid cancer, whether it may respond to additional doses of radioactive iodine, and how much radioactive iodine to use for treatment. If any iodine is concentrated in the areas of the thyroid cancer, another dose of radioiodine can be given to try to destroy the tumor. This treatment is safe, well tolerated, and has successfully cured most cases of thyroid cancer even after the tumor has spread.



## What happens to the radioiodine after a treatment?

Since surgery removes the vast majority of thyroid tissue, much of the radioiodine will not be absorbed and will leave the body primarily through the urine. Small amounts will also be excreted in saliva, sweat, tears, vaginal secretions, and feces. Nearly all the radioactive iodine will leave the body during the first 2 days after the dose has been given. Traces may still be present in the urine and blood for up to 1 week. Therefore, for the safety of laboratory workers, you may be advised not to have any blood or urine testing during this period.

## What about breast-feeding during treatment?

Small amounts of radioactive iodine will also be excreted in breast milk. Therefore, since radioiodine could permanently damage the infants' thyroid, breast-feeding is not allowed. **RADIOACTIVE IODINE TREATMENT SHOULD NEVER BE GIVEN INTENTIONALLY TO A PREGNANT WOMAN!** If radioiodine is inadvertently administered to a woman who is subsequently discovered to be pregnant, the advisability of terminating the pregnancy should be discussed with the patients' obstetrician and endocrinologist.

## Are future pregnancies possible?

For safety's sake, male and female patients are advised to avoid fathering a child or becoming pregnant for several months after radioiodine treatment. This is because a theoretical risk to a developing fetus exists, even though the amount of radioactivity retained may be small and there is no medical proof of an actual risk from radioiodine treatment. Such a precaution would essentially eliminate direct fetal exposure to radioactivity and markedly reduce the possibility of conception with sperm that might theoretically have been damaged by exposure to radioiodine. You may need to contact your physician for guidance about methods of contraception.

Regulations regarding the use of radioiodine therapy are made by the US Nuclear Regulatory Commission (NRC). Physicians and hospitals that administer this therapy must have a license to administer radioiodine, and must adhere to stringent regulations regarding its use. If you have any questions before or after receiving your treatment, please do not hesitate to contact your physician or your hospital radiation safety officer for clarification.



## Is hospitalization necessary for treatment with radioiodine?

Treatment for hyperthyroidism is almost always done on an outpatient basis because the dose required is relatively small in comparison with the doses typically used for treatment of thyroid cancer. If you have to take a larger dose of radioiodine for treatment of thyroid cancer, you may need to be admitted to the hospital for several days depending on your living environment, state of residence, and local practice patterns.

If you require hospitalization, your hospital room will have frequently handled items (such as the television control, table, phone, faucet handles, etc), covered with protective material, and the floor will be partially covered. These precautions have nothing to do with you, but are merely designed to prevent the radioactive iodine from contaminating those items that will be reused by other patients after your dismissal from the hospital. To limit the contamination of your personal items, you should bring a minimal amount of belongings for your stay. All items will be monitored at your dismissal. Clothing should be limited to what you wear when you are admitted. You should use hospital gowns during your stay. Paperback books, magazines, and newspapers are preferred to hardback books, work papers, and craft items. Check with your endocrinologist about any other issues.

## After treatment, should contact with other people be limited?

The amount of radioactive exposure to other persons during your daily activities will depend on the duration of contact and the distance you are from them. As an example, a person 2 feet away receives only one fourth the exposure of someone 1 foot away.

Therefore, the general principle is to avoid prolonged, close contact with other people for several days.

If your work or daily activities involve prolonged contact with small children or pregnant women, you may want to wait for several days after your treatment to resume these activities. Those patients with infants at home should arrange for care to be provided by another person for the first several days after treatment. It will not be necessary for you personally to stay elsewhere after your treatment, although you will need to sleep alone for several days.

# Recommendations for reduction of exposure to others

## For several days after treatment:

- ◆ Use private toilet facilities, if possible; flush twice after each use.
- ◆ Bathe daily and wash hands frequently.
- ◆ Drink normal amount of fluids.
- ◆ Use disposable eating utensils or wash your utensils separately from others.
- ◆ Sleep alone and avoid prolonged intimate contact.
- ◆ Launder your linens, towels, and clothes daily at home separately from others. No special cleaning of the washing machine is required between loads.
- ◆ Do not prepare food for others that requires prolonged handling with bare hands (such as mixing a meat loaf or kneading bread)

Brief periods of close contact, such as handshaking and hugging, are permitted. You may visit or shop in public places, attend concerts, or use public transportation at your convenience.

Your endocrinologist or radiation safety officer may recommend continued precautions for up to several weeks after treatment, depending on the amount of radioactivity administered. Patients receiving radioactive iodine should also carry information about their treatment with them in order to fully inform authorities who are in charge of screening for radioactive materials in public areas – an increasingly common occurrence.



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