THERAPY FOR DIFFUSE HYPERTHYROIDISM
(I-131 as Sodium Iodide)

Overview

- I-131 therapy for Diffuse Hyperthyroidism uses I-131 orally to reduce thyroid gland function to the point where the patient is unlikely to become hyperthyroid again. A currently unavoidable side effect is that the patient will become hypothyroid and require replacement thyroid hormone by mouth indefinitely.

Indications

- Treatment of Graves disease (1-4).

Procedure Time

- Initially: 20 minutes for obtaining informed consent and administering the dose.
- Later (if the patient is hospitalized): 20 minutes per day for monitoring the patient's I-131 body burden until it is below 30 mCi (1,110 MBq).

Patient Preparation (1,5)

- The patient must discontinue iodide containing preparations, thyroid hormones, and other medications that could potentially affect the ability of thyroid tissue to accumulate iodide.

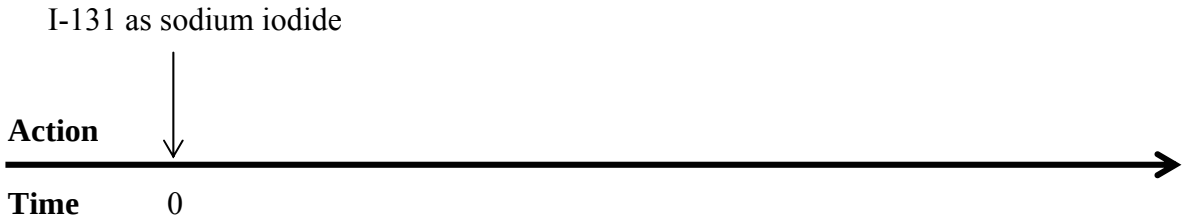
Medication	Time of withdrawal
Antithyroid medication (propylthiouracil, methimazole, carbimazole) (6)	3 dy
Multivitamins	7 wk
Thyroid hormones	2 wk for triiodothyronine 4 wk for thyroxine
Expectorants, kelp, agar, carageen, topical iodide	3 wk
Radiographic contrast agents	3 wk
Amiodarone	3 mo

- The nuclear medicine physician explains the expected benefits and possible complications.
- The nuclear medicine physician obtains written informed consent for treatment and for treatment as an outpatient [see consent forms at end of section].

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical: I-131 as sodium iodide.
- Dose: 10-20 mCi (370-555 MBq) - depending on gland size, uptake values, and therapeutic strategy (7-9).
- Technique of administration: Oral.

Protocol Summary Diagram



Post Treatment Restrictions

- There may be post-treatment restrictions related to the distance between the patient and other persons, and the patient's urine. [See form at the end of this section.]

Complications

- The following complication frequencies are best estimates from the literature for a treatment dose of approximately 15 mCi.

Complication	Time of onset	Frequency (%)	Reference
Exacerbation of hyperthyroidism	< 1 wk	rare	1,10
Hypogonadism - men	< 3 mo	40	11
Hypogonadism - women	< 3 mo	20	11
Recurrent hyperthyroidism	< 1 yr	10	1,7
Hypothyroidism	< 1 yr	80	1,4
Development or exacerbation of exophthalmopathy	< 2 yr	10	12,13
Hypothyroidism	< 10 yr	90	1,4
All cancers including leukemia	< 15 yr	no increase	14
Subsequent birth defects, miscarriages		no increase	1
Overall mortality		no increase	15

- If the patient is inadvertently treated with radioiodine while pregnant, the treatment may cause severe abnormalities in the fetal thyroid gland (16).

Optional Maneuvers

- Retreatment: If the patient does not become euthyroid or hypothyroid in approximately 3 months, the patient may be retreated with I-131 (17).

- Prevention of development or exacerbation of exophthalmopathy: Some recommend early administration of thyroxine or pretreatment with corticosteroids (13,14).

- Uncooperative patients: I-131 may be administered via a nasogastric tube (18).

- Pretreatment with lithium: Pretreatment with lithium may significantly increases the effect of I-131-iodine (19).

- Pretreatment with diuretics in patients with low radioiodine uptakes: Pretreatment with hydrochlo

- Letter documenting radioactive treatment: If the patient triggers a radiation detector in a public facility, it is useful for him/her to have a letter documenting the cause (21,22).

Principle Radiation Emission Data - I-131 (23)

- Physical half-life = 8.04 days.

Radiation	Mean % per disintegration	Mean energy (keV)
Beta-4	89.4	191.5
Gamma-14	81.2	364.5

Dosimetry - I-131 as Sodium Iodide (24)

Organ	rads/15 mCi	mGy/555 MBq
Thyroid	19,500.0	195,000.0
Stomach wall	21.0	210.0
Total body	10.6	106.5
Ovaries	2.1	21.0
Testes	1.4	14.0

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THERAPY FOR DIFFUSE HYPERTHYROIDISM

Nuclear Medicine Department

Institution_____

Your physician has referred you for a treatment dose of radioactive iodine for hyperthyroidism from Graves disease. Graves disease is an autoimmune disease caused by an abnormal antibody directed at the thyroid gland. The abnormal antibody causes the thyroid gland to become overactive. Unfortunately, we have no way to prevent your immune system from producing the abnormal antibody.

The standard treatment is to decrease your thyroid function below normal by destroying a portion of your thyroid gland cells. Results are not always successful. There is an approximately 10% chance that the treatment will not decrease your thyroid gland function sufficiently. In that case an additional treatment will be necessary.

On the other hand, there is an approximately 90% chance that the treatment will decrease your thyroid gland function below normal in a few months following treatment.

When your thyroid function becomes less than normal, you will need to take replacement thyroid hormone. Because the amount of replacement thyroid hormone that you need may vary in the future, you should see a physician periodically, e.g. once a year, for the rest of your life to be sure that the amount of thyroid hormone in your blood is normal.

If you have Graves ophthalmopathy (protrusion of the eyes), there is a small chance that the condition will worsen with radioactive iodine treatment. In addition, there is a 1% or less chance that the treatment may make your thyroid condition worse for 1 to 3 days. If either of these complications occur, you may contact your physician for symptomatic treatment.

You should refrain from eating for 1 hour following ingestion of the radioactive iodine.

Female patients who may be pregnant or who are breast feeding should not undergo this treatment. Pregnancy should be postponed for at least 3 months following treatment.

_____	_____
Patient or legal guardian	Physician
_____	_____
Witness	Date

REFERRAL INFORMATION

Referring physician_____ Patient name_____

Diagnosis_____ Hormone levels: TSH_____ T-4____

Imaging findings_____ Uptake values: 6 hr_____ 24 hr_____

Gland size_____ Patient weight_____

Off PTU ≥ 7 days_____ No IV contrast ≥ 3 weeks_____

Ophthalmopathy_____ On corticosteroids_____

Pregnancy test (females of reproductive age)_____

Comments_____

Dose of I-131 to be ordered_____ Treatment date_____

Nuclear medicine physicia_____ Today's date_____

INSTRUCTIONS FOR OUTPATIENT TREATMENT WITH IODINE-131

Nuclear Medicine Department

Institution _____

Patient _____ was administered ____ mCi of I-131 on _____

The radioiodine dose that you will receive will be beneficial to you, but other persons with whom you may come in contact should not be unnecessarily exposed to radiation. If you are currently nursing an infant, additional instructions will be given to you concerning the need to interrupt or discontinue breast feeding. Below are some actions to which you must agree to help keep exposures to others as low as possible. The instructions should be followed for 2 days following the treatment.

1. Maintain a distance of at least 3 feet from others for the first 2 days.

2. Sleep alone for the first 2 nights.

3. Do not travel by airplane or mass transport for the first 2 days.

4. Do not travel with others by automobile for longer than 2 hours for the first 2 days.

5. Have sole use of a bathroom for the first 2 days or follow detailed instructions for bathroom use.

6. Drink plenty of fluids for the first 2 days.

The above are minimum actions necessary to keep exposures to others as low as possible. Your physician may wish to have you follow certain other precautions to help maintain exposures to others as low as possible.

Other precautions:

_____
_____

_____

Patient Agreement

I agree to abide by the above recommendations as a condition of my treatment on an outpatient basis. I have had the opportunity to ask questions regarding the limitations on my activities following release and understand each of the recommendations described above.

_____ _____

Patient signature/Date Staff signature/Date