Austin Radiological Association

Nuclear Medicine Procedure

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's disease.

Procedure Time

- Initially: 60 minutes for obtaining informed consent and administering the dose.

Patient Preparation

- 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)	3-5 days
Multivitamins	7 days
Thyroid hormones	2 wk. for triiodothyronine 4 wk. for thyroxine
Expectorants, kelp, agar, carrageen, topical iodide	3 wk.
Radiographic contrast agents	4 wk.
Amiodarone	3 mo.

- The nuclear medicine physician explains the expected benefits and possible complications.

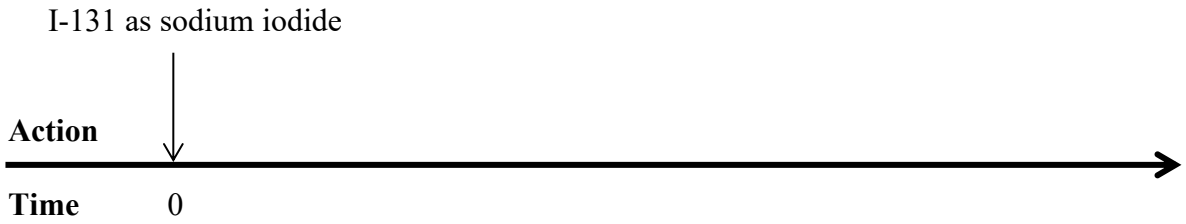
- The nuclear medicine physician obtains written informed consent for treatment as an outpatient. Completed before dose is ordered.

- All female patients of child bearing age must have serum pregnancy test within 7 days of dosing.
- Ensure female patients are not breast-feeding, or are willing to discontinue.
- Current TSH and T4 panel are required and reviewed by physician prior to dosing. TSH not required if patient receiving Thyrogen.
- Results of Thyroid scan and uptake if available.
- ARA I-131 Policy and checklist are completed prior to patient visit

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical: I-131 as sodium iodide.
- Dose: 10-30 mCi (370-1110 MBq) - depending on gland size, uptake values, and therapeutic strategy, as determined by nuclear medicine physician. Pedi dose by NACG chart.
- Technique of administration: Oral.

Protocol Summary Diagram



Post Treatment Restrictions

- There are post-treatment restrictions related to the distance between the patient and other persons, and the patient's bodily fluids.

Complications

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

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

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

Optional Maneuvers

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

- Prevention of development or exacerbation of exophthalmopathy: Some recommend early administration of thyroxine or pretreatment with corticosteroids.

- Thyrogen pre-treatment, when discontinuing thyroid medication is contraindicated.

- Pretreatment with lithium: Pretreatment with lithium may significantly increase the effect of I-131-iodine.

- Pretreatment with diuretics in patients with low radioiodine uptakes: Pretreatment with hydrochlorothiazide significantly increases radioiodine uptake by the thyroid compared to a low iodine diet.

- 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.

Method for timely correction of Data Analysis and reporting errors and notification of referring parties

- Data Analysis and reporting errors are reported to the interpreting physician and appropriate clinic manager for timely correction and notification of the referring physician via report addendum or STAT call if error is significant.

Principle Radiation Emission Data - I-131

- 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

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