Houston Thyroid and Endocrine Specialists
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TREATMENT OF HYPERTHYROIDISM OR THYROID CANCER: Iodine I-131

Radioactive iodine treatment with I-131 is one good option to treat high-uptake-hyperthyroidism and sometimes a required treatment for thyroid cancer. radioactive iodine treatment (RAI) is based on the biology that the thyroid actively accumulates iodine, using it to produce thyroid hormones. Radioactive I-131 is like the iodine found in foods such as fish, seaweed, and iodized salt, except that it releases an electron, or beta particle, which creates its treatment action. For use in treatment, the RAI is given as a capsule. It is absorbed quickly by the stomach and intestines, then carried in the bloodstream to the thyroid, where it is taken up by the thyroid gland. While in the thyroid gland, the RAI disrupts the function of some of the thyroid cells - the more radioactive iodine given, the more cells cease to function.

Preparing for the treatment:

Hyperthyroid patients:

Women must have a pregnancy test performed prior to testing. You should inform the doctor if you have recently taken large doses of iodine, seaweed, kelp or had a CT scan with IV contrast within the last month. Also you must remain off drugs commonly used to treat hyperthyroidism such as methimazole or PTU for at least 7 days prior to the treatment. You will be scheduled to come to the office in the morning to swallow a capsule of radioactive iodine, and then you may go back home

Thyroid cancer patients who recently had thyroid surgery:

Women must have a pregnancy test performed prior to testing. You should inform the doctor if you have recently taken large doses of iodine, seaweed, kelp or had a CT scan with IV contrast within the last month. The remaining thyroid tissue after thyroid surgery must be prepared to be "hungry" for the iodine treatment by one of these pathways: Path 1 or Path 2

Side Effects of iodine treatment

Radioactive iodine treatment has few side effects, and these occur infrequently. A sore throat may occur a few days after the treatment, which can be treated with acetaminophen. Rarely, the salivary glands may swell, which is caused by the iodine and not the radioactivity. Sucking hard sour candies for a few days can prevent this. Mild nausea may develop for a few hours after the iodine is taken, so it is best not to eat two hours before and two hours after the iodine administration. There are specific precautions for hyperthyroid patients and specific precautions for thyroid cancer patients to take after receiving I-131.

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How do I prepare and what are the radiation safety precautions after treatment with I-131 RAI?

No special preparation is necessary other than having the proper set up at home to prevent exposure to others (see table below). Your endocrinologist or radiologist should give you detailed instructions on precautions to take depending on the dose of I-131 you receive.

Since RAI produces radiation, patients must do their best to avoid radiation exposure to others, particularly to pregnant women and small children. The amount of radiation exposure markedly decreases as the distance from the patient increases. Patients who need to travel in the days after I-131 RAI treatment are advised to carry a letter of explanation from their physician since radiation detection devices used at airports or in federal buildings may pick up even very small radiation levels.

You will be able to return home following radioactive iodine treatment, but you should avoid prolonged, close contact with other people for several days, particularly pregnant women and small children. The majority of the radioactive iodine that has not been absorbed leaves the body during the first two days following the treatment, primarily through the urine. Small amounts will also be excreted in saliva, sweat, tears, vaginal secretions, and feces.

Instructions to reduce exposure to others after I-131 RAI treatment

Action	Durati (Days)
Sleep in a separate bed (~6 feet of separation) from another adult	1-11*
Delay return to work	1-5*
Maximize distance from children and pregnant women (6 feet)	1-5*
Limit time in public places	1-3*
Do not travel by airplane or public transportation	1-3*
Do not travel on a prolonged automobile trip with others	2-3
Maintain prudent distances from others (~6 feet)	2-3
Drink plenty of fluids	2-3
Do not prepare food for others	2-3

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Do not share utensils with others	2-3
Sit to urinate and flush the toilet 2-3 times after use	2-3
Sleep in a separate bed (~6 feet of separation) from pregnant partner, child or infant	6-23*

*duration depends on dose of I-131 given

What equipment is used?

None, the patient simply swallows a pill. If the patient has thyroid cancer, they may be asked to follow up with a whole body thyroid nuclear scan 7-10 days after the treatment. Patients being treated for hyperthyroidism do not need such a scan.

Are there long term risks of I-131 RAI?

In general, RAI is a safe and effective treatment. Hypothyroidism is a common side effect of RAI for hyperthyroidism and always seen after RAI for thyroid cancer (see Hypothyroidism brochure). Some studies suggest a slight increase in thyroid cancers after RAI treatment for hyperthyroidism. Loss of taste and dry mouth due to salivary gland damage may be seen. The use of lemon drops, vitamin C or sour stimulation to potentially decrease the exposure of the salivary glands to RAI is controversial and should be discussed with your physician. Importantly, once you have been treated with RAI, regular medical follow-up is life-long.

What are the special concerns for women?

RAI, whether I-123 or I-131, should never be used in a patient who is pregnant or nursing. Pregnancy should be put off until at least 6 – 12 months after I-131 RAI treatment since the ovaries are exposed to radiation after the treatment and to ensure that thyroid hormone levels are normal and stable prior to pregnancy. There is no clear evidence that RAI leads to infertility.

Are there special concerns for men?

Men who receive RAI treatment for thyroid cancer may have decreased sperm counts and temporary infertility for periods of roughly two years. Sperm banking is an option in a patient who is expected to need several doses of RAI for thyroid cancer.

How will I feel after the procedure?

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Patients may experience some pain in the thyroid after I-131 therapy similar to a sore throat. You should ask your physician to recommend an over-the-counter pain reliever to treat this pain, should it occur. Also consider sucking on lemon drops for the first 1-3 days after swallowing the pill. Drink plenty of fluids in the first 24 hours.

Is there a risk of other cancers from the treatment?

Patients may be at slightly higher risk of acute myeloid leukemia (prevalence of 0.5% between 2 to 10 years after treatment and the risk is considerably lower when smaller I-131 doses are used) (1). In a report of 6840 patients treated in Europe with doses averaging 162 mCi I-131 there was an increased risk of bone and soft tissue cancers (relative risk 4.0), female genital organs (relative risk 2.2), and leukemia (relative risk 2.5) (2). There was no relationship identified with radioiodine and breast disease. Overall, a meta-analysis showed a relative risk of secondary malignancies of 1.19 in thryoid cancer patients given radioactive iodine versus those not treated with radioiodine (3). It is important to note the while cumulative doses of RAI may be associated with a statistically significant increase in second malignancies (relative risk), the actual magnitude of this risk (absolute risk) is very small.

References: (1) Radioiodine-131 in the diagnosis and treatment of metastatic well differentiated thyroid cancer. Maxon HR 3d, Smith HS Endocrinol Metab Clin North Am 1990 Sep;19(3):685-718. (2) Second primary malignancies in thyroid cancer patients. Rubino C, de Vathaire F, Dottorini ME, Hall P, Schvartz C, Couette JE, Dondon MG, Abbas MT, Langlois C, Schlumberger M Br J Cancer. 2003;89(9):1638. (3) Second primary malignancy risk after radioactive iodine treatment for thyroid cancer: a systematic review and meta-analysis. Sawka AM, Thabane L, Parlea L, Ibrahim-Zada I, Tsang RW, Brierley JD, Straus S, Ezzat S, Goldstein DP Thyroid. 2009;19(5):451