

THYROID UPTAKE

PURPOSE: To measure thyroid function.

RATIONALE: Ingested iodine is absorbed rapidly and generally can be detected in the thyroid gland and saliva within minutes after oral administration. Iodine is absorbed from the intestinal tract as iodide and removed from the blood stream by the thyroid epithelium. AN enzymatic process in the thyroid gland converts iodide to nascent iodine which then combines with thyrosine. Two molecules of the resulting diiodothyrosine combine to form thyroxine. Thyroxine in turn combines with a protein to form thyroglobin. Thyroglobulin is stored in the thyroid follicle and can be recovered into thyroxin for release into the blood stream. Non-trapped iodide is excreted in the urine and in trace amounts in sweat and feces. The rate at which iodide is trapped by the thyroid gland is dependent upon: (1) saturation of the iodide stores of the thyroid stimulating hormone activity, (2) the rate or organification of iodide and (3) the rate of production and excretion of thyroid hormone. Radioactive iodine follows the same pattern of distribution and experiences the same metabolic fate as non-radioactive iodine. The uptake of radioactive iodine in the thyroid gland can thus be measured by external counting over the neck of the patient with a scintillation detector through the radiation emitted is affected by the same factors mentioned above. Consequently, the thyroid uptake is suppressed when the thyroid iodine store is saturated by iodine intake in excess of the normal daily dietary intake and by administration excess of the normal daily dietary intake and by administration of anti-thyroid medications at on the thyroid through their effect on the enzymatic system responsible for organification of iodine. The radioactive iodine uptake is increased when the thyroid iodide stores are depleted by decreased iodine intake over a prolonged period of time and in cases of increased when the thyroid iodide stores are depleted by decreased iodine intake over a prolonged period of time and in cases of increased thyroid hormone production because of increase iodide retention in the plasma. In spite of these many variables, the radioactive iodine uptake has proven to be a practical and accurate screening test of thyroid function. In the index of this manual is a complete list of drugs and agents that will affect the thyroid uptake. The time required for each of these agents to cease any affect upon the thyroid gland is also given. Attention is directed to the fact that these values are for euthyroid patients. Those patients who should be hypothyroid will require a substantially longer period of time while those who are hyperthyroid will require a shorter period time.

PROCEDURE: A dose of radioactive iodine is given by capsule orally to the patient. At 4 to 24 hours later the patient returns to the isotope lab and the amount of radioactivity over the neck of the patient is determined with a scintillation probe. The counts over the neck, after correction for extra thyroidal background, are compared with a standard counted under the same geometric conditions. The uptake is then expressed in percentage of the administrated dose.

PREPARATION OF PATIENT:

1. Patient is cleared of thyroid affecting medications.
2. Patient is NPO after midnight.
3. Patient remains fasting for 1 hour after receiving dose.
4. The test is not performed on gravid females.

TIME INVOLVED:

Day One: Patient is seen for 15 minutes in morning to receive dose, and 4 hours later for the first uptake.

Day Two: Patient is seen 24 hours after receiving dose for reading of second uptake over neck and thigh. Time: 10 minutes.

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