Published in WWW.ENDOTEXT.ORG © 2018

SEVERE HYPOTHYROIDISM IN THE ELDERLY

Matthew Kim, MD, Assistant Professor of Medicine/Associate Physician, Brigham and Women's Hospital, Boston, MA

Updated May 31, 2018

CLINICAL RECOGNITION

Elderly patients with severe hypothyroidism often present with variable symptoms that may be masked or potentiated by co-morbid conditions. Characteristic symptoms may include fatigue, weight gain, cold intolerance, hoarseness, constipation, and myalgias. Neurologic symptoms may include ataxia, depression, and mental status changes ranging from mild confusion to overt dementia. Clinical findings that may raise suspicion of thyroid hormone deficiency include hypothermia, bradycardia, goitrous enlargement of the thyroid, cool dry skin, myxedema, delayed relaxation of deep tendon reflexes, a pericardial or abdominal effusion, hyponatremia, and hypercholesterolemia.

PATHOPHYSIOLOGY

See WWW.THYROIDMANAGER.ORG

DIAGNOSIS AND DIFFERENTIAL

Autoimmune (Hashimoto's) thyroiditis with destruction of functioning tissue is the most common endogenous cause of hypothyroidism in elderly patients. Checkpoint inhibitors targeting PD-1 that are used to treat a range of malignancies can induce a rapidly progressing form of autoimmune thyroiditis. Unrecognized or untreated cases can progress to a state of pronounced thyroid hormone deficiency over weeks to months. Administration of radioactive iodine to treat hyperthyroidism ascribed to Graves' disease usually causes permanent hypothyroidism. Surgery performed to remove thyroid cancer or an enlarged multinodular goiter inevitably leads to overt hypothyroidism. External beam radiation used to treat lymphoid malignancies and head and neck cancer can lead to rapid or delayed development of hypothyroidism. Pituitary dysfunction that inhibits secretion of TSH may be caused by growth of a mass in the sella turcica or may develop as a complication of surgery performed to remove a tumor.

Table 1: Causes of Hypothyroidism in the Elderly
Primary hypothyroidism

Autoimmune (Hashimoto's) thyroiditis Post-ablative hypothyroidism Post-surgical hypothyroidism Radiation-induced hypothyroidism Thyroiditis induced by interferon alpha or CAMPATH
Central hypothyroidism Pituitary or hypothalamic dysfunction
Decreased absorption of levothyroxine Celiac disease Drugs: iron sulfate, bile acid resins, sucralfate, calcium
Accelerated metabolism of thyroid hormone Increased deiodinase activity (consumptive hypothyroidism) Drugs: phenytoin, phenobarbital, carbamazepine, rifampin

DIAGNOSTIC TESTS NEEDED AND SUGGESTED

Lab tests that demonstrate an elevated TSH level in tandem with a low free or total T4 level confirm a diagnosis of primary hypothyroidism. Commonly used drugs including ASA and phenytoin lower total T4 levels and may cause interference with FT4 assays. Anti-thyroid peroxidase and anti-thyroglobulin antibody levels may be checked to confirm the presence of autoimmune thyroiditis, but this usually isn't necessary as it is the presumptive diagnosis in patients who haven't been treated with other predisposing therapies. A low free or total T4 level detected in tandem with a low or inappropriately normal TSH level may raise suspicion of central hypothyroidism. This may prompt further biochemical evaluation of other pituitary hormones and anatomic imaging of the pituitary and hypothalamus. Serious illness in the elderly is often accompanied by the non-thyroidal illness (euthyroid sick) syndrome that presents with a normal or low total T4 level, a low total T3 level, and an inappropriately low or normal TSH level. Recognition of this syndrome requires exclusion of other causes of hypothyroidism or pituitary dysfunction. Appropriate treatment of this condition is controversial. Subclinical hypothyroidism, with a normal range freeT4 level and elevated TSH level is not infrequent in elderly patients, and if due to autoimmune thyroiditis, often progresses to overt hypothyroidism.

THERAPY

Levothyroxine (T4) is the principal thyroid hormone preparation used to treat hypothyroidism. Regimens that include liothyronine (T3) have not been shown to be any more efficacious and run the risk of triggering atrial arrhythmias in susceptible individuals. Most adults require a full replacement dose of 0.8 mcg per pound of body weight. The major concern in elderly patients with known or suspected cardiovascular disease is to avoid exacerbating underlying conditions. Levothyroxine should be started at a low dose of 12.5-25 mcg daily. If this dose does not provoke ischemic symptoms or an atrial arrhythmia, it can be increased in 25 mcg increment at 4-week intervals. Patients who develop hypothyroidism after treatment of hyperthyroidism can be treated with full replacement doses from the outset. Agents

that may block absorption of levothyroxine include iron sulfate, bile acid resins, sucralfate, and supplemental forms of calcium. Doses should be separated from ingestion of these agents by at least 4 hours. Higher than anticipated doses may be required in patients treated with other agents that increase metabolism of levothyroxine including phenytoin, phenobarbital, carbamazepine, and rifampin. Appropriate treatment of subclinical hypothyroidism is open to debate. Many clinicians feel that treatment is indicated with any confirmed and unexplained elevation of TSH above normal, and there is consensus that replacement T4 should be given if a TSH level is > 10uU/ml.

FOLLOW-UP

When treating primary hypothyroidism, a TSH level should be checked 6 weeks after starting a dose or 4 weeks after changing a dose of levothyroxine. Doses should be adjusted to maintain a TSH level within the reference range. Maintenance of a slightly elevated TSH level may be acceptable in cases where treatment to a full replacement dose triggers ischemic symptoms or atrial arrhythmias. When treating central hypothyroidism, doses should be adjusted to maintain a free T4 level in the upper half of the reference range. The TSH level is unreliable in this setting and should not be used to guide treatment.

GUIDELINES

American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the Evaluation and Treatment of Hyperthyroidism and Hypothyroidism https://www.aace.com/sites/default/files/hypo_hyper.pdf

REFERENCES

Kim MI. Hypothyroidism in the Elderly. In: De Groot LJ, Chrousos G, Dungan K, Feingold KR, Grossman A, Hershman JM, Koch C, Korbonits M, McLachlan R, New M, Purnell J, Rebar R, Singer F, Vinik A, editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-2017 Mar 15. PMID: 25905236

Feldt-Rasmussen U. Treatment of hypothyroidism in elderly patients and in patients with cardiac disease. Thyroid. 2007 Jul;17(7):619-24. PMID: 17696830

Wiersinga WM. Adult Hypothyroidism. In: De Groot LJ, Chrousos G, Dungan K, Feingold KR, Grossman A, Hershman JM, Koch C, Korbonits M, McLachlan R, New M, Purnell J, Rebar R, Singer F, Vinik A, editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-2014 Mar 28. PMID: 25905416

Wiersinga WM. Myxedema and Coma (Severe Hypothyroidism). In: De Groot LJ, Chrousos G, Dungan K, Feingold KR, Grossman A, Hershman JM, Koch C, Korbonits M, McLachlan R, New M, Purnell J, Rebar R, Singer F, Vinik A, editors.

Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-2015 Apr 12.
PMID: 25905238