Hypothyroidism is a common condition with an insidious onset. The mean incidence is 3.5 per 1000 in women, and 0.6 per 1000 in men. The probability of developing hypothyroidism increases with age and reaches 14 per 1000 in women aged between 75 and 80 years. Lab values are indicative in about 5% of adults and 15% of older women (5-8 times more common than in men). Subclinical hypothyroidism is similar in frequency (normal serum free T4 levels with slightly elevated serum TSH concentration). Subclinical hypothyroidism can occur in up to 4-10% of adults. These numbers of prevalence would lead one to believe that routine screening is useful and common and supported.\(^1\)\(^2\)\(^3\) Surveys indicate that a large number of patients with thyroid disease use complementary and alternative medicine (CAM).\(^4\) Many patients use CAM to treat side effects of hypothyroidism (e.g. weight gain, constipation, fatigue, dry skin).\(^5\)

In fact, routine screening for thyroid disease in adults where there is no relevant finding or symptom is controversial. There were no found clinical trials evaluating the effectiveness of screening for hypothyroidism. Some groups (the American Academy of Family Physicians (AAFP), the American Association of Clinical Endocrinologists (AACE), and the American College of Physicians (ACP)] recommend periodic assessment in older women. The American Thyroid Association’s (ATA) guidelines recommend measuring TSH starting at age 35 (in both men and women) and then every 5 years thereafter. The United States Preventive Services Task Force (USPSTF) and the Institute of Medicine (IOM) do not recommend routine screening for thyroid disease in children or adults. A clinical consensus group also recommends against screening except in “aggressive” clinical cases in women 60 years or older and other high risk populations for thyroid dysfunction (those with a personal history of type 1 diabetes or other autoimmune disease, or a family history of thyroid disease).\(^6\)\(^7\)\(^8\)\(^9\)\(^10\)\(^11\)\(^12\)\(^13\)

There is a broad clinical spectrum of hypothyroidism. Many of the common symptoms of thyroid hormone deficiency, such as fatigue, cold intolerance, weight gain, constipation, myalgia, and menstrual irregularities, are also prevalent among those without thyroid dysfunction. The lethargic, myxedematous patient with severe hypothyroidism is a familiar inhabitant of medical textbooks but is rarely seen in today’s clinics. In contrast, physicians frequently encounter patients with a more mild thyroid dysfunction. Unlike patients with overt
hypothyroidism, these patients can have normal serum levels of thyroxine (T4) and triiodothyronine (T3) and only mildly elevated serum thyrotropin (TSH) levels. They may also have a normal TSH with some changes in T4 and/or T3. Such patients are often identified through routine screening or in the course of an evaluation of common nonspecific symptoms such as hypercholesterolemia.

**Pathophysiology**

Decreased thyroid hormone production is the most common cause of hypothyroidism. T4, a prohormone, is usually converted to T3, the active form of thyroid hormone, in the peripheral tissues. Early in the disease process, compensatory mechanisms maintain normal T3 levels. Decreased production of T4 eventually causes an increase in the secretion of TSH by the pituitary gland. TSH stimulates hypertrophy and hyperplasia of the thyroid gland. The thyroid then usually responds by releasing more T3.

All metabolically active cells require thyroid hormone, so deficiency of the thyroid hormone has a wide range of effects on the body due to either derangements in metabolic processes or direct effects by myxedematous infiltration (i.e., accumulation of glucosaminoglycans in the tissues). These changes range from decreased contractility of the heart, to infertility, to insulin resistance.

**Differential Diagnoses (DDX)**

Partial list includes: Addison’s disease, Depression, Fibromyalgia, Infectious Mononucleosis, Iodine Deficiency, Menopause, pituitary macroadenomas.

**Subjective Findings and History**

History may include the past treatment of hyperthyroidism with radioiodine or thyroidectomy, the use of drugs that affect thyroid hormone synthesis, or prior cranial irradiation suggesting a central cause of hypothyroidism. Women with a recent history of pregnancy may also be at a higher risk. Hypothyroidism during pregnancy should be referred to an experienced endocrinologist or OB/GYN.

Subjective complaints are varied and can occur concomitantly: fatigue, low body temperature, menstrual disorders, depression, dull facies, hoarseness, edema, cold intolerance, coarse dry or thinning hair, scaly, dry thick skin, depression, weight gain, paresthesias, constipation, intellectual impairment in earlier stages, dysphagia. The patient may develop into frank psychosis, bradycardia, macroglossia, pleural or abdominal effusion, anemia, and myxedema coma in rare cases. Onset is slow and insidious in most cases, and symptoms are variable. If secondary or tertiary hypothyroidism exists, you may see symptoms of other hormone deficiencies or symptoms of hypothalamic or pituitary disease. Further testing or referral is warranted. Many who are hypothyroid have a goiter, but not all who have a goiter and circulating antithyroid antibodies have hypothyroidism.

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Hypothyroidism Clinical Pathway
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Objective Findings

- Reflexes often show brisk contraction time and slow relaxation time.
- Skin and hair may be coarse and dry. Thinning hair. Decreased sweating.
- Low basal body temperature and bradycardia may be present.
- Objective findings in early cases may be non-specific.

Examination

Full physical examination (PE), including cardiovascular (CV) assessment, vitals, skin and hair exam, deep tendon reflexes (DTRs), pulmonary assessment, abdominal exam, basal body temperature, and thyroid palpation. Neck ultrasound and fine needle aspiration (biopsy) to examine nodules as needed.

Labs

- Thyroid studies: T3RU, T4 and FTI or Free T4; consider thyroid antibody testing if Hashimoto’s is suspected (antimicrosomal, antithyroid peroxidase (anti-TPO), antithyroglobulin antibodies). Hashimoto’s thyroiditis (autoimmune thyroiditis) is a specific form of hypothyroidism and may include symptoms of a feeling of fullness in the throat, painless thyroid enlargement, sore throat, neck pain, and a low-grade fever.
- TSH to differentiate primary from secondary (primary thyroid disease accounts for over 95 percent of cases of hypothyroidism): most sensitive test. In 2003, the American Association of Clinical Endocrinologists (AACE) changed the recommended TSH normal value to a narrower range of .3-3.0.mIU/L. National Academy of Clinical Biochemistry argues that the upper limit of normal of the euthyroid reference range should be reduced to 2.5 mU/L. Most laboratories use normal values of about 4.5 to 5.0 mU/L.
- Consider referral for TRH or TSH stimulation testing if unable to rule out tertiary hypothyroidism.
- Consider radioactive iodine (RAI) testing referral with nodular goiter.
- Consider reverse T3 testing with subclinical hypothyroidism features and normal thyroid studies.
- Lipid panel/profile. Hyperlipidemia occurs with increased frequency in hypothyroidism and if this is picked up on routine lab testing, the patient should be tested for thyroid dysfunction.
- Comprehensive metabolic panel (CMP) to check for hyponatremia, which can result from inappropriate production of antidiuretic hormone (ADH).

Plan

Normalize thyroid function (restoration to euthyroid state) and reduce symptoms. In most patients, hypothyroidism is a permanent condition requiring lifelong treatment. In patients with a goiter, a goal is also to reduce the size of the goiter.
Supplement with thyroid hormone when indicated (T3, T4, or combination) on an empty stomach and away from other medications. Monitor dosing to avoid switch to hyperthyroidism, which can increase risk of atrial fibrillation and accelerated bone loss.

_Nutritional:_
Assess diet, avoiding goitrogens; consider iodine supplementation (kelp), omega fatty acids. Limit soy isoflavones in patients who are not euthyroid. Limit gluten if sensitivity. Supplements to consider: vitamins to support thyroid function, selenium, zinc, folate, tyrosine, vitamin B complex, vitamin C, vitamin E, iodine

_Glandulars:_
Use those with thyroid to nourish gland. Some commercially available thyroid supplements contain unregulated doses of hormone. Doses should be monitored to avoid unintended iatrogenic thyrotoxicosis.

_Botanicals:_
Use to support thyroid function and restore trace minerals; to reduce swelling of a goiter if present (consider _Withania somnifera_ (Ashwagandha), plant sterols for autoimmune disease (Hashimoto’s), _Coleus forskohlii_.

_Homeopathic:_
Appropriate homeopathic remedy.

_Physical Medicine:_
Hydrotherapy, diathermy, manipulation

_Pharmaceuticals:_
USP thyroid or synthetic T3 (levothyroxine) or T4 (thyroxine) as indicated. Conversion tables are available from compounding pharmacies. All hormone supplementation to be monitored with laboratory assessment routinely. Labs should be monitored every three months until desired levels are attained, then once per year as long as patient is on the hormones. Dosages must be started slowly and carefully increased based on laboratory values.

**Length of Treatment**
Patient and condition dependent. Once hormone replacement is instituted it is often lifelong. Evaluation of therapy annual once dose established.

**Resources for Clinicians**
American Thyroid Association (ATA). Guidelines for the treatment of hypothyroidism. Prepared by the American Thyroid Association Task Force on Thyroid Hormone Replacement
http://www.thyroid.org/thyroid-guidelines/hypothyroidism2014/

American Association of Clinical Endocrinologists (AACE) and American Thyroid Association

Resources for Patients
The American Thyroid Association is a professional society of physicians and scientists who specialize in thyroid diseases. The Association is dedicated to promoting scientific and public understanding of the thyroid gland and its disorders, to improve methods for prevention, diagnosis, and management.
http://www.thyroid.org/patients/

MedlinePlus will direct you to information to help answer health questions. MedlinePlus brings together authoritative information from NLM, the National Institutes of Health (NIH), and other government agencies and health-related organizations.

Clinical Pathway Feedback
CHP desires to keep our clinical pathways customarily updated. If you wish to provide additional input, please click on the email address listed below and identify which clinical pathway you are referencing. Thank you for taking the time to give us your comments.

Clinical Services Department: providers@chpgroup.com


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