Chapter 2

Management of Hypothyroidism: Some New Aspects

Samia Perwaiz Khan*

Ziauddin University, Pakistan

*Corresponding Author: Samia Perwaiz Khan, Ziauddin University, Karachi, Pakistan, Tel: 0992-3334455724; Email: samiaperwaiz@hotmail.com

First Published May 08, 2016

Copyright: © 2016 Samia Perwaiz Khan

This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source.

Abbreviations

TSH-Thyroid Stimulating Hormone; fT4-Free Thyroxine; CHD-Coronary Heart Disease; GP-General Practitioner

Introduction

Hypothyroidism is a clinical syndrome caused by cellular response to insufficient thyroid hormones and raised TSH levels. Symptoms of this condition are cold intolerance, constipation, fatigue, weight gain, dry skin, goiter and even depression.

This is more common in females. 10 to 20% of women over 50 years of age have subclinical hypothyroidism (T4 normal and TSH increased). Also in pregnant women there is high risk of fetus developing hypothyroidism if mother has it. Primary causes are inadequate thyroid hormone, post surgical (thyroidectomy or 131I therapy) or autoimmune (Hashimotos thyroiditis), goitrogenic drugs. Secondary cause can be due to insufficient TSH. Treatment is with levothyroxin. Test of TSH to adjust the dose and than regular follow-up with TSH every year with the physician.

To avoid development of complications due to hypothyroidism in addition to levothyroxin (dosage adjustment according to weight and age), exercise, stress reducing therapy and diet which is rich in iodine should be regularly used as this is a lifelong condition and if managed appropriately can prevent the development of com-
Complications such as myxedema and serious cardiovascular diseases.

Hypothyroidism occurs when the thyroid gland does not produce enough hormones. This can happen after the surgical removal of the thyroid gland. This occurs in stress or simply if the thyroid gland is tired of working and is not functioning well. If these hormones are not produced adequately. It causes obesity, joint pain, infertility and heart diseases [1,5].

Infants may be born with congenital hypothyroidism.

Having hypothyroidism can make you feel exhausted and sluggish, and it can make it difficult to concentrate, even when you are taking levothyroxine (a type of thyroid hormone replacement therapy and the most common treatment for hypothyroidism).

Hypothyroidism is evaluated and diagnosed by a physician; usually an endocrinologist or primary care doctor. Signs, symptoms and several factors are taken into consideration when hypothyroidism is diagnosed all of which assist to identify the cause and severity of the disease. A diagnosis is reached after a thorough review of the patient’s symptoms, medical and family history, risk factors, physical examination and most accurate is a blood test. There are several types of blood tests the most definitive one is called the TSH test (thyroid-stimulating hormone). However, in some cases, physicians may refer to the free thyroxine or T4, free T4 index, or total T4 to help in the diagnosis [1,5].

Treatment for hypothyroidism involves daily use of the synthetic thyroid hormone levothyroxine (Levothroid, Synthroid, others). This oral medication provides adequate hormone levels, reversing the signs and symptoms of hypothyroidism.

Within a few weeks after starting treatment, one feels less fatigued. The medication also gradually lowers cholesterol levels elevated by the disease and may reverse any weight gain. Treatment with levothyroxine is usually lifelong, but because the dosage may need to be changed, doctor is likely to check TSH level every year.

**Diagnosis**

Many of the symptoms of hypothyroidism are fairly common complaints found in people with a normally functioning thyroid gland, so it can be hard to identify that symptoms are related to the thyroid. One of the best ways to figure out if symptoms could be related to a thyroid condition is to consider how long you have been experiencing them. For example, have she/he always felt cold when others were warm? When did she/he start to notice decreased energy? If person is starting to notice new signs and symptoms, it could be related to a thyroid issue. However, only a physician (eg, endocrinologist) can diagnose a thyroid problem.
Family and Medical History

It is important to give the physician as many details as possible about personal medical history, as well as family history (eg, mother had hypothyroidism). Be sure to discuss: Your general state of health, particularly any changes you have noticed in your general overall health. Family’s health history, especially if a close relative has been diagnosed with hypothyroidism (or any other thyroid-related issues). Whether there is any past history of thyroid surgery, or radiation of neck to treat cancer. Any medicines may be taking that could cause hypothyroidism (eg, amiodarone, lithium, interferon alpha, interleukin-2, or cancer chemotherapy).

Physical Examination

Physician performs a thorough examination and look for physical signs of hypothyroidism, including: Evidence of dry skin, swelling around the eyes/legs, slower reflexes and slower heart rate [1].

Blood Tests

Hypothyroidism can be detected by different blood tests, TSH Test. Thyroid-stimulating hormone or TSH is a blood test that measures the amount of T4 (thyroxine) that the thyroid is being signaled to make. Abnormally high level of TSH, could be due to hypothyroidism.

T4 (thyroxine) Test: The thyroid gland produces T4 (thyroxine). The free T4 and the free T4 index are blood tests that, in combination with a TSH test, can let your physician know how your thyroid is functioning.

Hypothyroidism can often be diagnosed with a simple blood test. In some persons, however, it is not so simple and more detailed tests are needed. Most importantly, a good relationship with a good endocrinologist will almost surely be needed.

Hypothyroidism is completely treatable in many patients simply by taking a small pill once a day. However, this is a simplified statement, and it's not always so easy. There are several types of thyroid hormone preparations and one type of medicine will not be the best therapy for all patients. Many factors will go into the treatment of hypothyroidism and it is different for everybody.

The idea is to measure blood levels of T4 and TSH. In the typical person with an under-active thyroid gland, the blood level of T4 (the main thyroid hormone) will be low, while the TSH level will be high. This means that the thyroid is not making enough hormone and the pituitary recognizes it and is responding appropriately by making more Thyroid Stimulating Hormone (TSH) in an attempt to force more hormone production out of the thyroid. In the more rare case of hypothyroidism due to pituitary failure, the thyroid hormone T4 will be low, but the TSH level
will also be low. The thyroid is behaving appropriately under these conditions because it can only make hormone in response to TSH signals from the pituitary. Since the pituitary is not making enough TSH, then the thyroid will never make enough T4. The real question in this situation is what is wrong with the pituitary? But in the typical and most common form of hypothyroidism, the main thyroid hormone T4 is low, and the TSH level is high.

When TSH is it too low, and when is it too high? Blood levels have normal ranges, but other factors need to be taken into account as well, such as the presence or absence of symptoms. You should discuss your levels with your doctor so you can interpret how they are helping (or not?) fix your problems. Although majority of individuals with hypothyroidism will be easily diagnosed with these simple blood tests, many millions will have this disease in mild to moderate forms which are more difficult to diagnose. The solution for these people is more complex and this is due to several factors. First we must realize that not all patients with hypothyroidism are the same. There are many degrees of this disease from very severe to very mild. Additionally, and very importantly, we cannot always predict just how bad (or good) an individual patient will feel just by examining his/her thyroid hormone levels. In other words, some patients with very “mild” deviations in their thyroid laboratory test results will feel just fine while others will be quite symptomatic. The degree of thyroid hormone abnormalities often, but not always will correlate with the degree of symptoms. It is important for both you and your physician to keep this in mind since the goal is not necessarily to make the lab tests go into the normal range, but to make you feel better as well! We must also keep in mind that even the “normal” thyroid hormone levels in the blood have a fairly large range, so even if a patient is in the “normal” range, it may not be the normal level for them.

For the majority of patients with hypothyroidism, taking some form of thyroid hormone replacement (synthetic or natural) will make the “thyroid function tests” return to the normal range, and this is accompanied by a general improvement in symptoms making the patient feel better. This does not happen to all individuals, however, and for these patients it is very necessary to get a good doctor. Because most patients will be improved (or made completely better) when sufficient thyroid hormone is provided on a daily basis to make the hormone levels in the blood come into the normal range, physicians will often will rely on test results to determine when a patient is on the appropriate dose and therefore doing well. Remember, these tests have a wide normal range. Find a doctor who helps make you feel better, not just make your labs better because once given this diagnosis, you are likely to carry it for a long, long time [1-5].
Subclinical Hypothyroidism

Is defined as elevated levels of thyroid-stimulating hormone (TSH) with normal levels of free thyroxine (fT4), while controversies exist on the limits of the TSH reference range. The prevalence of subclinical hypothyroidism is large and ranges between 3% and 18% in the adult population, with women, elderly persons, and iodine sufficient populations being affected more often. An international survey has demonstrated that 94% of the general practitioners (GPs) have diagnosed subclinical hypothyroidism in a patient during the past year.

Despite the large prevalence, evidence on screening and the benefits and risks of treatment is still controversial.

The most common cause of subclinical hypothyroidism is chronic autoimmune thyroiditis associated with antithyroid peroxidase antibodies (Hashimoto's thyroiditis). Individuals with subclinical hypothyroidism are often asymptomatic, but clinical manifestations can include non-specific complaints or symptoms similar to those seen in overt hypothyroidism, such as fatigue, weakness, weight gain, cold intolerance, and constipation. Adverse clinical effects of overt thyroid disorders are well known, and given the multiple actions of thyroid hormones on the heart, the vessels, bones and brain, long-term adverse outcomes could be suspected even in subclinical dysfunction.

An overview of the level of evidence on the association between subclinical hypothyroidism and various clinical conditions. With the aim to assess current evidence on the clinical aspects of subclinical hypothyroidism as well as the risks and benefits of its screening and treatment, a narrative review was performed based upon already conducted systematic reviews and other recently published nonsystematic reviews, with additional information retrieved from systematic reviews on risks of subclinical hypothyroidism. The evidence has been updated by a Pubmed search on the risks and treatment of subclinical hypothyroidism as mentioned in next section.

Subclinical Hypothyroidism and Cardiovascular Diseases

Thyroid hormones are well known to act on the heart and vasculature, and the impact of subclinical thyroid dysfunction on the cardiovascular system has been an important topic of research in recent years. Subclinical hypothyroidism can lead to impaired systolic and diastolic cardiac function as well as vascular dysfunction with increased vascular stiffness and endothelial dysfunction. A pooled analysis of individual participant data has found an increase in heart failure events in individuals with a TSH of 10mIU/l and higher compared to euthyroid controls. Subclinical hypothyroidism has also been associated with an increased risk of fatal and non-fatal coronary heart disease (CHD) events.
Risks were not increased for participants with TSH levels greater than 7mIU/l, and there was a significant trend for the risk of CHD events and mortality at higher TSH levels. The increased cardiovascular risk that is primarily observed with TSH levels of 10mIU/l and above can be explained by several mechanisms. TSH has known effects on the endocrine system, and studies have shown elevated total cholesterol and a higher prevalence of dyslipidaemia in individuals with subclinical hypothyroidism [2,3].

A systematic review including 13 heterogeneous studies concluded that thyroxine treatment leads to a reduction in serum total cholesterol and LDL cholesterol in persons with subclinical hypothyroidism. Evidence on the association of subclinical hypothyroidism with increased blood pressure is controversial.

In a cross-sectional study, Liu et al. found an increased blood pressure in these individuals. Other possible explanations for the increased cardiovascular risk in persons with subclinical hypothyroidism include increased carotid intima-media thickness, hypercoagulability, insulin resistance, oxidative stress, and endothelial dysfunction. A reduction in carotid intima-media thickness and improvement of brachial artery endothelial function following thyroxine replacement has been seen in individuals with subclinical hypothyroidism [5].

**Neuropsychiatric Disorders**

An association between subclinical hypothyroidism and mood disorders including depression and increased anxiety, as well as a reduced quality of life have been suggested. Treatment failure for depression has been more commonly observed in patients with subclinical hypothyroidism [5].

**Subclinical Hypothyroidism and Pregnancy**

For pregnant women, lower trimester-specific TSH reference ranges should be used due to the changes in thyroid physiology during pregnancy. Thyroid hormones are crucial for the normal foetal maturation and brain development and the foetus relies on placental passage of maternal thyroid hormones during the first trimester of pregnancy due to the immaturity of the foetal thyroid gland and the consecutive inability to produce sufficient thyroid hormones. Foetal consequences of maternal overt hypothyroidism including perinatal morbidity and mortality. Neurological impairment are widely known, and subclinical hypothyroidism has also been associated with adverse outcomes during pregnancy. Subclinical hypothyroidism affects 0.5% to 2.5% of women during reproductive age and can lead to higher rates of placental abruption, pregnancy loss, gestational hypertension and severe preeclampsia [5].
Musculoskeletal System and Functional Capacity

Persons with subclinical hypothyroidism more often suffer from weakness and myalgia, and reduced muscle strength has been shown in these individuals. Confirming this hypothesis, beneficial effects of levothyroxine replacement on strength measurements and cardiopulmonary exercise performance have been demonstrated. A possible mechanism for the lower exercise capacity could be higher oxygen requirements during exercise in people with subclinical hypothyroidism as well.

Chronic Stress and Thyroid Health

While there is no proof that stress causes most thyroid problems, it may play a factor. We deal with stress every day of our lives. Whether we are in rush hour traffic or facing an important work deadline, our stress levels are sometimes out of control. Can that be bad news for our thyroid a delicate gland that can sense when our bodies are burdened with stress.

Stress may exacerbate an underlying thyroid condition. For example, say hypothyroidism runs in your family. Under stress, your body releases the hormone cortisol. Too much cortisol can interfere with thyroid hormone production: It can stimulate the thyroid to work harder to create sufficient amounts of thyroid hormone.

Also, when stressed makes you more vulnerable to autoimmune thyroid conditions (eg, Hashimoto’s thyroiditis). A 2004 study in the journal Thyroid found that stress is one of the environmental factors for thyroid autoimmunity.

Feeling tired, having mood changes and gaining weight, does that mean you are stressed, or do you have hypothyroidism? These are symptoms of both stress and hypothyroidism, so consult a doctor to rule out hypothyroidism (an underactive thyroid). And know that these things can feed each other stress can aggravate hypothyroidism and you can be stressed because of the hypothyroidism symptoms.

Manage Stress

You can treat most thyroid conditions with medication, but unfortunately, there’s no pill to banish stress. Instead, the goal is to manage your stress by getting your body especially the thyroid back in balance. You can do this by making little lifestyle changes that have major impacts. Start by trying a mind-body therapy, such as yoga or meditation. These techniques can help you focus on your breathing and more importantly, slow down.

Exercise Makes a Big Difference

To overcome stress and boost your thyroid health work out when you can. Cardiovascular, strengthening, and flexibility exercises are all good ways to shape up and
de-stress. When you exercise, your body releases feel good hormones, such as endorphins, which can put you in a good mood the rest of the day.

**Sleep to Keep Everyday Stress in Check**

Getting enough sleep gives your body a chance to recover from a hard day’s work and rejuvenates you so that you’re able to take on your stressors the next day.

**Dangers of Hypothyroidism**

Because the body is expecting a certain amount of thyroid hormone the pituitary will make additional thyroid stimulating hormone (TSH) in an attempt to entice the thyroid to produce more hormone. This constant bombardment with high levels of TSH may cause the thyroid gland to become enlarged and form a goiter (termed a “compensatory goiter”).

Left untreated, the symptoms of hypothyroidism will usually progress. Rarely, complications can result in severe life-threatening depression, heart failure, or coma.

**Treatment of Hypothyroidism**

The easiest and most effective treatment is simply taking a thyroid hormone pill (Levothyroxine) once a day, preferably in the morning a hour or so before breakfast. This medication is a pure synthetic form of T4 which is made in a laboratory to be an exact replacement for the T4 that the human thyroid gland normally secretes. It comes in multiple strengths, which means that an appropriate dosage can almost always be found for each patient.

The dosage should be re-evaluated and possibly adjusted monthly until the proper level is established. The dose should then be re-evaluated at least once a year. If you are on this medication, make sure your physician knows it so he/she can check the levels at least annually. However, this simple approach does not hold true for everybody. Occasionally the correct dosage is a bit difficult to pin-point and therefore you may need a physical examination and blood tests more frequently. Also, some patients just do not do well on some thyroid medications and will be quite happy on another. For these reasons consult your doctor your blood hormone tests, symptoms, how you feel, and the type of medicine you are taking. The goal is to make you feel better, make your body last longer, slow down the risk of developing heart disease and osteoporosis...in addition to making your blood levels of TSH normal.

Some patients will notice a slight reduction in symptoms within 1 to 2 weeks, but the full metabolic response to thyroid hormone therapy is often delayed for a month or two before the patient feels completely normal. It is important that the correct amount of thyroid hormone is used. Not enough and the patient may have continued fatigue or some of the other symptoms of hypothyroidism. Too high a dose could cause symptoms of nervousness, palpitations or insomnia typical of hyperthyroidism.
Some recent studies have suggested that too much thyroid hormone may cause increased calcium loss from bone increasing the patient's risk for osteoporosis. For patients with heart conditions or diseases, an optimal thyroid dose is particularly important. Even a slight excess may increase the patient's risk for heart attack or worsen angina. Some physicians feel that more frequent dose checks and blood hormone levels are appropriate in these patients.

After about one month of treatment, hormone levels are measured in the blood to establish whether the dose of thyroid hormone which the patient is taking is appropriate. We don't want too much given or subtle symptoms of hyperthyroidism could ensue, and too little would not alleviate the symptoms completely. Often blood samples are also checked to see if there are antibodies against the thyroid, a sign of autoimmune thyroiditis. Remember, this is the most common cause of hypothyroidism. Once treatment for hypothyroidism has been started, it typically will continue for the patient's life. Therefore, it is of great importance that the diagnosis be firmly established and you have a good relationship with a physician you like and trust.

Synthetic T4 can be safely taken with most other medications. Patients taking cholestyramine (a compound used to lower blood cholesterol) or certain medications for seizures should check with their physician about potential interactions. Women taking T4 who become pregnant should feel confident that the medication is exactly what their own thyroid gland would otherwise make. However, they should check with their physician since the T4 dose may have to be adjusted during pregnancy (usually more hormone is needed to meet the increased demands of the mother's new increased metabolism). There are other potential problems with other drugs including iron-containing vitamins. Once again, pregnant women (and all women and men for that matter) taking iron supplements should discuss this with your physician. There are three brand name Levothyroxine tablets now available. You may want to consult with your physician or pharmacist on the most cost effective brand since recent studies suggest that none is better than the other.

**Determining Proper Dosage**

It may take time, to determine the right dosage of levothyroxine. Initially doctor generally checks level of TSH after two to three months. Excessive amounts of the hormone can cause side effects, such as increased appetite, insomnia, heart palpitations and shakiness.

If hypothyroid patient has coronary artery disease or severe hypothyroidism, doctor may start treatment with a smaller amount of medication and gradually increase the dosage. Progressive hormone replacement allows heart to adjust to the increase in metabolism. Levothyroxine causes virtually no side effects when used in the appropriate dose and is relatively inexpensive. If there is change brands, let your doctor know to ensure you are still receiving the right dosage. Hypothyroid patients should not skip doses or stop taking the drug because you're feeling better.
If drug is stopped, the symptoms of hypothyroidism will gradually return.

Proper absorption of levothyroxine, certain medications, supplements and even some foods may affect ability to absorb levothyroxine. Talk to your doctor if you eat large amounts of soy products or a high-fiber diet or you take other medications, such as: Iron supplements or multivitamins that contain iron, Cholestyramine, Aluminum hydroxide, which is found in some antacids or Calcium supplements.

**Hypothyroidism Diet**

The thyroid gland is a major organ in the human body that is responsible for the production of hormones necessary in regulating metabolism. If such processes are interrupted, it can cause hypothyroidism.

**Effects of a Good Hypothyroidism Diet**

Diagnosed with Hypothyroidism may sound horrible, but you could be in it for life. This means you will need to change your diet and lifestyle entirely. There must be a conscious and consistent plan for your everyday intake of food to prevent flares of symptoms that could disrupt your everyday routine. If you adhere strongly to your diet plan, then there should not be any worries about symptom attacks later on.

**Good Foods for Hypothyroidism**

Foods that are rich in iodine are highly recommended in the struggle to ward off hypothyroidism. Below is a categorized list of good food sources.

**Iodine for Hypothyroidism**

The thyroid gland needs iodine, therefore if you have an underactive thyroid gland you should increase the iodine intake in your diet. A well-balanced diet that includes iodine can help in alleviating the symptoms that you encounter with your condition. With the simplest intake of the foods mentioned above, you can greatly assist your thyroid in keeping up with your body’s metabolism.

Iodine-rich foods for hypothyroidism: iodized salt, seaweeds and sea foods, salt water fish, sushi, celtic sea salt are beneficial in hypothyroidism due to iodine deficiency [6].

**Selenium-Rich foods for Hypothyroidism**

Meat, Chicken, Salmon, Tuna, Whole unrefined grains, Brazil nuts, Dairy products garlic, Onions also useful food ingredients.

**Foods to Avoid for Hypothyroidism**

These foods must be avoided in order to prevent recurrence of hypothyroidism symptoms. Avoiding them will also prevent aggravating the already aggravated thyroid glands. Here is a list of foods to be avoided: cassava,
linseed kohlrabi, peanuts, kale, turnips, mustard greens, mustard.

**Conclusion**

As it may be a lifelong condition good management of Hypothyroidism is necessary to reduce symptoms of fatigue, lethargy, weight gain, depression and cardiovascular complications. It is most required to maintain the TSH and fT4 levels by adjusting proper dose of levothyroxine by consulting a physician (endocrinologist).

In addition by managing stress, regular exercise plan and appropriate diet rich in iodine and by avoiding goitrogenic foods helps in maintain thyroid hormone levels and avoid serious complications.

**References**


6. Hypothyroidism.com