WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 2, 435-443. Review Article ISSN 2277–7105

A REVIEW ARTICLE ON HYPOTHYROIDISM

Dr. Indu Mundel*[1], Dr. Ravi Sharma[2] and Dr. Kamlesh Kumar Sharma[3]

[1]M.D. Scholar, PG Department of Kayachikitsa, MMM Government Ayurveda College Udaipur (Raj).

[2]Prof. and HOD PG Department of Kayachikitsa MMM Government Ayurveda College Udaipur(Raj).

[3]Professor, PG Department of Samhita and Siddhant MMM Government Ayurveda College Udaipur (Raj).

Article Received on
25 Nov. 2024,

Revised on 16 Dec. 2024,
Published on 15 Jan. 2025

DOI: 10.20959/wjpr20252-35284

***Corresponding Author**
Dr. Indu Mundel
M.D. Scholar, PG Department of Kayachikitsa, MMM Government Ayurveda College Udaipur (Raj).

ABSTRACT

One clinical condition that primary care doctors frequently see is hypothyroidism. Infertility, dyslipidemia, hypertension, cognitive decline, and neuromuscular dysfunction can all be exacerbated by untreated hypothyroidism. An estimated one in three Americans suffers from hypothyroidism, according to data from the National Health and Nutrition Examination Survey. The prevalence is higher in females than in males, and it rises with age. Primary gland failure or insufficient pituitary or hypothalamic stimulation of the thyroid gland can also result in hypothyroidism. The most frequent cause of hypothyroidism in the US is autoimmune thyroid disease. Hypothyroidism can present with nonspecific, modest clinical signs, particularly in older adults. Serum thyroid-stimulating hormone testing is the most effective laboratory test for evaluating thyroid function. There is no proof that screening adults who don't have symptoms leads to better results. Oral administration of synthetic levothyroxine can alleviate symptoms in most people, and most patients will need lifelong treatment. It is not advised to use combination triiodothyronine/thyroxine therapy as it offers no benefits over thyroxine monotherapy. Among patients with subclinical hypothyroidism, those with raised thyroid peroxidase antibody titres and thyroid-stimulating hormone level above 10mlU/l are at higher risk of developing clinical illness and may be candidates for treatment.

KEYWORDS: Hypothyroidism, hypertension, Subclinical hypothyroidism.

INTRODUCTION

The prevalent medical disease known as hypothyroidism is caused by a lack of thyroid hormones. Death and severe negative health impacts are possible outcomes if treatment is not received. Due to the wide range of clinical presentation and overall lack of symptom specificity, hypothyroidism is primarily defined as a biochemical condition. Concentrations of thyroid-stimulating hormone (TSH) above the reference range and free thyroxine below the reference range are recognized as overt or clinical primary hypothyroidism. Free thyroxine levels within the normal range and TSH levels beyond the reference range are indicative of mild or subclinical hypothyroidism, which is frequently thought of as an early indication of thyroid failure.[1] Thyroxin (T4), triiodothyronine (T3), and calcitonin are hormones that are produced and secreted throughout the body by the thyroid. Under the hypothalamic-pituitary-thyroid axis, thyroid hormone is controlled. Anterior pituitary secretion of thyroid stimulating hormone (TSH) is triggered by the hypothalamus' tropic release of thyrotropin releasing hormone (TRH).[2]

TSH stimulates the thyroid and increases the production of thyroid hormones. TSH is stopped by the anterior pituitary through a negative feedback process when sufficient thyroid hormones are generated and emitted.[3]

Epidemiology

The National Health and Nutrition Examination Survey (NHANES III) study found the prevalence of overt hypothyroidism among individuals aged 12 years and older in the US to be 0.3% and subclinical hypothyroidism 4.3%. Female gender and increasing age are associated with a higher risk for thyroid-stimulating hormone (TSH) and an increased prevalence of antithyroid antibodies. Hypothyroidism is more prevalent in women with small stature at birth and low body mass index in childhood.[4]

Why hypothyroidism occurs

The thyroid itself is the source of 95% of hypothyroid episodes, which are categorized as primary hypothyroidism. A family history of thyroid illness or autoimmune conditions like type 1 diabetes enhance a person's risk of getting hypothyroidism. Thyroid hormone secretion is occasionally reduced as a result of issues in the pituitary and hypothalamus, two parts of the brain that regulate TSH release[5] Numerous factors can contribute to primary hypothyroidism, including:

Iodine consumption: The thyroid gland needs the right quantity of iodine to operate, and the most prevalent cause of Hypothyroidism is a global condition, yet excessive iodine consumption can also cause it.[6]

Autoimmune disease: In iodine-sufficient nations, autoimmunity—in which the immune system misidentifies the thyroid gland as a foreign object and assaults it—is the most frequent cause of hypothyroidism. Thyroid hormone production is lowered as a result.[7]

Medical or surgical intervention: In conditions like Graves' disease, nodular goiter, or thyroid cancer, radiation therapy and surgical excision of the thyroid, either entirely or in part, are frequently necessary. Thyroid function may be lost whole or partially as a result of this. Furthermore, other drugs, including interferon alpha, amiodarone, and lithium, can also result in hypothyroidism.[8]

Pregnancy: Pregnancy can cause hypothyroidism in certain persons. Hypothyroidism during pregnancy increases the risk of hypertension, early delivery, and pregnancy loss if therapy is not received. The final three months of pregnancy are marked by a marked increase in blood pressure due to preeclampsia. The growing fetus may potentially be adversely affected by hypothyroidism.[9]

Symptoms[10]

The symptoms of hypothyroidism depend on the severity of the condition. Problems tend to develop slowly, often over several years.

At first, you may barely notice the symptoms of hypothyroidism, such as fatigue and weight gain. Or you may think they are just part of getting older. But as your metabolism continues to slow, you may develop more-obvious problems.

Hypothyroidism symptoms may include

- Tiredness.
- More sensitivity to cold.
- Constipation.
- Dry skin.
- Weight gain.
- Puffy face.

- Hoarse voice.
- Coarse hair and skin.
- Muscle weakness.
- Muscle aches, tenderness and stiffness.
- Menstrual cycles that are heavier than usual or irregular.
- Thinning hair.
- Slowed heart rate, also called bradycardia.
- Depression.
- Memory problems.

EVALUATION

Hyperthyroid Diagnostic Studies

Most patients are evaluated for primary hypothyroidism using a serum TSH level. Elevated TSH and low free T4 levels are two hallmarks of hypothyroidism in the laboratory. TSH levels are higher and free T4 levels are within normal ranges in subclinical hypothyroidism. To check for autoimmune thyroid disorders, tests for antithyroid antibodies (such as thyroid peroxidase antibodies) should also be conducted. Overt hypothyroidism is more likely to occur in patients with thyroid peroxidase antibody positive and subclinical hypothyroidism. Within 20 years, 50% of these people will acquire primary hypothyroidism, according to studies. There are no guidelines, so clinical judgment is used to determine whether to do laboratory studies and clinical evaluations on a regular basis. Anemia, raised hepatic enzymes, elevated serum creatine kinase, and hyperlipidemia can also be found in laboratory tests of hypothyroidism patients.

There are two possible causes of central hypothyroidism: pituitary and hypothalamus. Free T4 should be used to diagnose central hypothyroidism instead of TSH since the TSH generated in these situations may be physiologically inactive and impact the levels of bioactive TSH. For hypothyroidism, imaging tests (such as neck ultrasonography) are not usually advised. TSH testing should only be performed on hospitalized patients if thyroid impairment is suspected. In hospitalized sick patients, mild TSH anomalies are symptomatic with euthyroid sick syndrome. However, hypothyroidism is likely if the TSH levels are extremely high. Although reverse T3 is not frequently measured in clinical practice, it is higher in patients with euthyroid illness.[11]

Guidelines for Screening for Hypothyroidism

The American Thyroid Association advises every five years, starting at age 35, to screen for thyroid illness, while there are no clear criteria for this process. Those who are at a high risk of developing hypothyroidism include:

- Women older than 60 years.
- Pregnant women
- Patients with a prior history of head and neck irradiation
- Patients with autoimmune disorders or type 1 diabetes
- Positive thyroid peroxidase antibodies
- Family history of thyroid disorders

Diagnosis by Differentiation Proceed to[12]

There is a long number of differential diagnoses because hypothyroidism has modest symptoms. Differential diagnosis is based on symptoms and indicators. For example, exhaustion may indicate rheumatological illnesses, depression, sleep apnea, or iron deficiency anemia. In the differential process, the following conditions might need to be taken into account.

- Euthyroid sick syndrome
- Goiter
- Myxedema coma
- Anemia
- Riedel thyroiditis
- Subacute thyroiditis
- Thyroid lymphoma
- Iodine deficiency
- Addison disease
- Chronic fatigue syndrome
- Depression
- Dysmenorrhea
- Erectile dysfunction
- Familial hypercholesterolemia
- Infertility

Risk factors[13]

Although anyone can develop hypothyroidism, you're at an increased risk if you:

Are a woman.

Have a family history of thyroid disease.

Have an autoimmune disease, such as type 1 diabetes or celiac disease.

Have received treatment for hyperthyroidism.

Received radiation to your neck or upper chest.

Have had thyroid surgery.

Complication[14]

Other health issues that might result from untreated hypothyroidism include:

Goitre: Hypothyroidism can result in to enlarge the thyroid gland. We term this ailment a goiter. A big goiter may make breathing or swallowing difficult.

Heart issues: Hypothyroid conditions can raise the risk of heart failure and heart disease. The main reason for this is that individuals with an underactive thyroid have a tendency to accumulate excessive amounts of the "bad" cholesterol, known as low-density lipoprotein (LDL) cholesterol.

Neuropathy's peripheral effects: If hypothyroidism is left untreated for an extended period of time, it can harm peripheral nerves. Information is transmitted from the brain and spinal cord to the rest of the body via these nerves. In the arms and legs, peripheral neuropathy can result in tingling, discomfort, and numbness.

Fertility: Fertility may be limited by ovulation disruption caused by low thyroid hormone levels. Autoimmune diseases, which are among the causes of hypothyroidism, can also impair fertility.

Birth defects. Untreated thyroid disease may increase the chance of birth abnormalities in children compared to children of moms without thyroid disease.

Untreated hypothyroidism at birth puts newborns at risk for major issues with their physical and mental development. However, the likelihood of normal development is very high if the issue is identified during the first few months of life.

Coma due to myxedema: This unique, life- Long-term hypothyroidism without therapy can result in a dangerous condition. Myxedema coma can be brought on by sedatives, infections, or other physical stressors. Excessive cold intolerance and drowsiness are among its symptoms, which are followed by excessive fatigue and coma. Medical intervention is necessary for myxedema coma.

TREATMENT

Replacing thyroxine (T4). For hypothyroidism, there is no cure. However, hypothyroidism is completely controllable in nearly all patients. To restore normal levels of T4 and TSH, the quantity of hormone that your own thyroid is unable to produce is replaced. Thus, T4 replacement can help your body function and restore thyroid hormone levels even if your thyroid gland isn't functioning properly. Synthetic thyroxine pills contain a hormone that is identical to the T4 produced by the thyroid gland. All hypothyroid patients can receive treatment as outpatients without needing to be admitted to the hospital, with the exception of those who have severe myxedema, a condition that can be fatal. Some patients may benefit from the addition of T3 (Cytomel) if they do not feel fully normal after taking a synthetic preparation of T4 alone.[15]

DISCUSSION

A common endocrine condition called hypothyroidism is brought on by insufficient thyroid hormone production and manifests as melancholy, weight gain, and exhaustion. Whereas autoimmune thyroiditis, especially Hashimoto's thyroiditis, is the most common cause in areas with adequate iodine, iodine insufficiency is the most common cause globally. Antibodies target thyroid cells in autoimmune hypothyroidism, causing dysfunction. Low levels of free T4 and increased thyroid-stimulating hormone (TSH) are the basis for the diagnosis. The usual course of treatment is levothyroxine, a synthetic T4 replacement that successfully restores hormone balance and reduces symptoms. However, because older adults and pregnant women are more likely to experience consequences like cardiovascular strain or premature birth, treatment needs to be tailored to each patient's needs. Even with successful therapy, there are always difficulties, especially when it comes to identifying subclinical hypothyroidism and treating some patients' chronic symptoms. Better diagnostic techniques, hereditary variables, and the possible advantages of T3 combination therapy are all being investigated in ongoing research.

CONCLUSION

Through the use of breathing and relaxation techniques that are useful in stress relaxation, regular yoga practice relaxes and lowers the symptoms in a fantastic sequence that increases excellent blood flow to the thyroid region.[16] The thyroid area responds well to natural therapies and diet. Deep inward awareness and a sense of profound relaxation are produced in the thyroid area by pranayama. Because they increase blood flow, which nourishes cells and supports the thyroid's correct function, asanas that compress and stretch the throat region are good for the thyroid and hypothyroidism.[17]

REFERENCES

1. Taylor, P. N., Albrecht, D., Scholz, A., Gutierrez-Buey, G., Lazarus, J. H., Dayan, C. M., & Okosieme, O. E. Global epidemiology of hyperthyroidism and hypothyroidism. Nature Reviews Endocrinology, 2018; 14(5): 301.
2. Zoeller, R. T., Tan, S. W., & Tyl. R. W. General background on the hypothalamic-pituitary-thyroid (HPT) axis. Critical reviews in toxicology, 2007; 37(1-2): 11-53.
3. Magner, J. A. Thyroid-stimulating hormone: biosynthesis, cell biology, and bioactivity. Endocrine reviews, 1990; 11(2): 354-385.
4. Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA, Braverman LE. Serum TSII, T(4), and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metab, Feb. 2002; 87(2): 489-99. [PubMed]
5. Feldt-Rasmussen U, Effraimidis G, Klose M. The hypothalamus-pituitary-Nasir, A. A., Ameh, E. A., & Ridout, A. Thyroid and Parathyroid Glands. Paediatric Surgey: A comprehensive text For Africa, Seattle, WA, USA. The global HELP organization, 2011; 261-269.
6. Alam Khan, V., Khan, M. A, & Akhtar, S. Thyroid disorders, etiology and prevalence. J Med Sci., 2002; 2(2): 89-94.
7. Ząbczyńska, M., Link-Lenczowski, P., Novokmet, M., Martin, T., Turek Jabricka, R., Trofimiuk Müldner, M., & Pocheć, E. Altered N-glycan profile of IgG-depleted serum proteins in Hashimoto's thyroiditis. Biochimica et Biophysica Acta (BBA)-General Subjects, 2020; 1864(3): 129464.
8. De Carvalho, G. A., Puz-Filbo, G., Junior, C. M., & Graf, H., Managemem of endocrine disease: pitfalls on the replacement therapy for primary and central hypothyroidism in adults. European journal of endocrinology, 2018; 178(6): R231-R244.

9. https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284
10. https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284
11. Garber JR, Cobin RH, Gharib H, Hennessey JV, Klein I, Mechanick JI, Pessah- Pollack R, Singer PA, Woeber KA., American Association Of Clinical Endocrinologists And American Thyroid Association Taskforce On Hypothyroidism In Adults. Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. Thyroid, Dec. 2012; 22(12): 1200-35. [PubMed]
12. Hennessey JV, Espaillat R. Current evidence for the treatment of hypothyroidism with levothyroxine/levotriiodothyronine combination. Therapy versus levothyroxine monotherapy. Int J Clin Pract. 2018 Feb; 72(2) IPMC free article] [PubMed]
13. https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284
14. https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284
15. https://www.thyroid.org/hypothyroidism/
16. Arem, R. The thyroid solution: A mind-body program for heating depression and regaining your emotional and Physical health Ballantine Books, 2000.
17. Devananda, S.V. The complete illustrated book of yoga. Harmony, 2011.