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Review Article

AYURVEDIC PERSPECTIVE OF SUBCLINICAL HYPOTHYROIDISM

Rajurkar H[1], Sharma S[2], Sharma M[2], Bhawane A[2]

1. Datta Meghe Ayurvedic Medical College Hospital & Research Centre, Nagpur, Maharashtra, India

2. Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical sciences, Sawangi, Wardha, Maharashtra, India

ABSTRACT
Thyroid gland is one of the important glands of the endocrine system and thyroid disorders are the most common disorders amongst the general population worldwide, as well as in india. Hypothyroidism is caused by inadequate function of the thyroid gland called as primary hypothyroidism or by insufficient stimulation by thyroid- stimulating hormones called as secondary hypothyroidism. Current view the thyroid gland is a butterfly shaped gland. It is located inferior to the larynx and anterior to the trachea. It has two lobes connected by the isthmus. It is made of microscopic spherical masses called follicles. A secretary substance is present in the follicle called colloid. Colloid is made of a glycoprotein called as thyroglobulin. Thyroglobulin produces thyroid hormones. They are triiodothyronine (t3), tetraiodothyronine (t4) and calcitonin. Ayurvedic perspective of subclinical hypothyroidism. Management of hypothyroidism with synthetic thyroid hormone derivatives may bring the value of tsh, t3 and t4 to normal range but the daily intake of medicine for lifetime, the known side-effects thereafter and increase in the dosage with time as the disease become chronic, is troublesome for the patients. Also the quality of life of the patients taking medicine regularly for long durations is compromised.

KEYWORDS: Triiodothyronine (T3), Tetraiodothyronine (T4) and Calcitonin.

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CORRESPONDENCE:
Rajurkar H* ✉ harshala_rajurkar@gmail.com
Address - Datta Meghe Ayurvedic Medical College Hospital & Research Centre, Nagpur, Maharashtra, India

INTRODUCTION
Thyroid gland is one of the important glands of the endocrine system and thyroid disorders are the most common disorders amongst the general population worldwide, as well as in India. Hypothyroidism is caused by inadequate function of the thyroid gland called as primary Hypothyroidism or by insufficient stimulation by thyroid-stimulating hormones called as secondary hypothyroidism.(1) The prevalence of hypothyroidism in the developed world is about 4-5%.(2) But in India, the prevalence of hypothyroidism is 11%, as compared to only 2% in the UK and 4.6% in the USA.(3) Based on status of thyroid hormones, it can be classified as Clinical Hypothyroidism and Subclinical Hypothyroidism.(1) Subclinical Hypothyroidism affects 3–15% of the adult population.(4)

Subclinical Hypothyroidism is defined as a state when TSH level is elevated or TSH level is greater than 4.5 mIU/L (in the range of 4.5-10 mIU/L) with a normal T4 and T3.(5) It is stated in a study that 80% of patients with Subclinical Hypothyroidism have a serum TSH less than10mIU/L.(6)

Generally, Levothyroxine which is only the replacement of the hormone is given to all the patients of Hypothyroidism irrespective of the serum TSH concentration level. The treatment should be different, depending upon whether the Serum TSH concentration is lower than10 mIU/L or higher than 10 mIU/L.

Hypothyroidism is a hypo metabolic clinical state resulting from decreased secretion of thyroid hormones.(7) The hypo metabolic state of Hypothyroidism can be explained as Mandagni mentioned in Ayurvedic texts.

Though, Endocrine disorders are not mentioned in Ayurvedic texts, it emphasizes on careful observation of symptoms and pathophysiology of the disease in terms of Dosha, Dhatu, Mala and Agni.(8) Considering Agnimandya as the root cause of all diseases, hypothyroidism is compared with Aam Dosha Lakshana due to Pitta Kshaya with Kapha Vata Vriddhi.

Aims & objectives
Ayurvedic Perspective of Subclinical Hypothyroidism

Observation and discussion
Current view The thyroid gland is a butterfly shaped gland. It is located inferior to the larynx and anterior to the trachea. It has two lobes connected by the isthmus. It is made of microscopic spherical masses called follicles. A secretary substance is present in the follicle called colloid. Colloid is made of a glycoprotein called as thyroglobulin. Thyroglobulin produces thyroid hormones. They are Triiodothyronine (T3), Tetraiodothyronine (T4) and Calcitonin.(9)

Functions of thyroid hormones are - it increases cellular metabolic activity, blood flow and cardiac output and rate and secretion of digestive juices. It stimulates carbohydrate, fat and protein metabolism. It regulates development and growth of nervous tissue and bones.[10] In gut there are two hormones which control the secretion of thyroid hormones. They are Cholecystokinin and Ghrelin.[11] Cholecystokinin is secreted from the endocrine cells of duodenum and Ghrelin is secreted by the oxyntic cells of stomach. The increased secretion of Cholecystokinin and Ghrelin results in the increased secretion of thyroid hormones.

Normal plasma levels of thyroid hormones. [12]

Thyroid-stimulating hormone (TSH) Normal test range for an adult: 0.40 - 4.50 mIU/L (milli-international units per liter of blood).

T4: Thyroxine Normal range for an adult: 5.0 – 10.0 ug/dL (micrograms per deciliter of blood).

T3: Triiodothyronine Normal range: 100 - 200 ng/dL (nanograms per deciliter of blood)

FT4: Free T4 or free thyroxin Normal test range for an adult: 0.9 - 1.7 ng/dL (nanograms per deciliter of blood)

FT3: Free T3 or free triiodothyronine Normal range: 2.3 - 4.1 pg/mL (picograms per milliliter of blood)

A state of Hypothyroidism could occur due to primary disease of the thyroid gland itself or lack of Pituitary TSH - Thyroid Stimulating Hormone or Hypothalamic TRH - Thyrotropine Releasing Hormone.[13]

Hypothyroidism is characterized by increase in level of TSH with either reduced T3 and T4 or normal T3 and T4. 14 Based on status of thyroid hormones, Hypothyroidism is classified as:

Clinical Hypothyroidism – Increased TSH with reduced T4 and T3

Subclinical Hypothyroidism – Increased TSH with normal T4 and T3

Signs and symptoms of Hypothyroidism [15]

At the initial stage, the signs and symptoms of Hypothyroidism are vague and ambiguous. Hence it is often missed in its early stages and instead treated for obesity, dryness, constipation, infertility, hyperlipidemia, depression etc. In primary stage the signs and symptoms are in general but later on affect the different systems of the body. Hence, Hypothyroidism is an important public health issue.[16]

The symptoms are tiredness, dry skin, hair loss, dyspnoea, constipation, hoarse voice, coldintolerance, impaired memory, menorrhagia or oligomenorrhea and weight gain with poor appetite.

The signs are myxedema, bradycardia, serous cavity effusions, delayed tendon reflex relaxation (Woltman's sign), ECG changes – sinus bradycardia, low voltage complex with ST wave abnormality.

Signs and symptoms of Sub Clinical Hypothyroidism

There are no obvious signs or symptoms seen or mild symptoms of hypothyroidism are present in some patients of Subclinical Hypothyroidism.[15]

Treatment

Generally, Levothyroxine is given to all the patients of Hypothyroidism irrespective of the serum TSH concentration level. Management of patients with a serum TSH level less than10mIU/L is controversial.[17] The treatment should be different, depending upon whether the serum TSH concentration is lower than10mIU/L or higher than 10mIU/L. A TSH level greater than 10mIU/L predicts a higher rate of progression and a level of less than 6mIU/L predict a lower rate of progression towards Overt Hypothyroidism. [4] So, the patients who have a TSH level that is constantly elevated above 10mIU/L should be treated immediately.[18] But the patients with TSH level below 10mIU/L can be given some other medicine. As the consequences of Subclinical thyroid disease (serum TSH 4.5-10.0 mIU/L) are minimal, they can be recommended against the routine treatment of Levothyroxine. [19]

Ayurvedic Perspective

Agni-Dushti and Aam formation

Agni is one of the unique and important concepts of Ayurveda and the digestion and assimilation of ingested food is performed by the Agni.[20] Agni is correlated with digestive fire and it is associated with activities of hormones, enzyme and co-enzymes which involve in digestive & metabolic functioning of the body.[21] Agni is considered as primary digestive fire present in koshtha and this Jatharagni performs Pakadi Karmas ordigestion. [22]

Agni transforms the food into energy which in turn performs the physiological functions of the body. Various chemical reactions occurring in the body are controlled by the Agni.

Agni offers Arogya, Ayu, Bala, Swasthyam, Varnam, Utsaha, Oja, Prabha and Teja to the body. All this contributes healthy physical and mental state of the body. [23]

Thirteen types of Agni, Bhutagni-5, Dhatwagni-7 and Jatharagni are mentioned in Ayurvedic texts.[24] Jatharagni is of prime importance among them, which control all other Agni. Agnimandya or Mandagni is the vitiated state of Agni, whenthe ingested food is not properly digested. Agnimandya leads to the formation of Aam –abnormal form of Rasa Dhatu.[25]

Mandagni is responsible for Dhatuvriddhi in the form of "Aam or Mala". Aam is produced in gut due to Jathargnimandya whereas Mala can be produced at tissue & cellular level due to Dhatwagnimandya. [26]

The Aam Dosha has tendency to attach with the Doshas - Vata, Pitta and Kapha and make them Saam or vitiated.

The Saam - Dosha Lakshanas. [27] Include obstruction of the channels, loss of strength, and feeling of heaviness in the body, lassitudeand loss of digestive power, more of expectoration, accumulation of wastes, anorexia and exhaustion.

Dosha - Dushti

In Charak Samhita, in Kiyantah Shiraseeya Adhyaya, different combinations of Dosha imbalance and their symptoms are explained in details. The Kapha - Vata Dosha Vriddhi or aggravation of Kapha-Vata Dosha and Pitta Dosha kshaya or Pitta in the state of diminution is described as follows.

When Pitta is in state of diminution, the Kapha together with Vata causes an unstable stiffness, cold, pain, heaviness, weakness of digestive power, dislike for food, trembling, pallor of nails and roughness in the body.[28]

Pitta kshaya leads to Agnimandya and Agnimandya in turn leads to Aam formation.

Agni is correlated with digestive fire and there is a close resemblance between the functions of thyroid hormones and Karma of Agni.

The Lakshanas of Aam are comparable with the clinical features of Hypothyroidism.

The Lakshanas of Dosha-Dushti or Pitta Kshaya andKaphaVata Vriddhi can also becompared with the clinical features of Hypothyroidism.

Thus it can be concluded that in Hypothyroidism there is basic defect of metabolism at tissue & cellular level, which is largely due to imbalance of various hormones circulating in the body. These hormones resemble Agni or Pitta in our body. It is well known fact that Agni & Pitta have similar physiological properties. Pitta contains essence of Agni in microform. So, Hypothyroidism is a clinical condition resulting due to Mandagni, which produce Aam Dosha. In short, Hypothyroidism can be termed as Aamdoshajanya Vyadhi. due to Pitta Kshaya.

Samprapti or pathogenesis

Samprapti Ghatak (Factors)

Nidan - Vata Kapha Prakopaka and Agni dushtikar
Dosha - Kapha vata vriddhi and pitta kshaya
Dushya - All dhatus predominantly rasa and meda
Agni - Jatharagni and Dhatvagni
Strotas - All strotas

Samprapti

Hetu Sevana (Indulgence in etiological factors)
⇩
Agnimaandya
⇩
Kaphaprakopa
⇩
SaamaDosha causing Margaavarodha (obstruction) of Vata movement resulting in Vataprakopa
⇩
Sign and Symptoms of Pittakshaya, Kapha – Vatavriddhi with SaamaDosha

Table 1: Comparison of Symptoms according to Modern view and Ayurvedic view

Symptoms involved	**Dosha involved**	**Explanation**
Weight Gain	Kapha vriddhi, Pitta kshaya	Mandagni leads to Dhatvagnimandya which causes Dhatuvriddhi (malaswaroopi) especially Medovriddhi
Loss of appetite	Kapha vriddhi, Pitta kshaya	Mandagni leads to Aam and it further causes Agnimandya.
Dry & coarse skin	Vata vriddhi, Pitta kshaya	Due to rukshaguna of Vata and Dhatvagnimandya produces vitiated RaktaDhatu which leads to Rukshata
Cold intolerance	Kapha-Vata vriddhi, Pitta Kshay	Due toDhatvagnimandya, Rasa Dhatu gets vitiated. It is unable to nourish Uttaradhatu - Rakta Dhatu leading to Sheet-asatmya
Constipation	Vata Vriddhi	Due to Rukshaguna of Vata and Mandaguna of Kapha, the normal function of Apanvayu is opposed and it results in Malavshtambha
Hoarseness of Voice	Kapha- Vata vriddhi	Due to Rukshaguna of Vata, dryness in the mouth leads to hoarseness
Generalized Aches, Pain	Vata vriddhi	Aggravated Vatadosha causes Ruja and Rasa Dhatvagnimandya leads to Angamarda
stiffness	Vata vriddhi	Aggravated Vata and Kapha causes stiffness
Menstrual disturbances	Vata vriddhi	Dosha dushti, prominently Vata aggravation causes obstruction and leads to Anartava.
Tiredness	Kapha vriddhi	Due to hypofunctioning of Agni vitiated Rasa Dhatu, Mandaguna of Kapha and Aam causes Shaithilya and Aalasya

Treatment: Nidan Parivarjana is the basic treatment of any disease in Ayurveda. Nidan Parivarjana means avoidance of causative factors in diet and lifestyle of the patient.Aushadhi Chikitsa or the line of treatment focuses on pachana and deepana or increasing the digestive power. Hence, Aampachak, Pitta Vardhak and Vata-Kaphahara drugs will be beneficial in the treatment of Hypothyroidism. Panchakarma procedures like Vaman, Virechana, Basti and Nasya are advised.

Someimportant and useful drugs are

- Trikatu is an effective formulation in treating mandagni and it is prescribed for treatment of tastelessness and digestive impairment. It pacifies Vata and Kapha vriddhi and increases the Pitta. Trikatu enhances the bioavailability of various phytoconstituents and acts as anti-inflammatory and immuno-modulatory. It reduces body weight, puffiness from eyes and increases the digestive capacity.
- Triphala It is one of the most popular herbal remedies and act as deepana, pachana, vatanulomaka and srotoshodhaka. Triphala corrects the state of Agnimandya which is one of

the main factors involved in pathogenesis of hypothyroidism.

- Ashwagandha is a Rasayana or adaptogenic herb that eliminates toxins, stabilizes the physiological functioning and rejuvenates the body. It has anti-inflammatory, anti-oxidant, immuno-modulatory properties and it alleviates anxiety and stress. [(25)].
- Brahmi - It is Rasayana or adaptogenic herb that acts as anti-stress drug and restore balance of hormones.
- Guduchi - It is probably the most important drug in Ayurvedic pharmacopoeia for treating any type of thyroid problems.
- Kanchanar - It is probably the most important drug in Ayurvedic pharmacopoeia for treating any type of thyroid problems.
- Haridra
- Guggulu is also a Rasayana and mainly used in Vata disorders. It has anti-inflammatory, anti-oxidant and analgesic properties. It reduces elevated blood cholesterol levels and is also considered as a cardiac tonic. [(26)]

CONCLUSION

Management of Hypothyroidism with synthetic thyroid hormone derivatives may bring the value of TSH, T3 and T4 to normal range but the daily intake of medicine for lifetime, the known side-effects thereafter and increase in the dosage with time as the disease become chronic, is troublesome for the patients. Also the quality of Life of the patients taking medicine regularly for long durations is compromised.

The consequences of Subclinical thyroid disease are minimal, hence routine treatment - Levothyroxineis not necessary. Management of patients with a serum TSH level less than10mIU/L is controversial. Hence, Ayurvedic medicines orformulations can be used as independent therapy in management of Subclinical Hypothyroidism.

If Subclinical Hypothyroidism goes untreated, it may lead to Clinical Hypothyroidism in some cases. Hence, Ayurvedic medicines orformulations, which will cure the root cause of the disease by addressing all the factors of Samprapti or pathogenesis of Hypothyroidism and which will improve the quality of life of patients should be given.

ETHICAL CLEARANCE

Taken from institutional ethics committee

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