IAMJ

INTERNATIONAL AYURVEDIC MEDICAL JOURNAL

Review Article ISSN: 2320-5091 Impact Factor: 6.719

UNDERSTANDING OF HYPOTHYROIDISM IN AYURVEDA

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https://doi.org/10.46607/iamj09p9032025

(Published Online: March 2025)

Open Access

Article Received: 11/02/2024 - **Peer Reviewed:** 28/02/2025 - **Accepted for Publication:** 13/03/2025.

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ABSTRACT

Hypothyroidism refers to a deficiency of thyroid hormones caused by various reasons. The global incidence of hypothyroidism is increasing alarmingly as people are exposed to more stress and strain. The synthesis and transport of thyroid hormones play a vital role in the normal physiology and functioning of thyroid hormones. With its negative feedback mechanism, HPT axis helps maintain normal hormone levels. The level of TSH is the primary indicator of hypothyroidism, and a thorough evaluation is needed to know the pathology behind it before starting hormone supplementation therapy. Hashimoto's Thyroiditis and Autoimmune Thyroiditis are the two main pathogenesis involved in the manifestation of hypothyroidism. While analysing the signs and symptoms of hypothyroidism in *Ayurvedic* view, we note the involvement of all *Srotas.* The *Kapha dosha* and *Vata dosha vruddhi* are elicited, and *Pitta dosha kshaya* is seen. Though some physicians consider it a *Sthanika vyadhi* under *Galaganda roga,* its *Dushti lakshanas* are seen in the whole body. Here, an attempt is made to understand Hypothyroidism as a syndrome from an *Ayurvedic* point of view.

Keywords: Hypothyroidism, HPT axis, TSH, Hashimoto's thyroiditis, Autoimmune thyroiditis, *Kapha dosha vruddhi, Vata dosha vruddhi, Pitta kshaya*, Galaganda

INTRODUCTION

Hypothyroidism refers to any state that results in a deficiency of thyroid hormone, including hypothalamic or pituitary disease and generalized tissue resistance to thyroid hormone and disorders that affect the thyroid gland directly[1]. The global incidence of hypothyroidism is increasing as the thyroid gland easily responds to stimuli like stress and anxiety. A recent statistical study reveals that iodine deficiency is the most common cause of hypothyroidism. According to the World Health Organisation, 2 billion people are iodine deficient worldwide[2]. The relative iodine deficiency causes Goitre, and severe deficiency causes Hypothyroidism & Cretinism. On the other hand, an oversupply of iodine results in autoimmune thyroid disease. Hypothyroidism (congenital) occurs in 1 in 4000 newborns worldwide, whereas in India, it is 1 in 2640 newborns. Females are more affected than males (6:1 ratio). Whites and Asians are the more affected populations. 80% of all Thyroid disease is diagnosed as Hypothyroidism.

Thyroid Gland Anatomy [3]

The thyroid gland is an endocrine gland situated in the lower part of the front & sides of the neck. It lies anterior to the trachea between the cricoid cartilage & suprasternal notch. It consists of two lobes connected by an isthmus and weighs 12-20gm (5cm x 2.5 cm x 2.5cm). Its highly vascular deep neck structure is soft in consistency and lies against C5, C6, C7, and T1. The arterial supply is from superior & inferior thyroid arteries, which are supplied by external carotid and subclavian arteries. The venous drainage is into superior, middle, and inferior thyroid veins, which drain into the Internal jugular and Brachiocephalic veins. Lymph drains deep cervical lymph nodes. Nerve supply is from the middle, superior and inferior cervical ganglion. Along with the thyroid gland, there are four parathyroid glands located at the four posterior poles of the thyroid gland. The thyroid gland is larger in females and increases in size during pregnancy & menstruation.

Thyroid Gland Histology[4]

The thyroid gland consists of numerous spherical follicles composed of thyroid follicular cells: Colloid, a proteinaceous fluid containing large amounts of thyroglobulin, the protein precursor of thyroid hormones. The follicular cells secrete Triiodothyronine T3 and tetraiodothyronine (Thyroxine) T4. In between follicular cells, the parafollicular cells are present, which secrete calcitonin. T3 and T4 are iodine-containing derivatives of the amino acid tyrosine.

Synthesis of Thyroid hormones

It consists of five main steps:

1. Thyroglobulin secretion
2. Iodide pump
3. Oxidation of Iodide
4. Iodination of Tyrosine
5. Iodothyronine

Transport of Thyroid hormones in blood

80 % of thyroid hormones are transported by thyroxine-binding globulin and 10% by Albumin and Transthyretin (thyroxine-binding prealbumin), respectively. Any defect in the stages of synthesis or transport of thyroid hormones will eventually result in Hypothyroidism.

Functions of Thyroid Hormones[5]

- **Growth & development**- for normal axonal & dendritic development myelination & linear growth with maturation of growing epiphyseal end plates.
- **Energy Metabolism**- stimulates BMR, oxygen consumption & heat production.
- **Nervous system**- It regulates nervous system activity by exerting an effect on adrenergic receptors.
- **Heart**- T3 maintains normal myocardial contractility.
- **Muscle**- normal skeletal muscle function is regulated.
- **Respiratory system**- Lung volume and breathing capacity is maintained.
- **Skin**-Normal cutaneous circulation &secretion of glands.
- **Colon**- helps in controlling normal bowel movements.
- **Vitamins**- increases utilization & clearance of vitamins.

- **Carbohydrate metabolism** -stimulates the absorption of glucose from the intestine.
- **Protein metabolism**- increases the synthesis of proteins in the cells.
- **Fat metabolism** decreases fat storage by mobilizing it and converting it into free fatty acid.
- **Action on sleep** – Hyposecretion of hormones causes excess sleep, and hypersecretion causes sleeplessness.
- **Action on sexual function** – helps in normal sexual development & reproductive function.

HPT AXIS

The hypothalamo-piturary - Thyroid axis regulates the secretion of Thyroid hormones by the negative feedback mechanism. Hypothalamus secretes Thyrotropin releasing hormone (TRH) which stimulates Anterior pituitary which in response secretes Thyroid Stimulating hormone (TSH). TSH stimulates Thyroid gland to secrete Thyroid hormones T3 & T4. When the level of T3 & T4 exceeds the normal limit, it sends negative feedback to the Anterior pituitary, reducing the secretion of TSH.

Pathogenesis of Hashimoto's Thyroiditis: [6]

Vishudha Chakra	
Position-At the level of the throat	
Function– Regulates the vital force of energy, self-expression & communication	
Panchamahabhuta*-Akasha*	
Probable correlation with Endocrine– Thyroid and Parathyroid	
Physically- communication **Mentally clear,** fluent thought **Emotionally** –independence **Spiritually -a** sense of security	
Blocked *Chakra*	**Open *Chakra***
Negative intellect	Youthfulness
poor communicator poor decisions make	melodious voice, command of speech and mantras
Addictions	light of 10,000 moons, cosmic consciousness,
Illness: Sore throat, thyroid and parathyroid problems, and mouth ulcer.	The normal function of the Thyroid and Parathyroid**.**

Lymphocytic infiltration in thyroid follicles causes the formation of the germinal centre. Follicles' atrophy results in oxyphil metaplasia. The absence of colloid matter and fibrosis eventually leads to Atrophic thyroiditis.

Pathogenesis of Autoimmune hypothyroidism7:

The pathogenesis of autoimmune hypothyroidism is uncertain. Various hypotheses for etiological factors include a combination of genetic and environmental factors, HLADR polymorphism, T cell regulatory gene, sex steroid effects, Immunological effects, Direct thyroid toxicity, congenital rubella infection, Thyroid lymphocyte infiltrate, Antibodies to Thyroglobulin, and Thyroid peroxidase enzyme.

Signs: Signs of hypothyroidism include Dry and coarse skin, Cool extremities, Myxoedema, Diffuse alopecia, Bradycardia, Peripheral edema, Delayed tendon reflexes, Carpel Tunnel syndrome, and Serous cavity effusions.

Symptoms: The symptoms of hypothyroidism include Tiredness, weakness, Dry skin, feeling cold, Hair loss, Difficulty in concentrating, Poor memory, Impaired Hearing, Constipation, Weight gain with poor appetite, Dyspnoea, Hoarse voice, Menorrhagia and Paraesthesia.

Normal Level of TSH:

1. Hyperthyroidism,
2. 0.4- 2.5- Normal range,
3. 2.6-4.0- At risk,
4. 4.1-10.0- Hypothyroidism

Treatment: The modern treatment is hormone replacement therapy by Levothyroxine. The daily replacement is needed, ie.1.6µg/Kg body weight (average 100- 150µg. Levothyroxine is Synthetic T4 under brand names Levothyroid Levoxyl, Synthroid, Tyrosine, Unithroid, Thyronorm, Eltroxin, Cytomel, and Thyrolar. The treatment is accompanied by lots of side effects like High Blood Pressure, Infertility, Weight Loss, Impaired Diastolic function and exercise capacity, Increased Intima media thickness and Increased risk of coronary heart disease.

UNDERSTANDING THYROID GLAND IN RELATION WITH VISHUDHA CHAKRA[8,9,10]

Jataragni	*Ama* Development of autoimmunity
Bhutagni	Iodine Selective trapping of iodide, transport, uptake by thyroid cells, organification
Dhatwagni	*Asthayi poshakamsha* of *dhatu* is vitiated. *Dhatwagni mandya*

ANALYSIS OF HYPOTHYROIDISM IN *AYURVEDIC* VIEW:

Sl.No	Symptoms involved	*Dosha* involvement
1.	Weight Gain	*Kapha vruddhi, Pitta kshaya*
2.	Puffiness of body features	*Kapha Vruddhi*
3.	Loss of appetite	*Kapha Vruddhi, Pitta Kshaya*
4.	Dry & coarse skin	*Vata Vruddhi, Pitta Kshaya*
5.	Minimal or absent sweating	*Pitta Kshaya*
6.	Anaemia	*Kapha-Vata Vruddhi, Pitta Kshaya*
7.	Constipation	*Vata Vruddhi*
8.	Hoarseness of Voice	*Kapha- Vata Vruddhi*
9.	Generalised Aches, Pain	*Vata Vruddhi*
10.	Muscular cramps, stiffness	*Vata Vruddhi*
11.	Sluggishness	*Kapha Vruddhi*

Kapha- Utkrishta Vriddhi, Vata- Alpa/Madhyama Vriddhi, Pitta- Utkrishta Kshaya

In *Charaka Samhita*, *Ashta nindita purushas* have been discussed, which can be considered functional disorders of the endocrine gland.

Involvement of Dhatu[11]

Dhatu	Symptoms
Rasa	Weight gain, Loss of appetite, Heaviness of body, Lethargy, generalised aches, Somnolence, premature ageing symptoms like hair loss, Cold intolerance, Puffiness, anaemia, Menstrual disturbances, and Infertility.
Rakta	Slow pulse rate, Dry skin, Slowing of mental activity, Lethargy
Mamsa	Heaviness in the body, Muscle ache, G*ranthi, Galaganda*
Meda	Tiredness, Sleepiness, sluggishness, Hyperlipidemia, Dyspnoea on exertion
Asthi	Osteoporosis, Osteoarthritis
Majja	Osteoporosis
Shukra	Loss of libido, infertility

Involvement of Srotas[11]

SROTAS	**SYMPTOMS**
Annavaha	Loss of appetite, malabsorption
Rasavaha	loss of appetite, body heaviness, lethargy, generalised ache, premature ageing symptoms like hair loss, cold intolerance, puffiness, anaemia, menstrual disturbances, and infertility.
Raktavaha	Slow pulse rate, dry skin, slowing of mental activity, lethargy, anaemia.
Mamsavaha	Heaviness in the body, moustache granthi, galaganda.
Medovaha	Tiredness, sleepiness, sluggishness, Weight gain, hyperlipidemia, dyspnoea.
asthivaha	Osteoporosis, osteoarthritis, Hair loss.
majjavaha	Osteoporosis
Shukravaha and artavavaha	Loss of libido, infertility Secondary amenorrhoea, menstrual disturbance, infertility.
purishavaha	Constipation
swedavaha	Absent/ minimal sweating

Involvement of Agni in Hypothyroidism

Dehagni or *Jataragni* is the fundamental of life, colour, strength, health, enthusiasm, plumpness, complexion, Ojas, Tejas, and other varieties of Agni and Prana. Extinction of this Jataragni leads to death; its proper maintenance helps a person live a long life, and its impairment gives rise to diseases.

It is *Agni* alone represented by *Pitta* in the body which brings about good or bad effects according to its normal or abnormal state, e.g., digestion or indigestion, vision or loss of vision, normalcy or otherwise of bodily heat, normalcy or otherwise of complexion, valour and fear, anger and joy, bewilderment and happiness and such other pairs of opposite qualities.

Kayagni, present in its own place, has portions of itself present in the Dhatus also. Their decrease (in quantity, qualities or functions) and increase (in quantity, qualities or functions) give rise to the increase and decrease of the Dhatus (respectively). If the preceding Dhatu is increased or decreased, it will increase or decrease the succeeding Dhatu, too.

Involvement of *Ama*: *Annaroopa* & *mala sanchaya* of *ama* is present. The *Samadosha lakshanas* include obstruction of the channel, loss of strength, feeling of heaviness in the body, inactivity of *vata*, lassitude, loss of digestive power, more expectoration, accumulation of wastes, anorexia, and exhaustion. The Clinical presentation of hypothyroidism includes symptoms like lethargy, fatigue, heaviness in the body, sleepiness, and loss of appetite.

***AVARANA* AND HYPOTHYROIDISM**

- In Hypothyroidism, *Avarana* plays a major role. *Mithya ahara viharas* led to the vitiation of *Tridoshas*, mainly *Kapha* and *Vata dosha.*
- Due to excess vitiation of *Kapha dosha*, *Kapha* obstructs the movement of *Vata.* Hence, this leads to a state called *Kapha avruta vata.* There are symptoms of *Kapha Avruta vata*, such as Shaityam, Shula, and *Gurutvam* results. Thus, cold intolerance, generalised ache and heaviness of the body are seen in hypothyroidism.

Considering the involvement of *Dosha Dhatu Srotas Ama Agni* and *Avarana*, the probable *Samprapti* and *Samprapti ghataka* of hypothyroidism

Samprapthi Ghataka:

Dosha- Kapha vruddhi, pitta dushti, vata vruddhi
Dushya- all dhatus predominantly *rasa, medha*
Agni- Jatharagni, Dhatwagni
Ama- Jatharagni mandya janita, Dhatvagnimandya janita
Srotas- all *Srotas*
Srotodushti- sanga, vimarga gamana
Adhishtana- gala *pradesha*
Udbhava sthana- Amashaya
Rogamarga- Bahya
Vyakta sthana- Sharira

Samprapthi

Nidana: *Vata Prakopaka Nidana, Kapha Prakopaka Nidana, Agni dushti hetu*

Galaganda**:** *Galaganda* is defined as Swelling in the neck region or enlargement of the gland of the neck. (*Shabdakalpadruma*) According to *Charaka, Galaganda* is the enlargement at the neck region produced due to provocated *Kapha dosha*. It is a *Kaphaja nanatmaja vikara,* and *Acharya Vagbhata* included it under *Mukha roga*.

Chikitsa* of *Galaganda: "*Chardi Virechanam Nasyam Swedo Dhooma Sira-* vyadha Agnikarma Ksharayoga Pralepo Langhanani Cha" (Bhaishajya ratnavali. Galaganda chikitsa.82) The therapies like Vamana, Virechana, Nasya, Swedana, Dhoomapana, Siravyadha, Agnikarma, Kshara yogas, Pralepa, Langhana and Purana ghrita pana.

In Kaphaja Galaganda, Upanaha sweda is advised. The Chikitsa includes Nidana Pa- rivarjana, Samshodana Chikitsa, Samshamana Chikitsa and Rasayana.

Samshodana Chikitsa

- *Snehapana- Amrutadya taila,Thumbi taila, Goghrita*
- *Vamana- with madana phala pippali*
- *Mrudu Virechana- Gandharva hastyadi taila or trivrut*
- *Nasya- Jeerna karkaru swarasa*

Yogas Kashaya Kalpana

- *Varunadi kashyam*
- *Asanadi Kashayam*
- *Vatsakadi Kashayam*
- *Guggulu tiktaka Kashyam*

Churna Kalpana

- *Shaddharana Churna*
- *Vyoshadi Churna*
- *Guggulu panchapalam Churna*
- *Abhaya Churna Churna*

Vati Kalpana

- *Kanchanara guggulu*
- *Triphala guggulu*

Arishta Kalpana

- *Amritarishta*
- *Abhayarishta*
- *Ayaskriti*

Rasayana

- *Shilajatu*
- *Pippali*
- *Chitrakam*

Rasaoushadi

- *Mandura Bhasma*
- *Swarna Bhasma*
- *Abhraka Bhasma*

Lepas

- *Nichuladi lepa*
- *Devadaru vishala lepa*
- *Hastikarna palasha lepa*
- *Sarshapadi pralepa*

Pathya Apathya*:* The *Pathya* include *Purana Ghrita pana, Jeerna Lohita shali, Yava, Mudga, Patola, Rakta shigru, Kathillaka, Salinca saka, Vetagra, Ruksha Katu Dravya, Deepana dravya* and drugs like *Guggulu* and *Shilajatu.* The *Apathya* include *Kshira Vikruti, Ikshu Vikruti,* all types of *mamsa, Anupa Mamsa, Pishtaannam, Madhura Amla Rasa* and *Guru Abhishyandakari Dravya.*

Yogasanas: The *Yogasanas* like *Halasana, Paschimottanasana, Matsyasana, Sarwangasana, Pavanamuktasana, Suryanamaskara, Simhagarjanasana* and *Kandarasana* are found beneficial. The breathing exercises like *Pranayama-Sheetali, Sheetkari, Sadanta, Bhastrika, Anuloma viloma pranayama* and *Ujjay shwasa* aids the healthy functioning of thyroid gland.

DISCUSSION

Hypothyroidism is a burning issue, and the present treatment is not helping much in resolving the underlying pathology. The conceptual analysis of the symptomatology of hypothyroidism helps us to identify it as *Kapha Pradhana Tridosha Vyadhi* with *Rasa* and *Medo Dushti* predominantly. The treatment can be planned based on Dosha *Pratyaneeka Chikitsa* than *Vyadhi Pratyaneeka Chikitsa.* The *yogas* like *Varunadi Kashaya* and *Kanchanara guggulu* help remove the Srotolepa and resolve *Agnimandhya*. The *Shodhana* Chikitsa helps improve *Agni,* and *Sthanika*

Lepas helps reduce *Sthanika Dosha Vruddhi*. If the patient is already taking levothyroxine, the methodology to wean the patient off the drug needs further brainstorming. If the patient is diabetic or hypertensive, the treatment plan should be with more caution.

CONCLUSION

Hypothyroidism can be considered a condition that results from Agni Dushti. Kapha Vata Dosha Vruddhi and Pitta Kshaya result from Agnimandya. Dhatwagnimandya, especially Rasa and Medho Dhatwagni Mandya, contribute to this condition. Approaching hypothyroidism with Dosha Pratyaneeka Chikitsa will help manage the condition better. Using Rasayanas will help manage the condition as it helps in *Srotomukha Shodhanam*.

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Source of Support: Nil
Conflict of Interest: None Declared

How to cite this URL: Suresh Gunadal & Vijayendra G. Bhat: Understanding of hypothyroidism in ayurveda. International Ayurvedic Medical Journal {online} 2025 {cited March 2025}