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A CONCEPTUAL EXPLORATION OF AGNI DUSHTI IN HYPOTHYROIDISM

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ABSTRACT

Hypothyroidism, also called **underactive thyroid** or **low thyroid**, is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone. The pathophysiology in hypothyroidism is characterized mainly by the reduction of the basal metabolic rate and generalised myxedema. HPT axis with its negative feedback mechanism helps in maintaining normal hormone levels. This condition affects on the metabolism of the whole body up to the cellular level so, the multi-system involvement and their signs & symptoms occurs as well as the mental status of the patient is also disturbed. While analysing the signs and symptoms of hypothyroidism in *Ayurvedic* view, we note the underactivity of *Agni* and involvement of all *Srotas* that adversely affects the functioning of related *dhatus*. Hence, here is an attempt to get the better understanding of etiopathogenesis of hypothyroidism through various *Ayurvedic* principles. *Ayurveda's* comprehensive understanding of endocrinology applies a natural and holistic approach that may significantly help prevent and reduce hormonal challenges.

KEYWORDS: Hypothyroidism, underactive thyroid, basal metabolic rate, HPT axis, *Agni, Srotas, Dhatus.*

INTRODUCTION

The development, structure and function of human body are governed and maintained by 2 mutually interlinked systems- the endocrine system and the nervous system.[1] Anatomically the endocrine system consists of 6 distinct organs; one of them is thyroid.

Its major functions include

i. Growth and differentiation of cells and
ii. Maintenance of homeostasis (by regulating BMR)

A basic feature of all endocrine glands is the existence of both negative and positive feedback control system that stimulates or regulates hormone production in a way that levels remain within the normal range, commonly termed as *hypothalamic- pituitary hormone axis;* thyroid hormones on TRH-TSH axis.

Among the endocrine disorders, disorders of thyroid are common and are only next in frequency to diabetes mellitus. And the functional thyroid disorders can be divided in to 2 types: hypothyroidism (low thyroid hormones) and hyperthyroidism (excess thyroid hormones). In general, the pathological conditions affecting endocrine glands with resultant hormonal abnormalities may have following causes: Hyperfunction, Hypofunction and Hormone resistance.

In this context, we are giving emphasis on hypofunction, which is the deficiency of hormone occurs from destruction of hormone- forming tissues from inflammation (often autoimmune), infections, iatrogenic (e.g. surgical removal, radiation damage), developmental defects (e.g. hypoplasia), enzyme deficiency, haemorrhage and infarction or nutritional deficiency (e.g. iodine deficiency).[2]

HYPOTHYROIDISM- AN OVERVIEW

Hypothyroidism, also called **underactive thyroid disease** is a common disorder and is more prevalent in women, the elderly, and certain ethnic groups. It is a hypometabolic clinical state resulting from inadequate production of thyroid hormones for prolonged periods, or rarely, from resistance of the peripheral tissues to the effects of thyroid hormones.[3] Although hypothalamic or pituitary disorders can affect thyroid function; localized disease of the thyroid gland that results in decreased thyroid hormone production is the most common cause of hypothyroidism. It may be either clinical/ overt (TSH elevated and low levels of FT_4) or subclinical (FT_4 normal with an elevated TSH). Early in the disease process, compensatory mechanisms maintain T_3 levels.

ETIOPATHOGENESIS OF HYPOTHYROIDISM

Hypothyroidism is caused by structural or functional derangements that interfere with thyroid hormone production.[4] This disorder may be divided into primary, secondary and tertiary categories, depending on whether it arises from an intrinsic abnormality in the thyroid or from pituitary or hypothalamic disease.

1. Primary hypothyroidism (Increased TSH)

It can be secondary to congenital, autoimmune, or iatrogenic causes.

a) Iodine deficiency– results in impaired function of thyroid gland

b) Hashimoto's thyroiditis- most common cause of primary hypothyroidism

Also called diffuse lymphocytic thyroiditis, Struma lymphomatosa or goitrous autoimmune thyroiditis and is characterised by 3 principle features:

- Diffuse firm, goitrous enlargement of the thyroid
- Lymphocytic infiltration of the thyroid gland
- Presence of thyroid autoantibodies (antithyroid peroxidase- antimicrosomal and antithyroglobulin antibodies)[5]

Pathogenesis

Initial activation of CD4 + T helper cell ----------> infiltration of CD8 + T cytotoxic cells (in thyroid parenchyma) also activation of B cells ---------- >autoantibodies --------> immune destruction of thyroid parenchyma

c) Exogenous goitrogens

d) Iatrogenic: surgery, drugs, radiation
Results in impaired function of thyroid gland

e) Congenital hypothyroidism
Causes are iodine deficiency, thyroid agenesis, thyroid dysgenesis and genetic defects in enzymes required for thyroid hormone synthesis; results in impaired function of thyroid gland
Clinical features: mental retardation, short stature, protruding tongue and umbilical hernia

f) Subacute granulomatous thyroiditis (de Quervain thyroiditis)

Pathogenesis:
Viral respiratory infection --------> inflammation --------> release of stored thyroid hormones --------> initial transient hyperthyroidism -------->hypothyroidism
Characterised by painful, tender thyroid.

g) Riedel thyroiditis – very rare condition

Pathogenesis
IgG4- related systemic disease --------> fibrosis of thyroid --------> hypothyroidism
Characterised by painless, hard and fixed goitre.

Primary hypothyroidism results from deficient thyroid hormone biosynthesis that is not due to disorders of pituitary or hypothalamus.

Clinical features of primary hypothyroidism are: lethargy, mild depression, disturbances in menstruation, weight gain, cold intolerance, dry skin, coarse brittle hair, myopathy, constipation, reduced reflexes and bradycardia. In severe cases, myxoedema coma (an advanced stage with stupor, hypoventilation and hypothermia) can occur.[6]

2. Secondary hypothyroidism (Low TSH)

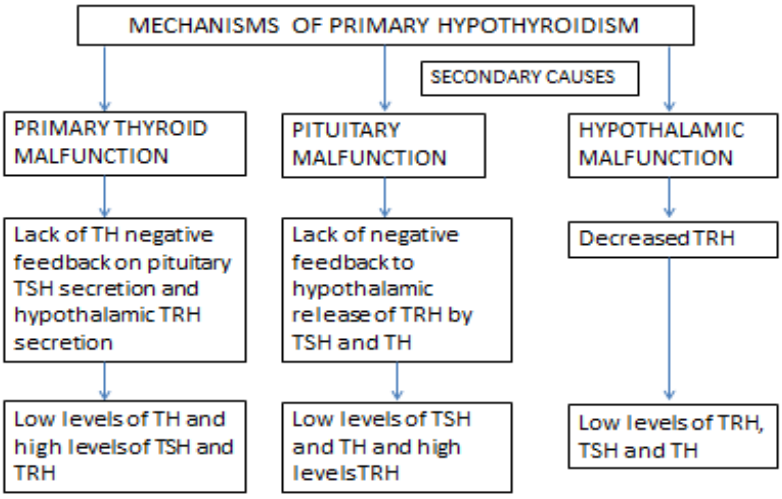
a) Diseases of pituitary.

3. Tertiary hypothyroidism (Low TSH, Low TRH)[7]

a) Diseases of hypothalamus

Secondary and tertiary conditions are much less common.

MECHANISMS OF HYPOTHYROIDISM



CLINICAL MANIFESTATION

Depending upon the age at onset of disorder, it is divided into 2 forms:

1. Cretinism or congenital hypothyroidism

Severe hypothyroidism during infancy and childhood.

The presenting features of a cretin are: slow to thrive, poor feeding, constipation, dry scaly skin, hoarse cry and bradycardia. As the child ages, clinical pictures of fully-developed cretinism emerges characterised by impaired skeletal growth and consequent dwarfism, round face, narrow forehead, widely set eyes, flat and broad nose, big protuberant tongue and protuberant abdomen. Neurological features such as deaf-mutism, spasticity and mental deficiency.

2. Myxoedema

Adulthood hypothyroidism

The striking features are cold intolerance, mental and physical lethargy, constipation, slowing of speech and intellectual function, puffiness of face, loss of hair and altered texture of the skin.[8]

THE PATHOGENESIS INVOLVED IN THE MANIFESTATION OF SYMPTOMS OF CLINICAL HYPOTHYROIDISM - is slowed metabolism and accumulation of matrix glycosaminoglycans- mostly hyaluronic acid, in interstitial tissues. This accumulation is not due to excessive synthesis, but is due to decreased destruction. It is hydrophilic in nature and also the increased capillary permeability to albumin account for interstitial oedema particularly evident in the skin, heart muscles and striated muscles.

The symptoms are:

- Cold intolerance (89%), lack of sweating (89%)
- Constipation (61%)
- Weight gain with decreased appetite (weight loss possible)
- Weakness (99%), fatigue (91%), myalgia, paraesthesia
- Carpal tunnel, other entrapment neuropathies
- Depression; forgetfulness (66%)
- Menorrhagia/ amenorrhoea infertility
- Galactorrhoea
- Elderly: many signs & symptoms are similar to normal aging

AYURVEDIC VIEW

There is difference in opinion in the *Ayurvedic* correlation of the disease. Some opinions is as lowered activity of *Agni* while for others it can be correlated as *Galaganda*.

HYPOTHYROIDISM AND AGNI

Agni can be said as digestive fire. Food nourishes body i.e. *dhatus, ojas,* strength, complexion etc. only when the *Agni* is in equilibrium. It is of 13 types: *Jatharagni, Bhutagni (5) and Dhatvagni (7).*

Jatharagni

Agni present in *Jathara* (Stomach) which digests the food is *jatharagni*. Also called *Bhagavan iswara*- Almighty god, himself. Served by *prana, apana and samana* (the three divisions of vata), by blowing/ increasing, protecting and preserving it. It stimulates other *Agni* to carry out their respective functions.[9]

Bhutagni

The five types of *bhutagni*'s namely *parthivagni, apyagni, tejasagni, vayavagni, akashagni* helps for the transformation of five categories of food substances i.e. *parthiva, apya, teja, vayaviya* and *akashiya* attributes of food ingredients respectively.[10]

Dhatvagni

Metabolic transformation of the *dhatus* occurs by the action of respective *Dhatvagni*. Further, it can be explained as the nutrient portion of rasa provides nourishment to *rakta*, from *rakta* to *mamsa*, *mamsa* to *medas*, *medas* to *asthi*, *asthi* to *majja* and *majja* to *sukra* under the effect of respective *dhatwagni*.[11]

Initially *Jatharagni* gives stimulation to *Bhutagni* because consumed food is *panchabhautika*, it has to undergo transformation by the respective *bhutagni*'s then only it becomes easy for tissue metabolism by *dhatwagnis*. Then processed metabolic products circulate inside the srotas continuously by the help of vata dosha. This favours the development, strength, complexion and happiness as well as growth of tissues. *Dhatus* remain in their normalcy after receiving respective nutrients from metabolised food substances.

In a broad point of view, we can say *Agni* along with *tridosha* is responsible for the homeostasis of the body and of course in case of endocrinological aspects too. Generally endocrine glands have both negative and positive feedback control system that stimulates or regulates hormone production through *hypothalamic-pituitary hormone axis.* Here in *Ayurvedic* perspective, strictly based on *Ayurvedic* basic principles, we can say that the neurological regulations on endocrines glands are brought about by *vata*. And then the hormones released from concerned endocrine glands via *rakta dhatu*. Most importantly these hormones depending upon there functions, are *kapha- pitta* fractions. Also we can correlate the specific *tridosha i.e. prana vata* (*vata* situated in *moordhni*- head; most of the neuro- endocrine functions), *sadhaka pitta* (responsible for basic endocrine functions) and *avalambaka kapha* (responsible for overall *kapha* functions of the body) in the proper understanding of the functioning of endocrine system of our body. These facts strengthen the view about the role of *tridosha* and *agni* in the proper functioning of hormones.

Thyroid hormones are metabolic in nature and metabolism is basically a transformation process involving *agni vyapara*. They functions very much

similar to dhatwagni. Even though in total metabolic process of the body (BMR): *Jatharagni, Dhatwagni and Bhutagni* are equally relevant. *Jatharagni* execute *pachana* in the primary level, *Dhatvagni* in the tissue level and *Bhutagni* in the molecular level. Their normal functioning on the other hand responsible for homeostasis of the body.

In case of hypothyroidism under activity of *agni* occurs. *Agni* at *dhatu* level is inhibited here leading to *sanga* or obstruction in srotases. Due to multiple srotas involvement, proper formation and functioning of related *dhatus* are adversely affected. Due to various *dhatu* involvement, *dhatusaras* are compromised leading to physical and mental features in hypothyroidism. *Manda guna* of *kapha dosha and yogavahi* property of *vata* are particularly seen in *roga samprapti*. Also *dosha- dushya sammurchana* in different *dhatus* results in systemic manifestation of the disease.

CONCLUSION

Although there is no clear description of any disease which is similar to hypothyroidism, but it is found that it possesses a strong correlation with *Agnidushti* and *Ama*. The conceptual analysis of symptomatology of hypothyroidism helps us to identify it as *Kapha Pradhana Tridosha Vyadhi* with *Rasa* and *Medo Dushti* predominantly. Thyroid dysfunction prevalence is rising at an alarming rate in Indian population. Hormone replacement therapy has been a standard approach to thyroid dysfunction. However, herbal approach to treatment of thyroid dysfunction is gaining popularity as it is said to be equally effective, safe and devoid of any side effects. As *Samprapti Vightan* is *Chikitsa* therefore the diseases can be treated by knowing the pathogenesis i.e *samprapti*. So a brief knowledge about *samprapti* of the diseases must be known completely.

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