HYPOTHYROIDISM – AN AYURVEDIC PERSPECTIVE

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ABSTRACT
Hypothyroidism refers to a hypometabolic state with deficient secretion of thyroid hormones due to various reasons. The global incidence of hypothyroidism is increasing alarmingly as people are exposed to junk foods and stressful life. The synthesis and secretion of thyroid hormones are regulated by the HPT axis and the gut hormones namely Ghrelin and Cholecystokinin. There is a close resemblance between the functions of thyroid hormones and Karma of Agni. The relationship between Kayagni and Dhatwagni can be viewed in perspective of the gut-thyroid relationship. In Ayurvedic view, hypothyroidism can be understood as a Santarpana Janya Vyadhi characterized by Agnimandyam at Koshta and Dhatu levels. The clinical signs and symptoms depend on the extent of involvement of Srotases. Hence the basic line of treatment of hypothyroidism is Apatarpanam. It can be done by correcting the Agni at Koshta and Dhatu levels followed by Vatanulomanam. The Shodhana Chikitsa can be selected after proper assessment of the sroto dushti lakshanas and the level of Dhatwagni Mandyam. The Shamana Oushadhis with Vata kaphahara and Agni Deepana properties are used. Here an attempt is made to understand hypothyroidism as a Mandagni Avastha and its management with the fundamental principles of Ayurveda.

Keywords: Apatarpanam, Dhatwagni, Hypothyroidism, Kayagni, Santarpana janyavyadhi

INTRODUCTION
The Thyroid gland is considered to be one of the most important organs of the endocrine system as it regulates nearly all the bodily functions including metabolic, respiratory, cardiovascular, digestive, nervous and reproductive system either directly or indirectly. In ayurveda, thyroid gland can be understood as structure comprising of prana vata, udana vata, kapha dosha, mamsa and medo dhatu. Acharya Charaka in Sareera sthana mentioned about two structures in Kanta
pradesha which are Kaphaja in nature. This can be compared with the thyroid gland and its lobes. Lack of thyroid hormone or resistance of the body tissue to the thyroid hormone with respect to metabolic demand results in disorder called hypothyroidism. There is 2 - 5 % prevalence of hypothyroidism in developed world \[1\]. The prevalence of subclinical hypothyroidism in the developed world is approximately 4-15%. Incidence of hypothyroidism is more in females and elderly patients \[2\]. This review is carried out with an aim to understand the condition Hypothyroidism with Ayurvedic principles and to formulate the possible line of management in Ayurveda.

**AIMS AND OBJECTIVES:**
1) To understand the possible pathogenesis of hypothyroidism in Ayurveda.
2) To formulate the possible line of management of hypothyroidism in ayurveda.

**Thyroid gland – Physiologic Anatomy**
Thyroid gland is a butterfly shaped gland. It is located inferior to the larynx, anterior to the trachea. It’s two lobes are connected by the isthmus. (50% of persons have a small third lobe called pyramidal lobe.) Normal mass is 15 to 20 gram. It is made of microscopic spherical masses called follicles. A secretory substance is present in follicle called colloid. Colloid is made of a glycoprotein called thyroglobulin. Thyroglobulin produces thyroid hormones. They are Triiodothyronine (T3), Tetra iodothyronine (T4) and Calcitonin,\[3\].

**Functions of thyroid hormones:**
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\[4\].

**Role of gut in thyroid hormones regulation:**
In gut there are two hormones which control the secretion of thyroid hormones from the thyroid gland. They are Cholecystokinin and Ghrelin. Cholecystokinin is secreted from the endocrine cells of duodenum. Ghrelin is secreted by the oxyntic cells of stomach. The increased secretion of Cholecystokinin and Ghrelin results in the increased secretion of thyroid hormones,\[5\]. Normal plasma levels of thyroid hormones,\[6\].

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>TSH</td>
<td>0.5 – 4.7mmu/L</td>
</tr>
<tr>
<td>Tri-iodothyronine (T3)</td>
<td>-0.92 – 2.78nmol/L</td>
</tr>
<tr>
<td>Free T4 (FT4)</td>
<td>10.3 -35pmol/L</td>
</tr>
<tr>
<td>Free T3 (FT3)</td>
<td>0.22 -6.78nmol/L</td>
</tr>
</tbody>
</table>

**Thyroid Hormone Variations:**\[7\].

**Hypothyroidism**
It is characterized by increase in level of TSH with either reduced T3 and T4 or normal T3 and T4.

**Hyperthyroidism**
It is characterized by decrease in level of TSH with either increased T3 and T4 or normal T3 and T4.

**HYPOTHYROIDISM:**\[8\].

Hypothyroidism is a hypometabolic clinical state resulting from inadequate secretion of thyroid hormones for prolonged periods or rarely from resistance of the peripheral tissues. As a consequence of hypothyroidism, there can be structural change, functional change or both.

Classification:
Based on site of pathology there are three types,\[9\].
Primary – Due to reduced production of thyroid hormones T3 and T4
Secondary – Due to defect in pituitary TSH synthesis or due to defect in hypothalamic TRH
If the pathology is at secondary level, treatment has to be given at pituitary or hypothalamus.
Based on status of thyroid hormones:
   Clinical Hypothyroidism - Increased TSH with reduced T3 and T4
   Sub clinical Hypothyroidism - Increased TSH with normal T3 and T4

SIGNS AND SYMPTOMS OF HYPOTHYROIDISM: [10].
Symptoms are Tiredness, Dryskin, Hairloss, Dyspnoea, Constipation, Hoarse voice, Cold intolerance, Impaired memory, Menorrhagia/ Oligomenorrhea and Weight gain with poor appetite.
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.

The aim of the management is to normalize TSH into the lower half of the reference range. It can be done by daily replacement with levothyroxine. 1.6 to 1.8 mug/kg body weight is the normal dose for young adults. Dose is adjusted based on TSH levels. It is ideally taken 30 min before breakfast.

DISCUSSION

Table 1: Analysis of thyroid hormones functions with Karma of Agni: [12].

<table>
<thead>
<tr>
<th>Thyroid hormone functions</th>
<th>Karma of Agni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilitate metabolism</td>
<td>Does Pachanam /Pakthi</td>
</tr>
<tr>
<td>Metabolism results in heat liberation</td>
<td>Tapayati Ushmanaam Utpaadayati Iti Pittam</td>
</tr>
<tr>
<td>Helps to sustain life</td>
<td>Balam Aarogyam Ayuscha Praanascha Agnou Pratishtita.</td>
</tr>
<tr>
<td>Promotes growth</td>
<td>It does Upachaya</td>
</tr>
<tr>
<td>It increases rate of secretion of digestive juices</td>
<td>Maintains Prabha/ Kanthi</td>
</tr>
<tr>
<td>Maintains libido in males</td>
<td>Provides Shouraym /Paurusham</td>
</tr>
<tr>
<td>Regulates the function of hippocampus responsible for memory</td>
<td>Provides Medha or Jnana Dhaaranam</td>
</tr>
<tr>
<td>Eliminates nitrogenous wastes from cells</td>
<td>Pachatyannam Vibhajathe Sarakitu Pruthakhthata</td>
</tr>
<tr>
<td>Provides energy to cells</td>
<td>Provides Utsaaha</td>
</tr>
</tbody>
</table>

KAAYAGNI AND DHATWAGNI IN THYROIDOLOGY:
From the function of thyroid hormones it is evident that the thyroid hormones are functionally equivalent to the Dhatwagni which is once again a part of the Kayagni.
Since there is a direct and invariable relationship between Kayagni and Dhatwagni, here in thyroidology gut hormones can be understood as Kayagni.

“Swasthasthasya Kaayagneramsha Dhatushu Samshrita[13].
Tesham Saada Atideepthibhyam Dhathu Vruddhikshayodbhava”

HYPOMETABOLISM AS MANDAGNI:
“Tayir Bhaved Vishama Teekshno Mandachaagni Samaihi Samaha”[14].
As per AshtangaHrudaya, Mandagni is attributed to the effect of Kapha Dosha on the status of Agni.
‘Mandasthu samyagapyannam upayuktam chirat pacheth’[15].

As per Ashtanga Sangraha, Mandagni refers to a state of Agni in which Pachana Kriya is taking place with prolonged duration i.e. Chiraat Pachanam.

Hence in hypometabolic state like hypothyroidism reduced rate of Pachana Kriya is taking at two levels – Koshta and Shaaka.

COMPARISON OF AAMA LAKSHANA WITH HYPOTHYROIDISM:
“Ushmano Alpabaltvene Dhatumadyamapachitham Dushtam Aamashayagatam Rasamaamam Prachakshate”[16].

In hypothyroidism, Aama formation takes place at two levels:
At Koshta due to Dosha Vaishamya and at Dhatu due to SrotoDushti
The lakshanas of Aama are being compared with the clinical features of Hypothyroidism.

Aama Avastha[17].

Hypothyroidism
Srotorodha— Fluid retention
Balabhramsha— Generalized body weakness
Guarava— Heaviness of body

Aalasyam and Klama— Lethargy
Apakhi— Lack of appetite
Anilamoodatha— Brady cardia
Mala sanga— Constipation

ASSESSMENT OF DOSHA AVASTHA WITH CLINICAL FEATURES OF HYPTHYROIDISM:

VaataVruddhi:[18].
Vaata Vruddhi Lakshanas are Karshnya, Ushna Kamatwa, Aanaha, Shakrut graha, Bala Bhramsha, Indriya Bhramsha and Bhrama.
VataVruddhi is due to increase in Ruksha and Sheeta Guna of Vata.

Kapha Vruddhi:[19].
Kapha Vruddhi Lakshanas are Agni sadana, Aalasya, Gauravam, Shvaityam, Shaiyam, Swasa, Kasa and Atinidrata.
Kaphavruddhi is due to increase of Manda, Guru and Sthiraguna of Kapha.

Pitta Kshaya:[20].
Pitta Kshaya Lakshanas are Agnimandyam, Sheetam and Prabha Hani.
Pitta Kshaya is due to the Kshaya of Ushna and Teekshna Guna of Pitta.

Hence in hypothyroidism there is Vata Kapha Vruddhi and Pitta Kshaya.

Table 2: Analysis of Sroto Dushti Lakshanas in hypothyroidism:[21].

<table>
<thead>
<tr>
<th>Srotas</th>
<th>Lakshanas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annavaha Srotas</td>
<td>Presents with Anannaabhilashanam</td>
</tr>
<tr>
<td>Rasavaha Srotas</td>
<td>Presents with Ashraddha, Gauravam, Tanda, Angamarda, Pandutvam, Srotorodha and Klaibyam</td>
</tr>
<tr>
<td>Raktavaha Srotas</td>
<td>Presents with Asrugdara, Kushta, Switra</td>
</tr>
<tr>
<td>Mamsavaha Srotas</td>
<td>Presents with Gandamala, Galaganda and Atimamsa</td>
</tr>
<tr>
<td>Asthivaha Srotas</td>
<td>Presents with Kesha Dosha and Nakha Dosha</td>
</tr>
<tr>
<td>Majjavaha srotas</td>
<td>Presents with Parva ruk and Bhrama</td>
</tr>
<tr>
<td>Shukravaha srotas</td>
<td>Presents with Klaibyam and Aharshanam</td>
</tr>
<tr>
<td>Aartavavaha srotas</td>
<td>Presents with Vandyatvam and Aartava naasham</td>
</tr>
</tbody>
</table>
PROBABLE SAMPRAPTI OF HYPOTHYROIDISM IN AYURVEDA:
After the analysis of Dosha, Avastha, Agni and Srotos, probable Samprapti of hypothyroidism can be understood in the following manner.
- Intake of Kaphakara and Agnimandya Janaka Aahara and Vihara leads to Kapha Pradhana Tridosha Prakopa in Pitta Sthana i.e Adho Aamashaya.
- The Dosha Prakopa will further result in Agnimandya at Koshta level.
- Agnimandyam at Koshta results in Uttarottara Dhatwagni Mandyam and Aama formation takes place at multiple Dhatus.
- The Dhatwagni Mandyam at multiple Dhatus exhibits Lakshanas similar to the signs and symptoms of Hypothyroidism.

CHIKITSA OF HYPOTHYROIDISM
Hypothyroidism can be understood as a Santarpana Janya Vyadhi occurred due to the intake of Vishtambhi, Guru, Snigdha and Sheet aaharas.
Hence the line of management can be Apatarpana. It can be done by Shodhana and Shamana.
Proper Rasayanas can be administered after the Kaya Shuddhi for maintaining the Kayagni and Dhatwagni in their optimum function.

<table>
<thead>
<tr>
<th>Table 3: VAMANA IN HYPOTHYROIDISM:</th>
</tr>
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<tbody>
<tr>
<td>WHY</td>
</tr>
<tr>
<td>Due to Kapha Pradhana Tridosha Avastha&lt;sup&gt;[22]&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4: VIRECHANA IN HYPOTHYROIDISM:</th>
</tr>
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<tbody>
<tr>
<td>WHY</td>
</tr>
<tr>
<td>Due to Vyadhi Utpathii.e Adho Aamashaya Janyakayaddhi, Pitta Sthanagata Kapha and for Vaata anulomanam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5: BASTHI IN HYPOTHYROIDISM:</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHY</td>
</tr>
<tr>
<td>Due to the involvement of Vata. Since Basthi is effective therapy for Vata anulomanam and is indicated in Shaakagata and Koshta gata rogas. Basthi is also mentioned as Agnikrut.</td>
</tr>
</tbody>
</table>

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<tr>
<th>Table 6: COMMON BASTHI YOGAS AND ITS APPLICATION</th>
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<tbody>
<tr>
<td>Niruha Basthi</td>
</tr>
<tr>
<td>Erandamoooladi Niruha Basthi&lt;sup&gt;[24]&lt;/sup&gt;</td>
</tr>
<tr>
<td>Lekhana Basthi&lt;sup&gt;[25]&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dwipanchamoooladi Niruha Basthi&lt;sup&gt;[26]&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
Anuvasana Basthi

Varunadi Ghritam[27]. In conditions like weight gain, lack of appetite.

Guggulu Tiktaka Ghritam[28]. In conditions like enlargement of thyroid gland, Thyroid nodules, Skin manifestations, muscle ache, stiffness, dyspnea, myxedema.

Kalyanaka Ghritam[29]. In conditions like lack of concentration, lack of memory, depression, lack of appetite, skin manifestations, loss of libido, infertility.

SHAMANA CHIKITSA IN HYPOTHYROIDISM

The Shamana Chikitsa in hypothyroidism should be adopted by considering the principles such as Aama Pachanam, Agni Deepanam, Vatakapha Shamanam and Mano Harshanam through Satwaavajaya Chikitsa[30].

SHAMANA OUSHADHI:

Kashaya Yogas:

Kashaya Yogas include Varunadi Kashayam, Punarnavadi Kashayam, Trayanthyadi kashayam, Hamsapathyadi Kashayam etc.

Churna Yogas:

Churna yogas include Vaiswanara churnam, Panchakola churnam, Triphala Churnam, Shaddharana Churnam etc.

Gutikayogas:

Gutika yogas include Chitraki vati, Kanchnar guggulu, Shivagutika etc.

Aasava/Arishtam:

Aasava includes Ayaskriti, Punarnavasavm and Chitrakasavam

Ghritam:

Ghrita yogas include Varunadi ghritam, Guggulu tiktaka ghritam, Kalyanaka ghritam etc.

Table 8: MANO HARSHANA CHIKITSA IN HYPOTHYROIDISM[31].

<table>
<thead>
<tr>
<th>STEPS</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jnanam</td>
<td>Convincing the patient about the disease and its present condition (Hypothyroidism)</td>
</tr>
<tr>
<td>Vijnanam</td>
<td>Informing the patient and family that the present condition is due to hormonal imbalance.</td>
</tr>
<tr>
<td>Dhairyam</td>
<td>Giving psychological support to the patient.</td>
</tr>
<tr>
<td>Smriti</td>
<td>Deviating the negative thoughts and hypothyroidism from the patient.</td>
</tr>
<tr>
<td>Samathi</td>
<td>Includes techniques like aasanas and Pranayama.</td>
</tr>
</tbody>
</table>

ADVISEABLE RASAYANAS IN HYPOTHYROIDISM[32].

Bhallataka – Due to its Kaphahara, Sroto Shuddhikara, Medhya and Vibandha hara properties.

Lashuna – Due to its Teeksha, Sroto Shodhana, Medohara and Aavarana hara properties.

Shilajatu – Due to its Kapha hara, Medohara and Sroto Shodhaka properties.

CONCLUSION

Hypothyroidism can be understood as a hypo activity of Agni at Koshta and Dhatu level. The knowledge of gut-thyroid relationship helps in understanding the Kayaagni and Dhatwagni in thyroidology. The critical analysis of symptomatology of hypothyroidism helps us to identify it as a Kapha Pradhana Tridoshaja Vyadhi resulting due to Agnimandyam at Koshta and Dhatu levels. Hence, the Lakshanas depend on the extent of involvement of Dhatus. So the fun-
damental treatment principle in hypothyroidism is to restore the Karmukata of Agni at both Koshta and Dhatu levels. This can be achieved through AmaPachanam, Agni Deepanam, Sroto Shodhanam and administration of appropriate rasayanas.

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