

## Management of Hypothyroidism in Children through *Ayurveda* Intervention - A Case Report

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### ABSTRACT:

Thyroid dysfunction is an unseen rival in a child's body that hinder their growth and development. Food and lifestyle changes along with familial relationships are found to be the most important cause of thyroid dysfunction in children. A 15-year-old female child with complaints of increasing weight, hair fall and constipation, heaviness on the face and frequent muscle cramps in both lower limbs for the last 4 months. She was diagnosed and treated with Hypothyroidism. According to *Ayurved* classics, it can be correlated with *Galaganda* (goiter). The principles of *Kapha Vridhhi* (increased *Kapha*), *Datwagni Mandhya* (depressed metabolic factor located in bodily tissues) and *Rasa-Meda Dushti Chikitsa* (treatment for primary product of food digestion and fat tissue) were used, i.e., *Ajmodadi Yoga*, Cap. Thyrin, *Gandamalakandan Rasa* and *Surya namaskar*. The Patient showed remarkable recovery in the complaints, i.e., weight reduction, relief in constipation, hair fall and muscle cramps. Through *Ayurvedic* interventions, clinical symptoms were reduced and laboratory parameters changed towards normalcy. This further confirms the relationship between disease and adopted treatment principles.

**Keywords-** *Agnideepan, Galganda, Hypothyroidism, Rasa-Meda Dushti, Surya-namaskar.*

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### INTRODUCTION:

According to *Shabdakalpadruma*, *Galganda* can be defined as neck swelling or enlargement of the neck gland. According to Acharya Charaka *Galaganda* (goitre) is an expansion of the neck area caused by elevated *Kapha Dosha*.

It is known as a *Kaphaja Nanatmaja Vikara* (Specific disease caused by mainly *Kapha*).<sup>[1]</sup> Thyroid dysfunction is most commonly caused by autoimmune disease (Hashimoto's thyroiditis) and iatrogenic causes (therapy of hyperthyroidism) in areas of iodine

sufficiency. Congenital hypothyroidism affects around 1 in 3,500 to 4000 babies with racial and ethnic differences worldwide.<sup>[2]</sup> When subclinical hypothyroidism is linked with positive Thyroid Peroxidase antibodies (TPO). The annual chance of developing clinical hypothyroidism is roughly 4%. Neonatal hypothyroidism is brought on by inborn mistakes in thyroid hormone production in 30 % of cases, thyroid gland dysgenesis in 65 cases, and TSH-R antibody-mediated in 5 % of cases. Girls are twice as likely as boys to have developmental problems.<sup>[3]</sup> It may be temporary, especially if the mother has Thyroid stimulating hormone receptor TSH-R-blocking antibodies or has taken antithyroid medications, but in the majority of cases, permanent hypothyroidism ensues.

The main symptoms of hypothyroidism encompass weight gain with poor appetite, constipation, hair loss, weakness, lethargy dry skin, cold sensitivity, poor concentration, shortness of breath, raspy voice, menorrhagia, and decreased hearing. The signs include swelling over hands and feet (myxedema, non-pitting edema), diffuse alopecia, swollen cheeks, bradycardia, cool extremities, peripheral edema, serous cavity effusions delayed tendon reflexes and carpal tunnel syndrome.

In primary hypothyroidism, serum Thyroxine (T4) levels are low while Thyroid stimulating hormones (TSH) levels are elevated. Serum T3 measurements are thought to be inaccurate. In severe and chronic cases, the ECG commonly displays sinus bradycardia with low voltage complexes and ST segment and T wave abnormalities. Third-generation thyroid-stimulating hormone assays are the most sensitive screening methods for primary hypothyroidism. Thyroid peroxidase antibody (TPO) testing is more appropriate

in situations of autoimmune thyroiditis.<sup>[4]</sup> Because TSH levels cannot be utilized to monitor therapy, treatment aims to keep free T4 levels in the higher half of the range used as a reference.

Although there are several representations in various textbooks, no ailment or condition that is identical to hypothyroidism has been mentioned in *Ayurveda*. Based on numerous hormonal abnormalities, eight varieties of *Nindita Purushas*<sup>[5]</sup> (condemned person) and *Avarana*<sup>[6]</sup> (spread completely, envelopes all the vital regions) may be characterized. If we try to understand the pathophysiology of hypothyroidism using *Ayurvedic* concepts, we discover that it is mostly caused by *Agni* (digestive fire) deficiency.

Following Acharya Vagbhata, the signs and symptoms of hypothyroidism are similar to those of *Kapha Vriddhi*<sup>[7]</sup> (increase in *Kapha Dosha*), *Medas Dhatwagni Mandya* (slow metabolism at adipose tissue level), *Rasa Dushti* (pathology of blood), *Medas Dushti* (pathology of adipose tissue) and *Kapha Avarana Janya*<sup>[8]</sup> *Dhatwagni Mandya* (slow metabolism due to blockage by *Kapha*). In a nutshell, the decreased function of *Jatharagni*, which affects *Dhatwagni* (metabolic factors located in tissues), gradually leads to a dysfunctional series and, subsequently leads to the diseased condition.

Acharya Vagbhata<sup>[9]</sup> also mentioned the *Lakshanas* (symptoms) of *Amadosha* (incomplete metabolism) is the sensation of weight in one's body, obstruction of the routes, anoxia, lassitude, decreased digestive ability, constipation, Less *Bala* (immunity) and also hampers *Vata Dosha* functions which are similar to found in the Hypothyroidism, include lethargy, tiredness, sensations of weight gain, sleepiness, and a lack of appetite. As a result, it is critical to seek out safe, effective, and less expensive solutions. Such cures might be discovered

within the vast resources of *Ayurveda*. When it comes to the pathophysiology and problems of hypothyroidism, systemic and drastic therapy is required, and *Ayurveda* may bring a glimmer of hope through its whole approach.

### CASE REPORT:

Centre of study: The author's guidelines do not permit disclosure of it.

A 15-year-old, female child, a resident of District-Bharatpur, Rajasthan approached OPD with registration no. 000001182889 first time on 17.12.2020 along with her father who narrated her complaints of increasing weight, hair fall, constipation, heaviness on the face and frequent muscle cramps in both lower limbs for the past 4 months. On retrieval of past medical records, noted that she had approached an endocrinologist for these complaints. Her thyroid tests revealed hypothyroidism and was prescribed allopathic medicines. She doesn't have a history of any major illness like allergic illness, Diabetes Mellitus, Hypertension, etc. She is a scholar and doesn't have any kind of addiction. Thus, the patient was hesitant to take the prescribed medicines and

approached *Ayurvedic* treatment for further management. Because the patient was pre-diagnosed with hypothyroid, clinical signs and symptoms were investigated to confirm the diagnosis. Weight gain, constipation, lethargy, agitation, restlessness, mild muscular spasms in both lower limbs and worry were all seen. During the assessment, the body temperature was 40°C, the pulse rate was 86 beats per minute, and the blood pressure was 136/88 mm Hg. Her thyroid was sensitive and enlarged, and she weighed 60 kg, was 161 cm tall, and had a BMI of 23.1.

### Diagnosis assessment

Advised her to take serum T3, T4, and TSH test. The symptoms the patient has exhibited and clinical signs shown resemble the disease in *Ayurveda* known as *Galaganda*.

Victoria Hospice Bowel Performance Scale (BPS) Score was used for grading of constipation and Sinclair Scale for grading of hair fall.

### THERAPEUTIC INTERVENTION:

Pharmacological and self-care treatment was given as follows (table no-2)

**Table 1: Showing Symptoms and Doshik involvement in Hypothyroidism**

Symptoms	Involved <i>Doshas</i>
Heaviness or Weight Gain <sup>[11]</sup>	<i>Kapha Vruddhi</i> (Kapha accumulation), <i>Pitta Kshaya</i> (loss of fire/ heat)
<i>Gauravta</i> (heaviness) or Puffiness of the face and body features <sup>[11]</sup>	<i>Kapha Vruddhi</i>
Reduced or lost appetite <sup>[11]</sup>	<i>Kapha Vruddhi</i> , <i>Pitta Kshaya</i>
Dry & coarse Twaka <sup>[11]</sup> (skin)	<i>Vata Vruddhi</i> (vata accumulation), <i>Pitta Kshaya</i>
Negligible or absent sweating <sup>[11]</sup>	<i>Pitta Kshaya</i>
Anemia <sup>[11]</sup>	<i>Kapha-Vata Vruddhi</i> , <i>Pitta Kshaya</i>
Constipation <sup>[11]</sup>	<i>Vata Vruddhi</i>
The harshness of Vocal sound <sup>[11]</sup>	<i>Vata Vruddhi</i>
Generalized Pain <sup>[11]</sup>	<i>Vata Vruddhi</i>
Muscular spasms, inflexibility <sup>[11]</sup>	<i>Vata Vruddhi</i>

**Table 2: Showing treatment plan**

Regime	Dose and Frequency	Timing	Anupana
<i>Ajmodadi Choorna</i> - 3gm <i>Guduchi Satva</i> - 250mg <i>64 Prabari Pippali</i> - 250mg	One mixture, Twice a day	20 minutes Before food	With Luke warm water
Capsule Thyrin	2 Capsules Twice a day	15 minutes after food	With Luke warm water
<i>Gandamalakandan Ras</i>	1 tablet Twice a day	20 minutes After food	With Luke warm water
<i>Surya namaskar</i>	12 time (Empty stomach)	in morning	Daily

**Table 3: Showing follow-up and outcomes on parameters**

Parameters	Beginning 13.01.2021	Follow-up 1 24.02.2021	Follow-up 2 07.04.2021	Follow-up 3 30.03.2022	Follow-up 4 04.05.2022	Follow-up 5 20.07.2022
<b>Constipation (Victoria Hospice Bowel Performance Scale (BPS) Score</b>	-2	-1	0	-2	-1	0
<b>Hair fall (Sinclair Scale)</b>	Grade 2	Grade 2 Slight benefit	Grade 2 Slightly more benefit	Grade 2	Grade 2 Slight benefit	Grade 1
<b>Mild Muscular spasm (Lower limbs)</b>	Frequently (10-15 times/day)	Less frequently (Once or twice / day)	Less frequently (once or twice/week)	Frequently (5-10 times/day)	Absent	Absent
<b>Facial Puffiness</b>	Regular Moderately on the full face	Regular Mild on the full face	Rarely Mild only infra orbital in morning	Regular Mild on the full face	Rarely Mild only infra orbital in the morning	Absent
<b>Weight (Kg)</b>	60	59.4	58.1	58	56.3	56
<b>BMI Percentile / BMI</b>	81 % / 23.1	79 % / 22.9	75 % / 22.4	75 % / 22.3	69 % / 21.7	69 % / 21.5

**Table 4: Showing changes in Laboratorial parameters:**

Parameters	17.12.2020	18.02.2021	06.04.2021	24.03.2022	02.05.2022	19.07.2022
<b>T<sub>3</sub></b>	FT <sub>3</sub> - 1.30 pg/ml	FT <sub>3</sub> - 3.36 pg/ml	FT <sub>3</sub> -2.49 pg/ml	0.61 ng/ml	-	1.16 ng/ml
<b>T<sub>4</sub></b>	FT <sub>4</sub> - 0.42 ng/dl	0.72 ug/dl	FT <sub>4</sub> - 1.03 ng/dl	4.00 ug/dl	-	6.70 ug/dl
<b>TSH</b>	> 100.00 μIU /ml	10.530 μIU/ml	6.270 μIU/ml	36.300 μIU/ml	3.580 μIU/ml	4.010 μIU/ml

**Table 5: Showing Thyrin ingredients with mode of action**

Drug Name	<i>Ayurvedic</i> Properties	<i>Ayurvedic</i> Pharmacological action	Pharmacological action
<i>Brahmi</i> ( <i>Bacopa monnieri</i> )	<i>Kashaya- Tikta, Ushna, Laghu, Madhur</i>	<i>Medhya</i> (Intellectual),, <i>Smriti-Prada</i> (Memory power), <i>Vata Shamak</i>	Nootropic, Metabolic stimulant, Increases T <sub>4</sub> production
<i>Gandira</i> ( <i>Coleus Forskohlii</i> )	<i>Katu, tikta, Kashaya, Ruksha, sara, Tikshna</i>	<i>Kaphabara</i> (kapha pacifying), <i>Vatabara</i> (Vata pacifying), <i>Vranashodhana</i> (wound cleaner)	Stimulator for cAMP accumulation, Enhances bioavailability
<i>Guggulu</i> ( <i>Commiphora mukul</i> )	<i>Tikta, Katu, Laghu, Ruksha, Ushna, Katu</i>	<i>Medohar</i> (fat), <i>Vata-vikriti</i> (Vata abnormalities)	Hypolipidemic action, Activate lipolytic enzyme action,
<i>Pippli</i> ( <i>Piper longum</i> )	<i>Katu, Laghu, Tikshna, Ushna, Madhur</i>	<i>Deepana</i> (appitizer), <i>Agnivardhaka</i> (Carminative), <i>Kanthya</i> <sup>30</sup> (beneficial for voice)	Carminative, Bioavailability enhancer, increase absorption of Selenium which is useful for T <sub>4</sub> enhanced activity
<i>Rakta-marich</i> ( <i>Capsicum Annuum</i> )	<i>Katu, Ruksha, Laghu, Tikshna Ushna</i>	<i>Medohar, Samana- balya</i> (strength, stamina), <i>Udana</i> (one of the type of <i>Vayu</i> mainly situated at neck) - <i>apana</i> (one of the type of <i>Vayu</i> mainly situated at pelvic region) – <i>smayak</i> (appropriate), <i>Dhamani</i> (blood vessels) - <i>pratichya bara</i> (anti-atherosclerosis), <i>rakta-skanda-bara</i> (anti-coagulant)	Help in Reducing Obesity, Dyslipidemia, Hypertension
<i>Yasad Bhasm</i> (Purified Zinc)	<i>Katu, Ruksha, Ushna</i>	<i>Kapha-Pitta Nashaka, Balya</i>	Antibiotic, anti-tumor,

**RESULTS:**

The patient was asked to visit for regular treatment and follow up with OPD once a month in the beginning. As patient presented with Weight gain, constipation, lethargy, agitation, restlessness, mild muscular spasm in both lower limbs raised TSH level and lowered T<sub>4</sub> level along with other signs of Hypothyroidism. With the help of prescribed *Ayurvedic* remedies, Thyroid function returned to nearly normal stage (Table-4, Date 07.04.2021) and her symptoms also reduced but the patient discontinued medication for almost six months by its own so there was a rise in TSH level (Table-3, Dated 30.03.2022) but not so much and regaining of previous complaints also to some extent.

She again visited and was advised with the same medicaments, later in consecutive follow-ups, her thyroid function returned to normal stage (Table-4, Date 20.07.2022). However, with *Ayurvedic* Treatment, it was achieved within almost eighteen months and a telephonic follow-up for a further six months revealed that the patient had no complaints without taking any *Ayurvedic* medicines. Nowadays, she is doing *Surya-namaskar* regularly in the morning along with Cycling, running and dancing.

During the intervention and after that no any adverse reaction was found and reported by the patient.

**DISCUSSION:*****Guduchi*** (*Tinospora cordifolia*) ***Satva***

It has *Ayurvedic* properties<sup>[12]</sup> *Rasa* (taste) – *Tikta* (Bitter), *Katu* (pungent), *Kashya* (astringent), *Guna* (properties) – *Guru* (heaviness), *Snigdha* (unctuous), *Vipak* (bio-transformed *Rasa*) – *Madhur* (sweet taste), and *Veerya* (potency) – *Ushna* (heat). It has anti-inflammatory, antioxidant, free radical scavenging, immunomodulatory, and

hepatoprotective properties and it also protects against tuberculosis, cytotoxic and poisonous drugs. It also contains n-hexane alkaloid, which has antimutagenic activity.<sup>[13]</sup> It works mainly on immune dysfunction and fighting against infections which are very common in patients with hypothyroidism.

***Ajmodadi Choorna***

It contains 12 ingredients, viz., *Trachyspermum ammi*, *Zingiber officinale*, *Piper nigrum*, *Piper longum*, *P. longum* (stems), *Plumbago zeylanica*, *Terminalia chebula*, *Argyrea nervosa*, *Cedrus deodara*, *Embelia ribes*, salt (*Saindava lavana*), and *Anethum graveolens*.<sup>14</sup> Out of these maximum drugs having *Ushana Veerya*, *Katu* and *Tikta Rasa Pradhan*(prominent). By these properties, the state of *Mandagni* might have improved and the combination is effective in *Medovruddhi* also.

**64 *Prahari pippli***<sup>[12]</sup>

It is a drug prepared from *Chhoti (short) Pippili* (*Piper longum* Linn.) and titrated with *Badi(long) Pippili*(*Piper longum* Linn.) *Phanta* till 64 *Prahar* so called 64 *Prahari pippli*. It has the properties of *Pippili* but more intensified. *Pippili* has *Ras- Katu*, *Guna- Laghu* (light), *Snigdha*, *Tikshna*, *Vipak-Madhur*, *Veerya-Anushnashit* (not cold or hot), so has *Vata Shamak* (*Vata* pacifying), *Agni deepan* (fire).<sup>[12]</sup> Hence works in *Agnimandya*, *Medovruddhi* condition in Hypothyroidism.

***Thyrim***<sup>[16]</sup>

It is the Proprietary medicine of Dr Vasishth's AyuRemedies Company. It contains *Brhmi* (*Bacopamonnieri*)- ext. 400mg, *Pashanbheda / Gandira* (*Coleus forskohlii*) –ext. 50 mg, *Guggulu* (*Commiphoramukul*) –250mg, *Pippali* (*Piper longum*)- ext. 50mg, *Rakta-marich* (*Capsicum annum*) – ext. 50mg and *Yashad Bhasma* (*Zinc calyx*)- 10mg.

***Gandamalakandan Ras-***

Its contains are *Shodhit Parad* (purified *Parad*), *Shodhit Gandhaka* (purified *Parad*), *Tamra Bhasm* (purified *copper ash*), *Mandoor Bhasm* (purified *iron ash*), *Trikatu* (equal combination of three bitter powders), *Saindha Lavan* (halite), *Kanchanar Chhal Choorna Choorna* (bark powder of *Bauhinia variegata*), *Shodhit Guggulu* (purified resin of *commifera mukul*) So the *GandamalakandanRas* has *Medohar*, *VataShamakand Rasayan* (rejuvenating) properties. Hence helpful in hypothyroidism.

[17]

### ***Surya Namaskar-***

A beautifully linked set of *Asanas* (positions) synchronized with breath enhances metabolic efficiency, cleans channels and boosts overall health and well-being. [18] *Surya-namaskar* may have aided in the reduction of cholesterol and triglyceride levels and the elevation of HDL cholesterol. [19]

### **DISCUSSION:**

The present case was analyzed on *Ayurvedic* principles and treatment was planned. As earlier described, no correlated description available so according to symptoms and sign condition can be assumed to be *Kapha Vriddhi* (increase in *Kapha Dosha*), *Medas Dhatwagni Mandya* (slow metabolism at adipose tissue level), *Rasa Dushti* (pathology of blood), *Medas Dushti* (pathology of adipose tissue) and *Kapha Avarana Janya Dhatwagni Mandya* (slow metabolism due to blockage by *Kapha*) along with *AamJanya* condition.

In this situation *Agni-Deepan*, *Amapachan*, *Meda-dhatwagni* treatment is carried out which also correct the *Kapha Avarana* condition. So, the line of treatment aimed to alleviate *Vata-Kapha* and strengthen the *Dhatwagni*. For this condition used the medicines having ***Rasa-Katu***, *tikta*, ***Guna-Laghu***, *Tiskhna*, *Ruksha*, ***Veerya-Ushna***, ***Vipak-Madhur*** which by their *properties* diminishes the *Kaspha Dosha* like *Giloy Satva*, *Ajmodadi Choorna*, *64-Prabari*

*Pippili*, *Thyrin*, *Gandamalakandan Ras*, having *Deepan*, *Aam-Pachan*, *Dhatwagni Vardhak* properties along *Kapha Avarana* pacifying properties. *Surya-namaskar* help shrinking *Medovruddhi*, *Kapha-Avarana*, promote *Agni-Deepan*, *Vata-shaman*. *Pippili*, *Guggulu* and *Parad-Gandhak* are the *Yogavahi* which work through the *Rasayan Guna* which encourage to soothe the *Vata-Dosha*.

All these make cumulative result in reducing symptoms of hypothyroidism and result in consecutive reduction in TSH level and elevation of T<sub>4</sub> level. In present case, patient left the medicament so again increase in symptom and Laboratory parameters but on restarting the medicine at last patient become normal.

According to Table-3, subjective parameters constipation changed from Grade -2 to Zero, hair-fall changed from Grade 2 to Grade 1, mild muscular cramps frequency changed from 15 times / per day to absent, facial puffiness changed from moderate to absent, weight reduced from 60 kg to 56 kg, BMI percentile reduced from 81 % to 69 %. According to Table-4, laboratorial parameters, T<sub>3</sub> increased from 1.30 pg/ ml to 1.16 mg/ml, T<sub>4</sub> increased from 0.42 ng / dl to 6.70 ug/dl, TSH reduced from >100uIU /ml to 3.580 uIU/ml.

Hypothyroidism can be correlated with *Kapha- Vata Vriddhi* and *Pitta Kshaya* condition due to *Agni Dusti* and *Kapha Avarana*. For its treatment plan *Katu*, *Tikta*, *Rasa* medicines were used having *Ruksha*, *Laghu*, *Tikshna Guna* and *Ushna Virya* which leads to enhanced digestive power result in reduced *Aama* and *Kapha Dosha* along with *Vata-Shaman* result in Improved T<sub>4</sub> level, reduces heaviness in body and laziness, relief in constipation, hair fall, facial puffiness and other symptoms of hypothyroid.

### **CONCLUSION:**

Hypothyroidism can be correlated with *Galganda* in *Ayurveda* with *Kapha-Vata* predominance. Combination of *Ajmodadi Choorna*, *Thyrin* and *Gandamalakandan Ras* are effective in reducing clinical signs and symptoms along with laboratory parameters of hypothyroidism in children.

**Limitation of the study:**

As this is a single case report, more cases need to be tried as treatment protocols for scientific validation.

**Declaration of Patient Consent:**

The author certified that they have obtained a patient consent form, where the patient has given her consent for reporting the case along with the Laboratory investigations and other clinical information in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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