REVIEW OF AYURVEDIC DRUGS ACTING ON HYPOTHYROIDISM

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INTRODUCTION
Thyroid problems are among the most common endocrine disorders presently seen worldwide. Hypothyroidism results when the thyroid gland fails to produce enough of the thyroid hormone, due to structural or functional impairment that significantly impairs its output of hormones, this leads to the hypo metabolic state of hypothyroidism. It is estimated to affect between 3.8-4.6% of the general population. The prevalence of primary hypothyroidism is 1:100, but increases to 5:100. The female-male ratio is approximately 6:1. There is no direct reference of thyroid in Ayurvedic classics, but Galganda and Gandmala have been frequently used in these classics. According to Charaka presentation of multiple Granthi around the neck is called Gandmala and single swelling on the Parshava of the neck is Galganda. So Galganda and Gandmala can be co-related with hypothyroidism. The incidence of hypothyroidism is increasing day by day, and there is increasing demand to treat the disease through the Ayurvedic system of medicine, as it is completely natural and safe. The root cause of hypothyroidism is disequilibrium of tridoshas. In this article effort is made to review some Ayurvedic herbs for correction of imbalance in tridosha and flawed function of the thyroid gland.

Key words: Hypothyroidism, Galganda, Gandamala, Ayurvedic herbs.

ABSTRACT
Thyroid problems are among the most common endocrine disorders presently seen worldwide. Hypothyroidism results when the thyroid gland fails to produce enough of the thyroid hormone, due to structural or functional impairment that significantly impairs its output of hormones, this leads to the hypo metabolic state of hypothyroidism. It is estimated to affect between 3.8-4.6% of the general population. The prevalence of primary hypothyroidism is 1:100, but increases to 5:100. The female-male ratio is approximately 6:1. There is no direct reference of thyroid in Ayurvedic classics, but Galganda and Gandmala have been frequently used in these classics. According to Charaka presentation of multiple Granthi around the neck is called Gandmala and single swelling on the Parshava of the neck is Galganda. So Galganda and Gandmala can be co-related with hypothyroidism. The incidence of hypothyroidism is increasing day by day, and there is increasing demand to treat the disease through the Ayurvedic system of medicine, as it is completely natural and safe. The root cause of hypothyroidism is disequilibrium of tridoshas. In this article effort is made to review some Ayurvedic herbs for correction of imbalance in tridosha and flawed function of the thyroid gland.

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INTRODUCTION
Thyroid problems are among the most common endocrine disorders presently seen worldwide. About 1 to 2% of the adult population is known to suffer from thyroid disorders.¹ According to the World Health Assembly report, about 1.5 billion persons in more than 110 countries are threatened with thyroid disorders. World Health Organization (WHO) estimation also indicates that about 200 million people have goiter, although most of the goiters are small and subclinical.

Thyroid is one of the earliest endocrine glands to build up². It is an endocrine gland located in the neck below the thyroid cartilage (which forms the laryngeal prominence, or "Adam's apple"). It acts by producing thyroid hormones, the principal ones being triiodothyronine (T₃) and thyroxine (T₄). Both T₄ and T₃ are iodine-containing chemicals. Because they are the only iodine containing hormones in the body, an adequate iodine intake is necessary for the optimum functioning of the thyroid gland. Doctors recommend about 150 mg/day of iodine for normal thyroid function; less than 50 mg/day for a long period may cause goiter.³

Hypothyroidism generally describes an under-active thyroid that does not produce enough thyroid hormones causing an overall decrease in physical and mental activity. The disease is more prevalent in females around 6-8 times, between 40-50 years.⁴ Hypothyroidism can result from a defect anywhere in the hypothalamic-pituitary-thyroid axis, either insufficient TSH from the pituitary or insufficient TRH from the hypothalamus. In the vast majority of cases, it is primary hypothyroidism followed by pituitary failure, while some other cases may be primary to the pituitary, either as a result of destruction due to tumors or infarction of the pituitary or secondary to primary hypothalamic lesions.
Hypothyroidism, which is decreased secretion of thyroxine (T₄) and triiodothyronine (T₃) by the gland itself, which results in a compensatory increase in TSH secretion. Thus, the combination of a low serum T₄ and a high serum TSH concentration both confirm the diagnosis of hypothyroidism.

**Main causes of hypothyroidism:**

The main causes of hypothyroidism can be classified into:

1. **Primary hypothyroidism** - The most common cause of primary hypothyroidism is Iodine deficiency,AITDs (Autoimmune thyroid diseases),iatrogenic causes,Drugs, Congenital etc.
2. **Secondary hypothyroidism** (due to pituitary TSH deficit).
3. **Tertiary hypothyroidism** (due to hypothalamic deficiency of TRH).

**Pathogenesis:**

Thyroid hormone is required for the normal functioning of each and every tissue of the body, hence deficiency manifests as multi system involvement. The daily requirement of iodine recommended is 150ug/day, when there is iodine deficiency. The thyroid compensates by increasing the iodine trapping mechanism and synthesis of hormone under the influence of TSH. This results in diffuse enlargement of the gland, which later on becomes multinodular. The onset and progression of disease is very gradual, the basal metabolic rate (B.M.R.) is decreased, deposition of haluronidase in dermis and all tissues and hence leading to non-pitting oedema i.e., myxoedema, which is the result of long lasting hypothyroidism.

**Symptoms:**

Hypothyroidism is one of the most undiagnosed and misdiagnosed diseases, as its clinical features are notorious. The symptoms of hypothyroidism are quite variable, depending on the severity of the hormone deficiency and of course one’s constitutional make-up. Weakness, malaise, lethargy, and weight gain, perioorbital puffiness are the early symptoms. It is followed by cold intolerance, loss of hair, skin changes consist of dry and scaly skin, nails become brittle, and hoarseness of voice and slowness of speech, constipation, irregular cycle, PCOD and infertility.  

**Ayurvedic perspective on hypothyroidism:**

There is no direct mention of the thyroid gland in Ayurveda, but a disease by the name Galaganda, characterized by neck swelling, is well known. The first description of neck swelling was mentioned in Atharva Veda by the name Apachi. Charaka mentioned the disease under 20 sleshma vikaras. Sushruta {renowned ancient Indian surgeon} in Shareera Sthana has mentioned that of the seven layers of the skin, the sixth layer Rohini is the seat of Galaganda. In Nidana Sthana he described Galaganda as two encapsulated small or big swellings in the anterior angle of the neck, which hang like scrotum, whereas Charaka mentioned Galaganda as a solitary swelling.

The climatic conditions, water supply, dietary conditions, etc., are mentioned as the main aetiological factors. Sushruta stated that Himvatprabhava rivers might give rise to the occurrence of Galaganda. Bhela described that Sleepda and Galaganda are more common in prachya desa (eastern part) of the country, and that persons consuming predominantly fish are liable to develop Galaganda. Harita Samhitakar desribed the role of dushtambu (contaminated water) and krimi dosha (infection) in the precipitation of Galaganda. Kashyapa Samhitakara added that any part of the country that is cold, damp, with densely grown long trees, water stagnation and heavy rains...
may be prone for the development of Galaganda.14

From the above descriptions it is tempting to associate Galaganda with goiter (abnormal swelling of the thyroid gland) where thyroid functions may or may not be compromised. But hypothyroidism is not just a localized disease. It has many symptoms related to many systems of the body. Thus it is probably inaccurate to draw a parallel between hypothyroidism and Galaganda.

Planning of treatment:

"Vikaranamakusalo na jihriyat kadachana Nahi sarva vikaranam namatoasti dhrivasvithitih."15

Ayurveda doesn’t emphasize the exact nomenclature of the diseases; rather it insists on diagnosis of the constitutional status of the disease as mentioned in Charaka.

Based on Ayurvedic principles, the following are the main treatments for hypothyroidism.

1. Genetical and hereditary defects come under Adibala Pravritta Vyadhis16, so no treatment is suggested.

2. Iodine deficiency is the main common cause for hypothyroidism. So ‘Sarvadha sarva bhavanam samanyam vriddhikaranam”17 applies here.

3. Autoimmunity is another common cause, so immuno modulatory drugs are recommended here.

4. If there is functional loss of thyroid tissue, or functional defects, thyroid stimulatory drugs are beneficial.

‘Samprapti vighatana’ is one of the main principles of treatment. Whatever may be the aetiology of the disease, it results in under-active condition of the thyroid gland and ultimately the slowing down of the body’s metabolism. So the treatment should aim to stimulate the thyroid gland.

Here brief description is given of some important plants which are frequently used in management of hypothyroidism in present era:-

(1) KANCHANARA:
Latin Name - Bauhinia variegata Linn
Family- Caesalpiniaceae
Rasa- Kashaya
Guna- Ruksa, Laghu
Virya- Sheeta
Vipaka- Katu
Karma- kapha-Pittahara
Useful part- Bark
Kanchnara is considered as a drug of choice for Granthi vikara and Galaganda.18 External application of kanchanara bark is done in Gandmala. Fresh bark of kanchanara is grinded with tandu-lodaka and mix with shunthi and used internally.19 It has a balancing activity on the thyroxin production, increasing any deficient production and decreasing any excess. It also clears swellings in the neck and goitre. It is a specific herb for swollen lymph nodes, cervical adenitis, scrophularia or swollen glands in general.

Water-soluble fraction of total alcoholic extract of Bauhinia variegata Linn at a dose of 2 g/kg was fed to Neomercazole (150 mg/kg)-induced hypothyroidic rats (n = 12 in each group) for 20 days. The experiment resulted in enhanced thyroid function as evidenced by increased thyroidal weight (p < 0.001), 131 uptake and decreased serum cholesterol (p < 0.05 for both), and active thyroidal histology.20

Bark extract of Bauhinia purpurea Linn. at 2.5 mg/kg orally administered to female mice (n = 7 in each group) significantly increased serum T3 and T4 concentrations (p < 0.001 for both) after 20 days of treatment21

(2) ASHWAGANDHA:
Latin Name- Withania somnifera Linn
Dunal
Family- Solonaceae
Ashwagandha is an adaptogenic popular herb that has shown incredible results for lowering cortisol and balancing thyroid hormones. It has adaptogens which works well with the hormones of the endocrine system which brings balance to the thyroid hormonal level. It increases the hormones which are secreted by thyroid gland. Ashwagandha is an immunomodulator herb so it is useful in autoimmune thyroid conditions.

Animal studies reveal Ashwagandha has a thyroid hormone balancing effect. In a 20 day study mice were given Ashwagandha and their T₃ and T₄ levels were analyzed, along with lipid peroxidation (anti-oxidant protection). Significant increases in serum T₄ were found, which indicates this herb has a stimulatory effect on a sluggish thyroid.²²

In another study, all three extracts (B. purpurea, C. mukul, and W. somnifera) were administered simultaneously to mice (n = 8) for 30 days at the doses mentioned above. The results showed an increase in both T₃ and T₄ levels (p < 0.01 and p < 0.001, respectively), suggesting that a combination of the three plant extracts may prove to be an effective treatment for hypothyroidism.²³

(3) SHIGRU:
Latin name- Moringa oleifera Lam. Family- Moringaceae
Rasa- Katu, Tikta, Madhura Guna- Snigdha, Laghu Virya- Usna Vipaka-Madhura Karma- Kapha-Vatahara Useful part- Root

The aqueous leaf extract of Moringa oleifera Lam. was evaluated for its ameliorative effect in the regulation of thyroidism in rat model. Male albino rats of 120-150 g were treated orally with doses of 500mg/kg body weight (b.w.) and 250 mg/ kg b.w. of aqueous extract of Moringa oleifera Lam. leaf. The group which received maximum test dose (500mg/kg bw, 14days) showed maximum percentage increase in hormone concentration of T₃ and T₄ whereas a maximum percentage decrease in TSH levels was observed when compared to the other dose levels, which clearly proves that the response was dose effective and the M. oleifera leaf extracts can be used in hypothyroidism condition to normalize hormone levels²⁵

(4) VARUNA:
Latin name- Crataeva nurvula Buch-Ham. Family- Capparidaceae
Rasa- Tikta, Kashaya Guna- Ruksha, Laghu Virya- Usna Vipaka- Katu Karma- kapha-Vatahara Useful part- Bark, Root

Decoction of Varuna root is given with honey in treatment of Gandamala²⁶. Varuna also possesses anti tumor property which makes it beneficial in extra growths of thyroid as well as in hypertrophy of prostate.

(5) GUGGULU:
Latin name- Commiphora mukul (Hook ex Stocks) Engl. Family- Burseraceae
Rasa- Tikta, Katu Guna- Ruksha, Laghu, Tikshna Virya- Usna Vipaka- Katu Karma- Vata-Kaphahara Useful part- Oleo resin/gum

Guggulu (the gum resin of Commiphora mukul) is reported to raise the triiodothyronine (T₃)/thyroxine (T₄) ratio in female mice²⁷ and reverse the effects of propylthi-
ouracil in hypothyroid mice by stimulating thyroid function.²⁸

**Triphladya Guggulu gutika** is used in Gandamala which main content is Guggulu²⁹

(6) **JALAKUMBHI:**
Latin name- *Pistia startiotes* Linn
Family- Araceae
*Rasa* - Tikta, Madhura
*Guna* - Ruksha, Laghu
*Virya* - Sheeta, Vipaka
*Madhura*
*Karma* - kapha-Vatahara

**Jalakumbhi bhasma** is given with gomutra in Galaganda.³⁰

Jalakumbhi is a widespread weed in rivers and lakes which is applied in paste form topically to reduce the swelling of Thyroid.

³¹

(7) **BRAHMI:**
Latin name- *Bacopa monnieri* Linn.
Family- scrophulariaceae
*Rasa* - Tikta, Kashaya
*Guna* - Laghu
*Virya* - Sheeta, Vipaka, Madhura
*Karma* - kapha-Pittahara

**Brahmi** is very well known Medhya drug in Ayurveda classics. Brahmi Stimulates thyroid activity by increasing the amount of T₄, useful in treating hypothyroidism. It is one of the most important nervine herbs used in Ayurvedic medicine and helps to improve memory, concentration and detoxify the nervous system.³²

**Bacopa monnieri** Linn (Indian pennywort) extract has been observed to increase both T₃ and T₄ levels in male mice.³³

(8) **AARAGVADHA:**
Latin name- *Cassia fistula* Linn.
Family- Caesalpiniaceae
*Rasa* - Madhura
*Guna* - Mridu, Guru
*Snigdha* 
*Virya* - Sheeta, Vipaka-Madhura
*Karma* - Vata-pittahara

**Aqueous and ethanolic extract of Cassia fistula** Linn leaves were investigated for its potential to protect hypothyroidism against hypothyroidism induced by propylthiouracil (PTU) in rats. Serum T₃, serum T₄, TSH, cholesterol level and changes in body weight were used for evaluation of antihypothyroidism activity. Treatment with both extracts of *Cassia fistula* in dose of 300 mg/kg significantly increased serum T₃, serum T₄ and decreased TSH and cholesterol level compared with control group³⁶

(9) **APAMARGA:**
Latin name- *Achyranthes aspera* Linn
Family- Amaranthaceae
*Rasa* - Katu, Tikta
*Guna* - Laghu, Ruksha, Tikshna
*Virya* - Ushna, Vipaka-Katu
*Karma* - Kapha-Vatahara

**Achyranthes aspera** Linn. leaf extract administered in rats (n = 7) at a dose of 200 mg/kg for 7 days caused an increase of T₃ and T₄ (p < 0.001 for both). An increase in blood glucose in this group (p < 0.05) further supported the extract’s thyroid-stimulating nature.³⁶

(10) **NIRGUNDI:**
Latin name- *Vitex nigundo* Linn
Family- Verbenaceae
*Rasa* - Katu, Tikta
*Guna* - Laghu, Ruksha
*Virya* - Ushna, Vipaka-Katu
*Karma* - Kapha-pittahara

**Nirgundi** is grinded with water and used for Nasya and Lepa in treatment of Gandamala.³⁷

Root bark of *Aaragvadha* is grinded with rice water and used for Nasya and Lepa in treatment of Gandamala.
Taila, which is prepared by Nirgundi swaras and paste of Langali root, is used for Nasya in treatment of Gandamala.⁸

DISCUSSION

Hypothyroidism is common disorder now a days. Many modern medicinal therapies and medicines are available for the treatment of this disease but these are not devoid of side effects and the re-occurrence rate is also high. It is very important to show an interest in indigenous system of medicine and traditional herbal remedies which are regarded as quite safe with no side effects and are cost effective.

Hypothyroidism is often correlated with galganda mentioned in Ayurvedic literature. Treatment often includes herbs like Kanchnara, Shigru, Varuna, Apanmarga, Brahmi, Jalakumbhi, Ashwagandha. These herbs have also been tested in various experimental models and proved efficacious. But still the mainstay for the Ayurvedic treatment of Hypothyroidism is samprapti vighatan (breaking of pathogenesis) of the disease and Lakshana pratyanik (symptomatic treatment). These Ayurvedic herbs not only provide relief in various symptoms but also directly alter the secretions of the different hormones involved in pathogenesis of the disease and stimulate the normal functioning of thyroid gland.

CONCLUSION

From this review we conclude that hypothyroidism can be very well managed with Ayurvedic medicines, depending upon the symptoms, and careful selection of drugs to be made. Herbal extracts possess natural antioxidants, which not only help in curing the diseases, but also improve the body’s defense system. So Ayurveda based herbal remedies should be preferred for the management of Hypothyroidism.

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