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A REVIEW OF AVAILABLE LITERATURE AND SCIENTIFIC STUDIES ON HERBS CONDUCTED SO FAR CONCERNING THYROID DISORDERS.

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ABSTRACT

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 are common worldwide. In India, there is a significant burden of thyroid diseases. According to a projection from various studies on thyroid disease about 42 million people in India are suffering from thyroid diseases.[1] Patients with thyroid disorders suffer either from hypo functioning or from hyper functioning of the gland. Whereas the former leads to a decrease in the concentrations of circulating thyroid hormones, the latter increases the same. These two dysfunctions are commonly referred as hypothyroidism and hyperthyroidism, respectively. In Ayurveda, the common thyroid-related problem that has been described from time to time is enlarged thyroid gland (galaganda)[2] which is now known as the simple goiter, a state of hypothyroidism. Some other diseases that are commonly mentioned in endocrine text such as myxedema, cretinism, Grave's disease, and nodular goiter, have not been well described in Ayurveda symptom-based herbal treatments. Despite several investigations on the herbal therapies, the use of Ayurvedic medicines in the regulation of thyroid problems continues to require more investigation. The primary aim of this paper is to review the available literature along the experimental studies conducted to date.

KEYWORDS: Galaganda, Ayurveda, Myxedema, Cretinism, Grave's disease and Nodular goitre.

INTRODUCTION

Thyroid diseases are the arguably amongst the commonest endocrine disorders .India is too no exception. Although small in size, the thyroid is considered to be one of the most important organs of the endocrine system, as it regulates nearly all body functions, including metabolic, respiratory, cardiovascular, digestive, nervous, and reproductive systems either directly or indirectly. Many abnormalities in a person's body can be the result of thyroid dysfunction. In fact, some typical problems directly related to thyroid abnormalities were known since the existence of Ayurveda. Thyroid diseases different from other diseases in terms of their ease of diagnosis , accessibility of medical treatment and the relative visibility that even a small swelling of the thyroid offers to the treating physician. With the widespread availability of thyroid function testing in recent years increasing numbers of patients with symptom, which might be attributable to hypothyroidism and hyperthyroidism are being tested.

Hypothyroidism

Hypothyroidism occurs when the thyroid is hypoactive and does not produce enough thyroid hormones. The most common form of hypothyroidic diseases described in Ayurveda is the enlarged thyroid gland (*galaganda*[2]), now known as goiter. According to Ayurvedic literature, impairment of air (*vayu*), mucus or water (*kapha*), and the fat (*meda*) leads to the enlargement of the thyroid gland[3] (galaganda). According to common belief, the most common cause of hypothyroidism is iodine deficiency, and this disease is prevalent only in iodine-deficient areas and despite the coverage of National iodine deficiency diseases control Programme in India, iodine deficiency is still prevalent in many parts of India.[4] Doctors recommend about 150 mg/day of iodine for normal thyroid function; less than 50 mg/day for a long period may cause goiter.[5] Because of the inadequate iodine in the diet, the thyroid cannot synthesize sufficient amount of T4 and T3, resulting in the abnormal increase in circulating TSH, which causes abnormal increase in the size of the thyroid gland (simple goiter). This disease process was recognized by early Ayurvedic practitioners. As thyroid hormones regulate growth and development (both physical and mental) of a person, hypothyroidic children suffer from cretinism (mental retardation). In Ayurveda this is known as a condition of low intelligence (*manda buddhi*).

Hyperthyroidism

Hyperthyroidism is the result of excess production and delivery of the thyroid hormones to the peripheral tissues often referred as thyrotoxicosis. There is limited *Ayurvedic* literature available on Hyperthyroidism, hyper thyroidism is believed to be the result of imbalance in air (*vata*) and fire (*pitta*), which govern the neuro hormonal system. In the conventional system of medicine, physicians relate constant psychological stress and excess secretion of cortisol with thyrotoxicosis. Apart from genetic susceptibility, an immunological increase in immunoglobin G (IgG) antibodies (sometimes referred as thyroid stimulating antibodies), which act on TSH receptors on the gland to stimulate hormone production, are considered as major factors for hyperthyroidism.[6] Conventional medical text relates it to the production of TSH receptor-stimulating antibodies, leading to enhanced secretion of thyroid hormones, which are responsible for increased metabolism and energy wastage. At present, diseases such as thyrotoxicosis, exophthalmic goiter or Graves' disease, and thyroid carcinoma and adenoma all come under the category of hyperthyroidism.

At the beginning of the thyroid dysfunction, visible symptoms may not be observed, moreover the progression of disease is very gradual. However, certain common signs and symptoms may develop according to the system affected.

Common Signs and Symptoms of Hypo- and Hyperthyroidism[6]

Hypothyroidism	Hyperthyroidism
Weight gain	Weight loss
Husky, hoarse voice	Vomiting
Tiredness/lethargy	Nervousness
Intolerance to cold; Cold hands and feet	Sweating
Dry skin and hair, brittle nails,	
Puffiness of body	Muscle weakness and fatigue
Periorbital swelling	Exophthalmos
Memory loss	Insomnia
Constipation	Diarrhea
Bradycardia	Tachycardia
Muscle stiffness	Tremors
Impotence	Loss of libido
Anemia	Angina, Depression

Chikitsa

According to the Ayurvedic management of thyroid diseases, the first line of treatment is to clear the blocked channels (*srotas*) in order to balance *vata*, *pitta* and *kapha*. Several herbal preparations are also administered to increase the digestive fire at a cellular level and restore metabolism. For the treatment of goiter, some *Ayurvedic* preparations are used to clean kapha internally. For many years people have been using seaweed, including kelp, as a supplement of iodine, a basic component of thyroid hormones. Several plants have also been screened from time to time and few appear highly promising for the treatment of thyroid dysfunction. Some important ones have been mentioned for hypothyroidism and hyperthyroidism .All these scientific studies are presented separately as clinical trials and pharmacological investigations.

Experimental studies on plants Extract Suggested for the Treatment of Hypothyroidism

Plants	Effective Dose /kg	Models	Duration In Days	Result Increased=+ Decreased= -
Bauhinia variegate[7]	2 g	Animal	20	+ thyroid function +Thy. Weight +I^{131}uptake
Bacopa monnieri[8]	*200*	Animal	20	A significant T4 serum+ + Thyroid stimulation
Bauhinia purpurea[9]	2.5 mg	Animal	20	A significant + serum T3 and T4 concentration
Commiphora mukul[10]	0.2 g	Animal	15	A significant + the T3 concentration +Thy. weight and + I^{131} uptake
Costuspictus[11]	150mg	Animal	45	+ T3 and T4 and +TSH Improvement in lipid profile
Withania somnifera[12]	1.4 g	Animal	20	+ Stimulation of Both T3 and T4
W.somnifera, [13] *C. mukul*, *B. purpurea*	1.4 g, 0.2 g, 2.5 mg	Animal	30	+ Both T3 and T4 concentration
Achyranthesaspera[14]	200 mg	Animal	7	+ in Both T3 ,T4 + Conc.

				S. glucose
Saussurealappa[15]	400 mg	Animal	14	+Thy. function +Stimulation, +Active Thy. histology

Experimental studies on plants Extract Suggested for the Treatment of Hyperthyroidism

Plants	Effective Dose /kg	Models	Duration In Days	Result Increased= + Decreased= -
Aegle marmelos[8]	1g	Animal	20	- T3 conc.
Aloe Vera[8]	125mg	Animal	20	- T3and T4
Althaea officinalis[16]	0 .1 g	Birds	42	- T3 and TSH
Azadirachtaindica[17]	100 mg	Animal	20	- T3 conc.
Momordicacharantia[18]	500 mg	Animal	15	- T3 and T4 conc. Hepatotoxic effects
Convolvulusplauricaulis[19]	400 mg	Animal	30	- T3 conc. and hepatic 5-D activity.
Emblicaofficinalis[20]	30 mg	Animal	20	- T3 production
Ocimumsanctum[21]	0.5 g	Animal	15	- T4 conc.
Piperbetel[22]	0.1 g	Animal	15	significant- both serum T3 and T4 conc
Rauwolfiaserpentina[23]	2.5 mg	Animal	30	significant - both serum T3 and T4 conc.
Trigonellafoenum-graecum[24]	0.11 g	Animal	15	- serum T3 and T4
Moringaoleifera[25]	175 mg	Animal	10	- serum T3 and T4
Lithospermumofficinale[26]	400 mg	Animal	01	- serum T3

Clinical Trials

Thyrocap

Thyrocap is a herbal preparation containing solid extracts of *Bauhinia variegata, Commiphora mukul, Glycyrrhiza glabra, and Convolvulus pluricaulis* (100 mg of each extract/capsule). This drug was prepared and tried in 50 patients of simple diffuse goiter at a dose of one capsule three times a day for 3 months[27].19 After 3 months treatment, a marked improvement was noticed in weakness, fatigability, dyspnea, and reduction in neck swelling. A significant increase in serum T4 and T3 concentrations ($p < 0.001$ and < 0.02, respectively) and a decrease in serum cholesterol concentration ($p < 0.02$) confirmed its thyroid-stimulating property.

Kanchnara Guggul

Prepared from gum resin of *Commiphora mukul* and bark powder of *Bauhinia variegata, Kanchnara guggul* (237 mg three times a day) was given to 899 tribal people of India bearing simple goiter. They were also asked to apply Kanchnara ointment simultaneously. Treatment was continued for 10 to 20 months. A 90 to 100% improvement was observed in the swelling of the gland in 163 patients, a 50 to 100% improvement was seen in 148 patients, and up to a 50% improvement was observed in 149 patients. It was also observed that patients over 50 years old exhibited only 40 to 50% improvement.

Sankhapushpi Syrup

One hundred sixty thyrotoxicosis patients were divided into three groups. Group 1 ($n = 100$) received a standard allopathic drug, Neomercazole (15 mg/day), along with Diazepam (tranquilizer; 5 mg/day) B.D.; group 2 ($n = 30$) received 125 mg of *Shankhapushpi (C. pluricaulis*) syrup alone B.D.; and group 3 ($n = 30$) was treated with equivalent doses of *Shankhapushpi* syrup and Neomercazole. The treatment was continued for 9 months. Maximum improvement (73 to 93%) in clinical features such as tremors, weakness, palpitation, increased appetite, and nervousness was observed in the *Shankhapushpi*-treated group. Thyroidal I131 uptake was also minimum in this group. These observations and a significant increase in serum cholesterol ($p < 0.01$) suggested that *Shankhapushpi* is a better thyroid inhibitor as compared with the modern allopathic drug, Neomercazole.[29]

Miscellaneous

A study has revealed that action of the most commonly recommended Ayurvedic drug, Kanchnara *guggul* (prepared from Bauhinia variegata), has been found to be similar to that of the allopathic drug Eltroxin.[7]

DISCUSSION AND SUMMARY

Considering all the literature available on *Ayurvedic* therapies in the regulation of thyroid dysfunction, it can be said that the management of the thyroid problems in *Ayurveda* is nearly similar to the conventional allopathic therapy, because both primarily aim to augment thyroid function (for hypothyroidism) or to reduce it (for hyperthyroidism). However, herbal therapy appears to be safe when compared with the modern allopathic treatment. This is because *Ayurvedic* preparations include mainly herbs that make the body work more efficiently while supporting many complex functions. Moreover, herbal extracts possess natural antioxidants, which not only help in curing the diseases, but also improve the body's defense system. On the downside, allopathic drugs and chemicals interfere in the body's natural process, resulting in unwanted side effects. Because they offer fewer or no side effects, herbal therapies should be preferred in the treatment of thyroid dysfunctions. Herbal therapies should be specific, considering the specific type of thyroid diseases and imbalance in the particular type of thyroid or pituitary hormone. Several preparations of L-Thyroxine, and thyroid extracts are used for hypothyroidism. Neomercazole, Methimazole Carbimazole, and Propyl thiouracil are commonly prescribed for hyperthyroidism. Radioiodine (not in pregnancy) and surgery are suggested in acute cases, but these medicines are not free from side effects and are also expensive. A report revealed that 21 patients indicated abnormal T4 suppression after receiving Carbimazole for 10 to 12 months and the disease relapsed after 1 year of stopping the therapy.[6] With Thyroxine therapy, side effects including bone fracture and sudden increase in heart rate have been observed.

CONCLUSION

All these findings indicate the plant-specific role in the regulation of thyroid functions. In fact, recent researches have revealed a differential role of herbal extracts in relation to the regulation of thyroid function. Although some were found to be thyroid stimulatory as evidenced by the increase in serum T3 and/or T4 concentrations, the others were inhibitory to either one or both of the thyroid hormones. Although these findings do not claim to cure or treat the thyroid dysfunctions, certainly the plants can be further studied for their potential

use in the treatment of hypo- and hyperthyroidism. As suggested, *Ayurvedic* medicines based on scientific studies appear to be the best choice.

REFERANCES

1. N. Kochupillai. Clinical endocrinology in India .current science, 2000; 8: 1061-7.
2. Charaka Samhita – Elaborated Vidyotini Hindi commentary part 1by Kashinath Panday and Dr Gorakhnath Chaturvedi; Varanasi: Chaukhamba Bharti Academy, 2007. Sutra Sthan chapter 28/9.
3. Sushruta Samhita –Ayurvedia-Tattava-Sandipika, Hindi commentary part 1, by kaviraj Ambika Dutt Shastri, Chaukhamba Sanskrit sansthan, Reprint, Nidaan Sthan 12/33.
4. Sheila C Vir. Current status of iodine deficiency diseases and strategy for its control in India. Indian J Pediatr, 2002; 69: 589-96.
5. Ganong, W. F., The thyroid gland, in Review of Medical physiology, 9th ed., Appleton and Lange.
6. API Text book of medicine, 7th 2003 edition, published by the association of physician of India.
7. Veena, K. et al., Effect of indigenous drugs on experimentally produced goiter, J. Res. Ind. Med., 1975; 10: 19.
8. Kar A, Panda Sand Bharat S., Relative Efficacy of 3 medicinal plant extracts in the alteration of thyroid hormone concentration in male mice, 2002 July; 81(2).
9. Panda S, Bharat S. and Kar, A., Withania somnifera and Bauhinia purpurea in the regulation of circulating thyroid hormone concentrations in female mice, J. Ethno pharmacology, 67: 233.
10. Panda, S. and Kar, A, Guggulu (Commiphora mukul) induces triiodothyronine production: possible involvement of lipid peroxidation, Life Sci, 65, 137, 1999.
11. S. Ashwani, Zachariah Bobby, M.G Sridhar and C.C Cletus, Insulin Plant extract restores Thyroid hormone levels in experimental Hypothyroidism. Pharmacognosy Res, 2017 Jan-Mar; 9(1): 51-59.
12. Panda, S. and Kar, A., Changes in thyroid hormone concentrations after administration of Ashwagandha root extract in adult male mice, J. Pharm. Pharmacol, 1998; 50: 1065.
13. Panda, S. and Kar, A., Combined effects of Ashwagandha, Guggulu and bauhinia extracts in the regulation of thyroid function and on lipid peroxidation in mice, J. Pharm. Pharmacol., 2000; 6: 141.

14. Tahiliani, P. and Kar, A., Achyranthes aspera elevates thyroid hormone levels and decreases hepatic lipid peroxidation in male rats, J. Ethnopharmacol, 2000; 71: 527.
15. Chaturvedi, P. et al., Effect of Saussurea lappa alcoholic extract on different endocrine glands in relation to glucose metabolism in the rat, Phytother. Res, 7: 205.
16. Farshid Roshanagar, Mehrdad Modaresi and Majid Toghyani, Effect of Marshmallow root extract on Thyroid Hormone in Broilers, R. J. A. S. E. T, 2014; 7(1): 161-164.
17. Panda, S. and Kar, A., How safe is neem extract with respect to thyroid function in male mice? Pharmacol. Res, 2000; 41: 419.
18. Panda, S. and Kar, A., Excess use of Momordica charantia extract may not be safe with respect to thyroid function and lipid peroxidation, Curr. Sci, 2000; 79: 222.
19. Panda, S. and Kar, A., Inhibition of T3 production in levothyroxine-treated female mice by the root extract of Convolvulus pluricaulis, Horm. Metab. Res, 2001; 33: 16.
20. Panda, S., Bharti, S., and Kar, A., Emblica officinalis and Bauhinia purpurea in the regulation of thyroid function and lipid peroxidation in male mice, J. Herbs Spices Med, 2002; 10: 1.
21. Panda, S. and Kar, A., Ocimum sanctum in the regulation of thyroid function in male mouse, Pharmacol. Res, 1998; 38: 107.
22. Panda, S. and Kar, A., Betel leaf can be both per oxidative and anti per oxidative in nature, Curr. Sci, 1998; 74: 284.
23. Panda, S. and Kar, A., Regulation of hyperthyroidism by Rauwolfia serpentina root extract in mice, Pharm. Pharmacol. Commun, 2000; 6: 517.
24. Panda, S., Tahiliani, P., and Kar, A., Inhibition of triiodothyronine production by fenugreek seed extract in mice and rats, Pharmacol. Res, 1999; 40: 405.
25. Tahiliani, P. and Kar, A., Role of Moringa oleifera leaf extract in the regulation of thyroid hormone status in adult male and female rats, Pharmacol. Res, 2000; 41: 319.
26. Winterhoff, H., Sourgens, H., and Kemper, F.H., Anti hormonal effect of plant extracts — pharmaco dynamic effects of Lithospermum officinale on the thyroid gland of rats: comparison with the effects of iodide, Horm. Metab. Res, 1983; 15: 503.
27. Pandit, R.K., Gupta, R.C., and Prasad, G.C., Effect of an herbal compound: Thyrocap in the patients of simple diffuse goiter, J. Res. Edu. Ind. Med, 13: 16.
28. Ghallop, M., Ghenga roga chikitsa me Ayurveda ek bardan (in Hindi), Bulletin of Adimzati and Vikash Pradhikaran, Indore, India, 1991; 19.