Abstract:
Modern scientist such as pharmacologist and phytochemists have shown interest in the plant drugs and conducted scientific studies to evaluate their beneficial effects for management of hyperthyroidism. Kaur et. al. have also published a comprehensive review on such drugs. These plants include Brahmi (centellaasiatica), Ashvagandha (WithaniaSomnifera), Guggul (Comnmiphoramukul) etc. But some herbs such as Coleus (Plectranthus barbatus), Bladder wrack (Fucus vesiculosus) and Coleus or forskohlii (Plectranthus barbatus) are not described in Ayurveda. In addition some clinical studies have also been carried out recently by Ayurveda scholars to evaluate the efficacy of some Ayurveda preparations in the management of hypothyroidism. A review has been presented on such single drugs and preparations for the knowledge of Ayurveda doctors so that they may take advantage of those researches to boost their confidence in using such drugs in practice.

Keywords: Hypothyroidism, plants/herbs, Brahmi, Ashvagandha, Guggulu, Galaganda

Introduction:
Thyroid is a butterfly-shaped endocrine gland situated at the front of the neck lying against and around front of larynx and trachea. Its enlargement in Ayurveda is known as Galaganda which is a slowly developing firm and painless gland in front of the neck lookingas scrotum is hanging in the neck (Sushruta Sutra 11:23,31& Vaghbata-Ashtanga Hridaya Uttara 21:53).
The thyroid gland secretes tri-iodothyronine (T3) and thyroxine (T4) hormones which primarily influence the metabolic rate and protein synthesis and also have many other effects including those on development. The thyroid also produces the calcitonin which plays a role in calcium homeostasis. Its functions are controlled by the thyroid stimulating hormone (TSH) of the pituitary gland.
Pharmacologist and phytochemists have shown interest in the Ayurvedic drugs and carried out scientific studies on many plants to evaluate their role in management of hypothyroidism. Some of these herbs are not described in Ayurveda. In addition in recent past Ayurveda scholars have also conducted clinical trials to study the effects of some Ayurveda preparations in the treatment of hypothyroidism. Here a review is being presented for the knowledge of Ayurveda doctors so that they may take advantage to boost their confidence in using such drugs in practice. Some western herbs which are not described in Ayurveda but have shown promising effects in alleviating the thyroid disorders are also included in this review as Ayurveda mainly uses plant source materials in their practice and believes that all the materials available may rationally be used as drugs.

Hypothyroidism
Main function of thyroid is to regulate body heat (BMR) which is produced by destruction of certain molecules, hence its function relates with Bhutagni. Vata particularly, Samana Vata regulates the Agni, so this Vata is also important for proper functioning of thyroid gland.
Under functioning of thyroid is hypothyroidism which leads to lesser production of heat. Increase in Kapha causes diminution of Agni resulting in less production of heat and slowness in the body functions and firm edema and all these features represent hypothyroidism. Hence in hypothyroidism Kapha is increased and Pitta and Agni arein diminished state. Increased Kapha leads to firm swelling in the body which is not pitting on pressure which is characteristic feature of myxedema. In broad sense hypothyroidism is Ati-Bhutagni-Mandaya.

Single Plants for Hypothyroidism
Brahmi (Centellaasiatica): It is a Medhya Rasayana and widely used for its multiple actions particularly for the treatment of mental disorders and regulating the functions of nervous system. It is antioxidant and contains asiaticoside, asitac acid, brahmoside and brahmic acid (madecassic acid). Morre quoted by Kaur et.al showed that Centellaindica stimulates...
synthesis of T4 may be due to its energizing effect. It is also known as Gotu Kola (Kaur et al.).

Ashvagandha (Withania Somnifera): It is a well known Rasayana drug and has antioxidant activity. It is an adaptogen plant (Chudasama and Gurdipsingh, 2015) and also has antioxidant properties. It contains alkaloids, steroidal and saponin, glycoside which are essential for activating the hormonal pathways in the system. These chemical constituents involve in increase the production of T4 hormone with the help of conversion of T4 to T3. In a study Ashvagandha extract has shown to have ability to improve thyroid activity and also enhance the anti-peroxidation activity in tissue. It is also known as Indian ginseng or winter cherry (Kaur et al.).

Guggulu (Commiphoramukul): Oleo resin of Guggulu contains Z- guggulsterone, which have strong thyroid stimulating activity. Guggulsterone also increase synthesis of T3 by improving the conversion of T4 to T3 and hepatic lipid peroxidation and also increase levels of T3. When levels of T3 increase it can reduce the LDL cholesterol level in the patient suffering from hypothyroidism. Weight loss can also be stimulated. Hence it directly acts on thyroid gland as stimulant of thyroid hormones (Kaur et al.).

Coleus or forskohlii (Plectranthus barbatus): Coleus is any of various Old World tropical plants of the genus Coleus having multicolored decorative leaves and spikes of blue flowers Forskohlii is herb containing essential oils and terpenes. It most commonly the production and synthesis of thyroid hormones. It also activates production of cyclic AMP. It is also useful as adjuvant with the synthetic drugs to increase production of thyroid gland, if the patient has not been to use medication therapy for a long period (Kaur et al.).

Bladder wrack (Fucusvesiculosus): Bladder wrack is a variety of seaweeds and all seaweeds contain variable amount of iodine. Dried bladder wrack contains approximately 50 mg of iodine which helps to stimulate thyroid gland to restore its normal function and also reduce the size of goiter. It is necessary to intake iodine in case of low iodine levels, because it causes side effect and can helps to stimulate thyroid gland to convert it hyperthyroidism. It contains Iodine and L-fucose compound which have anti-obesity, anti-inflammatory, antioxidant and anti-carcinogenic properties (Kaur et al.).

Bladder wrack is a special type of algae and has a special beneficial advantage that it can be used in therapy of both hypothyroidism and hyperthyroidism. Bladder wrack is obtained from algae not from any plant source, because of that it belongs to the family of Fucaceae (Kaur et al.).

Lineswala and Gurdipsingh (2002) studied the combined effect of Bhaliataka Vati comprising of Bhallataka, black sesame, Haritaki and Guda and Galagandahara yoga containing Kanchnara-2 parts, Trikatu-1 part, root of Chitraka-1 part, Devadaru-1 part, Kshara of Jalakumbhi-1 part and Guggulu-3 parts.

Effect of Bhallataka Vati and Galagandahara Vati: Bhallataka Vati and Galagandahara Vati were administered simultaneously to the patients of hypothyroidism with dose of both the drugs as 2 g thrice a day with milk for 2 months. The therapy provided marked improvement to 71.4% patients and moderate improvement to 28.6% patients of hypothyroidism.

Effect of Bhallataka Vati and Galagandahara Vati after Performing Vamana: After performing classical Vamana Karma and Samsarjana Krama the patients of hypothyroidism were given Bhallataka Vati and Galagandahara Vati simultaneously for 2 months as mentioned above. In this group 85.7% patients showed marked improvement and 14.3% patients had moderate improvement.

Gupta (2003) studied the effect Pippali Kshirapaka and Shamana Yoga Vati administered after performing Virechana Karma.

Effect of Pippali (Piper longum) Kshirapaka: Gupta (2003) administered Kshirapaka prepared from 3-6 Pipali in two divided doses to the patients of hypothyroidism for 12 weeks. In this group marked relief was found in 10% patients, moderate response was observed in 50% patients and mild improvement was seen in 30% patients while 10% patients showed no response

Effect of Shamana Yoga Vati administered after Virechana: Gupta (2003) performed classical Virechana Karma done with Snushi-Bhavita Katuk in the patients of hypothyroidism and after Samsarjana Krama the patients were given Shamana Yoga Vati (comprises of 15 drugs with main action of Dipana) in the dose of 12 tablets (500 mg each) per day in divided doses for 12 weeks. In this group marked relief was found in 30% of patients, moderate response was observed in 60% patients while mild improvement was seen in 10% patients.

Effect of Vamanottara-Virechana Karma followed by Vardhamana Pippali Rasayana (VVVPR): 15 patients of hypothyroidism at the outset were given classical Virechana Karma followed by classical Virechana Karma by Mali (2012). After the Samsarjana Krama, Vardhamana Pippali Rasayana was given with starting dose of 500 mg which was increased by 500 mg daily till it reached 7.5 grams and then it was reduced by 500 mg daily till it reached to 500 mg. It was administered with milk for thirty days. The therapy provided moderate improvement to 40.0% patients, improvement to 46.7% patients and 6.7% patients remained unchanged. During the treatment the condition of 6.7% patients was found worsened.

Effect of Vardhamana Pippali Rasayana (VPR): 15 patients were treated by Mali (2012) with Vardhamana Pippali Rasayana given in dose and
duration as mentioned above in VVVPR group. The therapy provided improvement in 26.7% patients and 73.3% patients remained unchanged. In this group the condition of 6.7% patients was found to be worsened.

Bansal (2013) treated 16 patients of hypothyroidism with classical Vamana Karma and after Samsarjana Krama the patients were administered placebo in dose of 4 tabs (500 mg each) given twice a day for 4 weeks. All patients were asked to continue their modern medicine as per their dose. In this group 73.33% patients have marked improvement 19.98% showed moderate improvement and 6.66% showed mild improvement.

Conclusions

In some recent studies Ayurveda plants such as Brahmi (centella asiatica), Ashvagandha (Withania somnifera) and Guggul (Commiphora mukul) have been reported to have definite role in the management of hypothyroidism.

Some herbs such as Coleus (Plectranthus barbatus), Bladder wrack (Fucus vesiculosus) and Coleus or forskohlii (Plectranthus barbatus) which are not described in Ayurveda have also been shown to have definite role in the management of hypothyroidism.

Some clinical studies carried out in recent past in Ayurvedic Institutions have also reported their beneficial effects in the treatment of hypothyroidism.

It is also claimed that if those preparations are prescribed after Shodhana particularly after Vamana then the quantum of relief can be enhanced.

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