

Sharad Panthi* and Tianshu Gao

Liaoning University of Traditional Chinese Medicine, Chongshan East Road No.72, Shenyang 110032, Liaoning, China

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***Corresponding author:** Sharad Panthi, Liaoning University of Traditional Chinese Medicine, Chongshan East Road No.72, Shenyang 110032, Liaoning, China. Tel No: +86 31961100; Fax: +86 31961500; E-mail: sharadpanthi@yahoo.com

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Mini Review

Diagnosis and management of primary hypothyroidism in Traditional Chinese Medicine (TCM) and Traditional Indian Medicine (Ayurveda)

Abstract

Primary hypothyroidism is one of the most common endocrine disorders. TCM and Ayurveda are the two giant ancient systems of medicine flourished in China and Indian sub-continent respectively. The term like hypothyroidism is not mentioned in both classical literatures of TCM and Ayurveda but the features nearest to hypothyroidism are described in both. In TCM the disorders like Xulao (consumptive disease), Xusun (wasting) and Yinbing (thyroid swelling) can be closely correlated with hypothyroidism while in Ayurveda the disorder Galaganda (enlarged thyroid gland) is the nearest one. According to TCM the pathogenesis of hypothyroidism lies in liver depression as well as spleen and kidney yang deficiency while Ayurveda believes it is due to imbalance of Tridosha (three bodily humours) and treatment is directed accordingly. Modern management of hypothyroidism by using thyroxin is effective with some limitations. The herbs, Chinese massage and acupuncture used in TCM as well as the Ayurvedic herbs could be complementary to the modern day treatment of hypothyroidism. These classical methods of management not only help to reduce the dosage of thyroxin but also help to restore thyroid function significantly and improve general health. The further research is needed to prove the scientific validity of these classical methods of management.

Introduction

Hypothyroidism is the common health problem worldwide. Primary hypothyroidism is one of the most common endocrine disorders. Prevalence of hypothyroidism in the developed world is about 4.6% [1]. Prevalence of hypothyroidism among children is also very high in China and South-Asian countries. Hypothyroidism is a pathological state of reduced thyroid hormone synthesis and secretion in which the basal metabolic rate is reduced as main characteristic. The disease is not restricted by age and gender. Hypothyroidism during embryonic and infant period can seriously affect the growth and development of body and brain in children. According to modern medicine, the underlying cause of hypothyroidism is abnormality in thyroid gland, pituitary defects and hypothalamic dysfunctions and thus divided into primary, secondary and tertiary hypothyroidism respectively. Among these, primary hypothyroidism is most commonly seen. Primary hypothyroidism accounts for over 95% of the total hypothyroidism and more than 90% of primary hypothyroidism is caused by autoimmune thyroid diseases, thyroid surgery and hyperthyroidism treatment. Primary hypothyroidism is due to thyroid gland atrophy, studies have shown that there is close relationship between hypothyroidism with thyroid stimulating hormone receptor, thyroid specific transcription factor and thyroid transcription factor gene mutation [2-4]. And along with aging, the prevalence rate of thyroid diseases also gradually increases [5]. Hypothyroidism is related to elevated blood lipids, leading to

abnormal lipid metabolism as well as high homocysteine. Thus, serum total homocysteine and endothelin may be the predictive markers of hypothyroidism [6,7].

TCM Perspective

In ancient Chinese medicine literatures, there is no such term like hypothyroidism, but we can find the nearest features of hypothyroidism like fatigue, pale or lusterless complexion, aversion to cold, cold limbs, waist ache, memory loss, mental retardation, hair loss, sparse eyebrows, loss of libido, myxedema, even severe clinical manifestations such as kidney-spleen yang deficiency syndrome. Chinese medicine Xulao (consumptive disease), Xusun (wasting) and Yingbing (Thyroid swelling) also come under this category.

Etiology and pathogenesis

The main causes are congenital deficiency, weary internal injuries, aging, improper diet, emotional disturbances and treatment failure of chronic diseases. Its pathogenesis is strength loss, blood and qi deficiency, damage to internal organs and spleen-kidney yang deficiency. Spleen-kidney yang deficiency is the main pathogenesis which leads to visceral dysfunction, pain and edema. Chinese medicine believes that Xulao disease as a state of vital qi deficiency of five Zangfu (internal) organs. There is spleen-kidney yang deficiency, lack of qi and blood as well as both yin and yang deficiency.

With the development of Chinese medicine modern physicians

have further elucidated the pathogenesis of hypothyroidism. Professor Gao Tian-shu [8] according to literatures and his clinical experience believes that the theory of “deficiency of spleen and kidney yang” is not sufficient to explain hypothyroidism so put forward the “liver depression”, “spleen deficiency”, and “kidney deficiency” three phase pathogenesis and treatment theory based on syndrome differentiation.

Treatment based on syndrome differentiation

Oral drug therapy: Professor Gao Tian-shu [8] manages the hypothyroidism according to evolution of pathogenesis based on syndrome differentiation. The first phase of pathogenesis is liver depression and spleen deficiency syndrome. Therapeutic principle for this syndrome is to dredge the liver, remove liver qi stagnation, tonify spleen and remove phlegm. The major formula used is *Xiao Yao Powder*, it contains Chai hu (*Bupleurum chinese*), Dang gui (*Angelica sinensis*), Bai shao (*Paeonia lacriflora*), Fu ling (*Poria cocos*), roasted Gan cao (*Glycyrrhiza glabra*), Wei jiang (Stewed Zingiber officinale) and Bo he (*Mentha haplocalyx*). The second phase of pathogenesis is spleen yang deficiency as well as qi and blood deficiency syndrome. The therapeutic principle is to replenish the spleen qi and lifting the clear yang. The treatment formula in this syndrome is *Bu Zhong Yi Qi Decoction*. It contains Ren shen (*Panax ginseng*), Huang qi (*Astragalus membranaceus*), roasted Gan cao (*Glycyrrhiza glabra*), and combination of three herbs to make up the qi of the whole body. Among these three herbs Ren shen is taken in more amount than the other two herbs. The herbs used in this formula such as Dang gui (*Angelica sinensis*), Chen pi (*Citrus reticulata*), Tian ma (*Gastrodia elata*), Chai hu (*Bupleurum chinese*) etc. have the role of tonifying spleen and kidney. As spleen yang is rooted in the kidney yang the herbs like Rou gui (*Cinnamomum cassia*), Xian mao (*Curculigo orchioides*) and Du zhong (*Eucommia ulmoides*) can be used to warm the kidney yang. The third phase is kidney yang deficiency and dampness retention syndrome. The treatment principle of this syndrome is to warm kidney yang. The major formula used is *Jin Pian Shen Qi Powder* and modification of formulation according to associated other clinical features. Chinese medicine mainly focuses on the replenishing kidney- yang- qi and blood; regulating the balance of yin and yang so as to improve the clinical symptoms, which is different from the hormonal therapy.

Modern studies have proved the efficacy of Chinese herbs and medicines used in the treatment of hypothyroidism. In a research conducted by our department showed that *Bu Zhong Yi Qi Decoction* has a significant role in the recovery of iodine deficiency induced hypothyroidism –associated renal damage. It can increase Vascular Endothelial Growth Factor (VEGF) thus has nephroprotective effect and also has thyroid gland stimulating action increasing TT3 and TT4 concentration [9]. In another study carried out by our department *Qibei Fuyuan Yin* (mainly contains *Astragalus membranaceus*, *Pseudostellaria heterophylla*, fresh *Ostrea gigas*, *Angelica sinensis*, *Bupleurum chinese* etc.) inhibited hypothyroidism related myocardial apoptosis through decreasing the Fas, FasL and Caspase-3. There was also relative increase in the serum concentration of both T3 and T4 [10].

Acupuncture therapy : The selection of acupoints differs

according to different principles postulated by different experts. According to Zhao Yu-xiang et al. [11] the main acupoints selected are: Qihai (RN6), Pishu (BL20), Shenshu (BL23), Zusanli (ST36), Xinshu (BL15). These points are selected bilaterally. Manipulation of needles is done, moxibustion is given in Zusanli and modified according to clinical features. In case of aversion to cold and cold limbs, moxibustion can be given to Dazhui (DU14) and Mingmen (DU4) to replenish yang qi, warm the meridians and strengthen physique. If associated with mental retardation Baihui (DU20), Sishencong (EX-HN1) and Taixi (KI3) can be added. If associated with bradycardia, Neiguan (PC6) and Shenmen (HT7) can be added to replenish qi and calm the heart and tranquilize the mind. In loss of appetite Neiguan (PC6), Gongsun (SP4) and Zhongwan (RN12) can be used.

Ayurveda Perspective

The term hypothyroidism is not mentioned in Ayurveda, the ancient system of medicine in Indian sub-continent but the problems related to thyroid disorders were described. In Ayurveda the disorders related to thyroid are described under the disorder known as “Galaganda” (Enlarged thyroid gland) [12]. The disorder galaganda can be correlated with simple goiter, a state of hypothyroidism. Although the rest of the thyroid disorders are not well described in Ayurveda but the problem galaganda is described in detail in almost all classical Ayurvedic texts [12].

The first description of neck swelling was mentioned in Atharva Veda (the last of the four Vedas) by the name Apachi. Charaka (Father of Ancient Indian Medicine) mentioned the disease under 20 *sleshma vikaras* [13]. Sushruta (Father of ancient Indian Surgery) in *Sareera Sthana* has mentioned that of the seven layers of the skin, the sixth layer Rohini is the seat of Galaganda [14]. In *Nidana Sthana* he described Galaganda as two encapsulated small or big swellings in the anterior angle of the neck, which hang like scrotum [15] whereas Charaka mentioned Galaganda as a solitary swelling [16].

Etiology and pathogenesis

The disbalance between mind, body and soul is the main cause of disease. According to Charaka Samhita’ hygienic food taken even in proper quantity does not get properly digested when the individual is afflicted with grief, fear, anger, sorrow, excessive sleep and excessive vigil [17]. The description is also found in Sushruta Samhita (a classical Ayurvedic text book of surgery).

According to Ayurvedic literatures thyroid is the part of *rasabaha srotas* (Lymphatic Channel). Ayurveda believes that the balanced state of three doshas (bodily humours) like vata (air), pitta (fire) and kapha (mucus/water) is the healthy state. Disbalance between air (vata), Mucus or water (Kapha), and the fat (Meda) is the major cause which leads to enlargement of thyroid gland (Galaganda). The pathogenesis of hypothyroidism is not clearly described in ayurveda. According to Charaka, hypothyroidism is the vata-kapha disorder. When the vata, khapha and meda become excited or become out of balance, they produce hormonal (OJUS) imbalance and lead to enlargement of gland known as galaganda [18]. The disorder may onset with loss of appetite or immunity.

Treatment

The treatment approach in ayurveda is very different because it

individualized the treatment according to prakriti (nature) of the patient, agni (enzymatic activity) and interplay of doshas (bodily humours) in the disorder [19]. It focuses on holistic approach like mind, body, behavior and environment. Ayurveda mainly focuses on the clearance of the blocked channels before starting any oral medicines so as to balance vata, pitta and kapha and then start rasayana (rejuvenative) therapy. According to ayurveda concepts, hypothyroidism is regarded as a state of “Pitta kshya, Kapha vridhi and medodusthti (decrease of pitta, increase of kapha and impairment of fat)” [20]. According to one of the basic principle of management of disease “Saamanyā Vishesh Siddhanta” [21], which means similarity leads to increase and dissimilarity leads to decrease, this method of treatment is employed to decrease the kapha by the use of anti-kapha drug, increase the quantum of dhatugata (tissue level) pitta by the use of pitta increasing drug and decrease the meda by the use of anti-meda drugs. All these methods help to restore the metabolism in the body which was impaired by the blockage of channels by kapha.

Compound preparations: Some compound preparations useful in hypothyroidism are: Kanchar Guggulu (major composition as *Bauhinia variegata* and *Commiphora mukul*), Barunadi Kasaya (*Crataeva nurvala* decoction), Mahayograj Guggulu (major composition as *Commiphora mukul*), Aswagandharista (major composition as *Withania somnifera*), Trifala (combination of three herbs *Emblica officinalis*, *Terminalia chebula* and *Terminalia bellirica*), Chandraprabha Vati (*Commiphora mukul* as major composition). The combination of Kanchar Guggulu, Trivit Abaleha (*Operculina turpethum*) and Varunadi Kasaya was found to be effective in the management of hypothyroidism in a research conducted by Kaur Jagmeet and Chauhan Milan in India [22].

Yoga and pranayama: Some useful yogas are Sarvangasana (shoulder stand posture), Matsyasana (fish like posture), Hlasana (plough like posture), Surya-namaskar (sun salutation), Naukasana (boat like posture) and some useful pranayams are Suryabhedana (single nostril breathing), Anulom- bilom (alternate breathing) and Ujjayi (victorious breathing) [23].

Some promising ayurvedic herbs: The herbs like Kanchar (*Bahunia variegata* [24], *Bahunia purpurea*) [25], Guggulu (*Commiphora mukul*) [26,27], Ashwagandha (*Withania somnifera*) [28], Apamarga (*Achyranthes aspera*) [29], Kustha (*Saussurea lapa*) [30], Brahmi (*Bacopa monnieri*) [31] have been used for centuries in Ayurvedic medicine.

In a study carried out by Panda and Kar [25], Ashwagandha (*Withania somnifera*) showed an increase in serum T4 concentration while Kanchar (*Bahunia purpurea*) enhanced both serum T3 and T4 concentration. Both the plant extracts increased the hepatic glucose-6 phosphatase activity and had antiperoxidative effects. The herbs like Brahmi (*Bacopa monnieri*) [31] can increase T4 concentration suggesting its thyroid stimulating activity while in a research done by Tripathi [27] showed that Guggulu can increase the conversion of T4 to T3 through proteolytic activity and the uptake of iodine into thyroxin. Guggulu can potentially ameliorate hypothyroidism and has potent anti-oxidative property [26].

Conclusion

TCM and Ayurveda being the two milestones of ancient systems

of medicine are helping people for centuries in preserving health and curing different types of ailments. In ancient literatures of both TCM and Ayurveda, there is no any definite description by the name of hypothyroidism but the problems nearest to hypothyroidism are described in detail. The herbal preparations used in both systems of medicine have been found to be effective in managing hypothyroidism. Modern researches have also proved the effectiveness of these preparations. The herbs and herbal preparations have shown the thyroid stimulating properties increasing serum concentration of T3 and T4, can recover hypothyroidism associated complications and also possess potent antioxidant properties. All these findings suggest the potential role of herbs in regulating thyroid functions. In a country like China and in Indian sub-continent, traditional treatment methods can be the best armor in early intervention of primary hypothyroidism. Although, in small children there may be some practical difficulties in prescribing traditional medicines but there is no problem with older children in prescribing such medicines. Thus, it can be concluded that with the proper combination of herbal prescription and small dose of thyroxin, satisfactory clinical outcome can usually be obtained but precise monitoring methods should be applied to evaluate the treatment effects and dose adjustment can be done according to thyroid function test in long term follow-up. These herbal preparations can be further studied for their specific use and mechanism of actions in the management of hypothyroidism.

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