

Reflection and prospect on acupuncture-moxibustion in treating Hashimoto's thyroiditis

针灸治疗桥本甲状腺炎的研究思考与展望

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Abstract

Objective: To categorize and summarize the clinical and mechanism studies of the past 30 years on the treatment of Hashimoto's thyroiditis (HT) with moxibustion, moxibustion plus medication, and acupuncture plus medication, etc., and to analyze the current problems.

Methods: The clinical and laboratory studies related to the treatment of HT with acupuncture-moxibustion therapies published before June 2015 were retrieved from MEDLINE, Excerpta Medica Database (EMBASE), China National Knowledge Infrastructure (CNKI), Wanfang Academic Journal Full-text Database (Wanfang) and Chongqing VIP Database (CQVIP).

Results: Moxibustion, moxibustion plus medication, and acupuncture plus medication can produce certain therapeutic effects in treating HT.

Conclusion: The research on the treatment of HT with acupuncture-moxibustion therapies is rather limited in the amount and content. In the future, standardization should be fortified, specific moxibustion research needs deepening, and the action mechanism of moxibustion should be emphasized.

Keywords: Acupuncture Therapy; Moxibustion Therapy; Acupuncture-moxibustion Therapy; Acupuncture Medication Combined; Hashimoto Disease; Thyroiditis; Review

【摘要】目的: 对近 30 年来艾灸、灸药结合、针药结合等疗法治疗桥本甲状腺炎的临床及机理研究进行总结和归纳, 并对出现的问题进行初步探讨。**方法:** 检索截止到 2015 年 6 月发表的临床和实验类针灸治疗桥本甲状腺炎的研究报道, 检索数据库包括 MEDLINE, 荷兰医学文摘(EMBASE), 中国知网(CNKI), 万方学术期刊全文数据库(Wanfang)和重庆维普数据库(CQVIP)。**结果:** 艾灸、灸药结合及针药结合等疗法治疗桥本甲状腺炎具有一定的疗效。**结论:** 针灸治疗桥本甲状腺炎的研究数量有限, 且存在一定的局限性, 以后的研究应加强规范性, 深入开展特色灸法研究, 并注重灸法效应机理的研究。

【关键词】 针刺疗法; 灸法; 针灸疗法; 针药并用; 桥本氏病; 甲状腺炎; 综述

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Hashimoto's thyroiditis (HT), also known as chronic lymphocytic thyroiditis or Hashimoto's disease, is an autoimmune thyroid disease, mainly presenting unilateral or bilateral goiter and general fatigue. Some

patients may have compression and mild pain in thyroid area^[1]. So far, the incidence of HT in China hasn't been clearly evaluated yet, but it's often encountered in clinic and accounts for 22.5% of all thyroid diseases, and thus has become a common endocrine disease in China^[2].

Modern medicine holds that genetic and environmental factors both contribute to the development of HT. It's believed that the pathogenesis of HT is related to the autoimmune system, though the

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pathogenesis hasn't been revealed^[3-4]. It plausibly develops when there happens congenital immune surveillance deficiency under genetic susceptibility, and thus thyroid autoantibodies are generated via humoral and cell-mediated immune reactions to attack thyroid follicular epithelium^[5]. Currently, modern medicine treats HT with iodine intake control, thyroid hormone replacement therapy, immune therapy, and operation, etc^[6]. These methods are effective to some extent, but usually require a whole life administration, yet the efficacy is not stable enough and the recurrence rate is high, all aggravating patients' emotional burden.

1 Databases and Retrieve Strategy

During recent years, acupuncture-moxibustion therapy has achieved a certain progress in the treatment of HT. In clinic, moxibustion, acupuncture, or acupuncture/moxibustion plus medication are often adopted to treat HT and have achieved satisfactory effects. Preliminary study on the action mechanism of acupuncture-moxibustion in treating HT has also been conducted. We arranged and analyzed the studies on acupuncture-moxibustion in treating HT published in the last 30 years. The target databases included MEDLINE, Excerpta Medica Database (EMBASE), China National Knowledge Infrastructure (CNKI), Wanfang Academic Journal Full-text Database (Wanfang) and Chongqing VIP Database (CQVIP). Retrieval range was from January 1986 to June 2015, and the search strategy was TI = (Hashimoto's thyroiditis or thyroid disease or chronic lymphocytic thyroiditis or autoimmune thyroiditis or autoimmune thyroid disease) and (acupuncture or moxibustion). Forty-seven articles were collected from the initial search and were then filtered based on the inclusion criteria.

2 Inclusion Criteria

Published literatures with HT or Hashimoto's disease or chronic lymphocytic thyroiditis or autoimmune thyroiditis as the studied disease; studies on acupuncture-moxibustion; with clear diagnostic criteria (different diagnostic criteria were permitted due to the large time range); clinical studies with clear subject numbers.

3 Exclusion Criteria

The one with a more complete structure was selected from the duplicated literatures; literature review; single case report; article without a clear study method or sample size; pure clinical experiences.

Seventeen articles were finally collected for analysis based on the above criteria^[7-23].

4 Literature Analysis

4.1 Clinical effect of acupuncture-moxibustion for HT

Currently, moxibustion, acupuncture, or acupuncture/moxibustion plus medication are adopted to treat HT in clinic. Their treatment effects have been proven, and acupuncture/moxibustion plus medication can produce more significant efficacies compared to dry medication.

4.1.1 Moxibustion

The involved moxibustion therapy in this article mainly refers to herb-partitioned moxibustion, and the herbal powders are predominantly *Fu Zi (Radix Aconiti Lateralis Preparata)* powder or powder of a herbal formula. This therapy is easy-to-operate, safe and reliable, and thus has become a major method in acupuncture-moxibustion therapy in treating HT. According to clinical observations, these methods all can produce a benign regulation on the symptoms, thyroid function, and immune function of the patients.

Chen HP, *et al*^[7] used herb cake-partitioned moxibustion [*Fu Zi (Radix Aconiti Lateralis Preparata)* cake] to treat HT, with two groups of acupoints used alternately [Danzhong (CV 17), Guanyuan (CV 4), and Zhongwan (CV 12) as a group; Dazhui (GV 14), Shenshu (BL 23) and Mingmen (GV 4) as a group]. The results showed that herb-partitioned moxibustion significantly up-regulated serum thyroxine 3 (T3) and T4 and down-regulated thyroid stimulating hormone (TSH) in HT coupled with hypothyroidism; the indexes in normal subjects didn't show any significant changes. Among the HT patients, the iodine intake was improved in those who had a low iodine intake, while there was no significant change in those who had normal or a high iodine intake. After treatment, serum T3 and T4 were improved more significantly in those of yang deficiency than those of qi deficiency. The results all indicated that herb-partitioned moxibustion can produce different effects on the immune and thyroid function in HT patients, generally towards a normal condition^[7].

Hu GS, *et al*^[8] treated HT with herb [*Fu Zi (Radix Aconiti Lateralis Preparata)*] cake-partitioned moxibustion by selecting the same acupoints but different herbal powder beneath the *Fu Zi (Radix Aconiti Lateralis Preparata)* cake, to observe the effect of Chinese herbs on HT. The results revealed that the Chinese herbal powder can enhance the therapeutic efficacy. The enrolled 103 subjects were divided into three groups, 35 subjects in moxibustion group I, 36 in moxibustion group II, and 32 in a control group. In moxibustion group I, Chinese herbal powders for tonifying yang qi were placed beneath the *Fu Zi (Radix Aconiti Lateralis Preparata)* cake; in moxibustion group II, Chinese herbal powders for tonifying yang qi and activating blood circulation were placed under the cake; for the control group, Thyroid Tablet was prescribed

(40-120 mg each day). The treatment duration was 2 months. At the end, the total effective rate was 42.9% in moxibustion group I, versus 77.8% in moxibustion group II, and the efficacy in moxibustion group II was more significant than that in moxibustion group I. Regarding the improvement of enlarged thyroid, nodules and texture, moxibustion group II was significantly superior to moxibustion group I. After intervention, the serum T3, T4, and TSH contents showed marked improvements in the two moxibustion groups, while there were no significant differences between the two groups. The two moxibustion protocols both can effectively improve the symptoms, thyroid condition and function, and reduce the binding rate of thyroglobulin antibody (TGAb) and thyroid microsomal antibody (TMAB); moxibustion group II produced a more significant efficacy in improving thyroid condition and reducing serum thyroid antibody binding rate compared to moxibustion group I; there were no significant intra-group differences in the control group. The results suggest that the herbs with functions of activating blood flow and unblocking stagnation can obviously strengthen the effect of moxibustion and achieve a better treatment result compared to the Western medication. Together with the previous achievements of the same study group^[9], it proves that the Thyroid Tablet can effectively correct the hypothyroidism, and also indicates that the action mechanism of moxibustion should be different from the Western medication in treating hypothyroidism. Moxibustion restores and maintains the thyroid hormone levels via promoting the recovery of thyroid function; the Thyroid Tablet works through introducing external hormones, but the over-increase of the external hormone at the beginning of the treatment will possibly cause hyperthyroidism^[8].

Wang XY treated HT by using herb-partitioned moxibustion with herbal cakes made by *Fu Zi (Radix Aconiti Lateralis Preparata)*, *Rou Gui (Cortex Cinnamomi)*, *Wu Ling Zhi (Faeces Troglodytoris)*, and *Ru Xiang (Olibanum)* mixed at 5:2:1:1. Sixty-six patients were randomized into a treatment group of 34 cases and a medication group of 32 cases, simultaneously with a group of 35 healthy subjects as the control. The treatment group was intervened by herb-partitioned moxibustion at Dazhui (GV 14), Mingmen (GV 4), Danzhong (CV 17), Zhongwan (CV 12), Guanyuan (CV 4), Shenshu (BL 23), and Zusanli (ST 36), 2 g moxa for each cone, 5 moxa cones for each acupoint, one session per day, 30 d as a treatment course, with a 2 d interval, totally for 6 treatment courses; the medication group was intervened by Thyroid Tablet, 20 mg each time, three times a day, but a daily dose of 80 mg (divided into two times) for those coupled with myxedema, totally for 6 months; the healthy control group was also given herb-partitioned moxibustion at the same acupoints with the same procedure adopted in the

treatment group, but only for 1 treatment course (30 d). Regarding the thyroid function and immune function, the contents of T3, T4, and TSH were significantly increased in the treatment group and medication group after the intervention, approaching the normal levels, while the above indexes didn't show marked changes in the healthy control group after the intervention. Besides, the contents of TGAb and TMAB declined significantly in the treatment group after the intervention, while they didn't show significant changes in the medication group. The results indicate that herb-partitioned moxibustion can significantly improve the contents of serum T3, T4, and TSH, and the thyroid ¹³¹I intake rate in patients with hypothyroidism. Meanwhile, the above indexes didn't show significant changes in the healthy subjects. Furthermore, in the treatment group, 16 patients were diagnosed with qi deficiency pattern while 18 with yang deficiency pattern. The author found that herb-partitioned moxibustion produced a more significant effect in improving T3, T4, and TSH levels in yang deficiency patients compared to that in qi deficiency patients. Herb-partitioned moxibustion and medication both can markedly improve HT symptoms such as myxedema, fatigue, and lassitude. However, concerning the improvement of tongue coating and pulse, herb-partitioned moxibustion was superior to Thyroid Tablets. Therefore, it's concluded that herb-partitioned moxibustion and Thyroid Tablet both can effectively restore the abnormal thyroid function, but the former one can more significantly improve the main symptoms and immune function, especially for hypothyroidism patients with a yang deficiency constitution^[10].

4.1.2 Acupuncture

Among the relatively few reliable literatures talking about acupuncture in treating HT, acupoints from neck were mainly selected, combined with pattern differentiation. The reports all showed that acupuncture can regulate the immune function and thyroid function in HT patients.

Luzina K, *et al* treated 20 cases of HT coupled with hypothyroidism with acupuncture plus auricular acupuncture based on pattern differentiation. For acupuncture, bilateral Renying (ST 9) and Shuitu (ST 10) were selected as the major points, together with other points selected according to the pattern [Hegu (LI 4), Quchi (LI 11), Yanglingquan (GB 34), Zusanli (ST 36), and Guanyuan (CV 4) were added for yang deficiency; Endocrine (CO₁₈), Thyroid (AH₁₃), Sympathy (AH_{6a}), Shenmen (TF₄), Pituitary (AT₄), and Cortex (AT₄) for auricular acupuncture; Hegu (LI 4), Quchi (LI 11), Yanglingquan (GB 34), Zusanli (ST 36), and Taichong (LR 3) were added for qi depression transforming into fire; and Endocrine (CO₁₈), Thyroid (AH₁₃), Sympathy (AH_{6a}), Shenmen (TF₄), Pituitary (AT₄), Cortex (AT₄), Liver

(CO₁₂), and Spleen (CO₁₃) for auricular acupuncture]. Filiform needles of 40 mm and 25 mm in length were correspondingly used, combined with twirling reinforcing manipulations, and the needles were retained for 30 min each time, once every other day, totally for 20 times. After the treatment, the TSH and TMAb contents in serum significantly declined, while the contents of TGAAb and free thyroxine 4 (FT4) increased though without statistical significance, which was possibly due to the short treatment course^[11]. Thus, we can see that acupuncture can regulate the above indexes, plausibly via modulating the human immune system, nervous system, and endocrine system, and consequently produce a positive influence on the recovery of thyroid function.

4.1.3 Acupuncture/moxibustion plus medication

Acupuncture/moxibustion plus medication here means to take Western medication, such as Levothyroxine Sodium Tablets, when receiving acupuncture or moxibustion. Relative studies held that acupuncture/moxibustion plus medication can produce a more significant efficacy than dry Western medication, and can somehow reduce the adverse effects of Western medication and improve the quality of life.

Some researchers adopted moxibustion plus medication [*Fu Zi (Radix Aconiti Lateralis Preparata)* cake-partitioned moxibustion plus Levothyroxine Sodium Tablet] to treat HT^[12-17]. Eighty-five patients were randomized into a moxibustion-medication group of 42 cases and a Western medication group of 43 cases. In the moxibustion-medication group, two groups of acupoints were used alternately, i.e. Danzhong (CV 17), Guanyuan (CV 4) and Zhongwan (CV 12) versus Dazhui (GV 14), Shenshu (BL 23) and Mingmen (GV 4). The *Fu Zi (Radix Aconiti Lateralis Preparata)* cakes were of 0.4 cm in height and 2 cm in diameter. Each moxa cone was consisted of 2 g moxa wool. For each session, every acupoint was treated with 3 moxa cones successive, once every other day. The Levothyroxine Sodium Tablet was taken at a dose of 25 µg, once a day. After a month of treatment, the total effective rate was 25.0% in the moxibustion-medication group versus 7.5% in the Western medication group, and the difference was statistically significant, indicating a better therapeutic efficacy in the moxibustion-medication group^[12,15]. Regarding the effects in improving the contents of FT3 and FT4, the high metabolic syndrome, the neuromuscular score, declamation, photophobia, and the contents of thyroid peroxidase antibody (TPOAb), and TGAAb, the moxibustion-medication group was also statistically superior to the Western medication group^[13,15-17]. Moreover, the moxibustion-medication group acted faster than the Western medication group^[14]. The results suggested that herb [*Fu Zi (Radix Aconiti Lateralis Preparata)*] cake-partitioned moxibustion plus oral administration of Levothyroxine

Sodium Tablet can modulate the immune function of HT patients, and its effects in improving the HT-related symptoms, body signs, thyroid function, and the quality of life were more significant than dry Western medication.

Xu HF adopted moxibustion plus medication (herb-partitioned moxibustion plus Levothyroxine Sodium Tablet) to treat HT with hypothyroidism, and the herbal cake was consisted of powdered *Fu Zi (Radix Aconiti Lateralis Preparata)*, *Lu Jiao Shuang (Cornu Cervi Degelatinatum)*, *Rou Gui (Cortex Cinnamomi)*, *Ru Xiang (Olibanum)* and *Gou Qi Zi (Fructus Lycii)* mixed at 3:2:1:1:1. Fifty-nine patients were divided into a moxibustion-medication group of 30 cases and a medication group of 29 cases by their visiting sequence. The medication group was prescribed with Levothyroxine Sodium Tablet, orally taken at 1-2 µg/(kg·bw), once a day; the moxibustion-medication group was given herb-partitioned moxibustion at Dazhui (GV 14), Mingmen (GV 4), Danzhong (CV 17), Zhongwan (CV 12), Guanyuan (CV 4), bilateral Shenshu (BL 23) and Zusanli (ST 36), in addition to the same dose of medication. The moxibustion treatment was performed once a day, 2 cones each session for every point. For both groups, 28 d treatments were taken as a course, with a 2-3 d interval after a course, and totally 6 treatment courses were observed. After the treatment, the total effective rate was 86.7% in the moxibustion-medication group versus 75.9% in the medication group, and the difference was statistically significant. To talk about the items that reflect the thyroid function, the contents of FT3 and FT4 increased significantly, while the levels of TSH, TGAAb, and TPOAb dropped significantly in both groups after the intervention, and the improvements in the moxibustion-medication group were far more significant than that in the medication group. The above data indicated that moxibustion plus medication can produce a satisfactory result in improving the symptoms and regulating thyroid function in HT coupled with hypothyroidism, better than pure Western medication^[18].

Yin JJ adopted acupuncture plus medications to treat HT. Ninety-six patients were randomized into a treatment group and a control group, 48 cases in each group. The treatment group was intervened by acupuncture once per day, mainly at Neiguan (PC 6), Yanglingquan (GB 34), and Hegu (LI 4), with intense reducing manipulation. The needles were manipulated once every 10 min and were retained for 30 min each time. Meanwhile, Chinese medication was also ordered, named *Tong Luo Huo Xue* Decoction [consisted of *Chai Hu (Radix Bupleuri)*, *Yuan Hu (Rhizoma Corydalis)*, *Xiang Fu (Rhizoma Cyperi)*, *Dang Gui (Radix Angelicae Sinensis)*, *Sheng Di Huang (Radix Rehmanniae Recens)*, *Yi Mu Cao (Herba Leonuri)*, *Lu Lu Tong (Fructus*

Liquidambaris), and *Ban Xia (Rhizoma Pinelliae)*, 12 g each, plus *Mu Xiang (Radix Aucklandiae)*, *Yu Jin (Radix Curcumae)*, *Tao Ren (Semen Persicae)*, and *Quan Xie (Scorpion)*, 10 g each, for unblocking collaterals and activating blood flow], 1 dose every day, 2 months as a treatment course, totally for 1 course. The control group was prescribed with oral administration of Western medications, Mecobalamin 0.5 µg and Prednisone 10 mg each time, 7 d as a treatment course, totally for 3 courses. After the intervention, the symptoms, body signs, and thyroid function were improved in the treatment group, and the total effective rate was 87.5%, higher than 62.5% in the control group. It suggested that acupuncture plus Chinese medication should be effective in treating HT, and can produce a higher therapeutic efficacy than Western medication^[19].

4.2 Mechanism study on acupuncture-moxibustion in treating HT

The mechanism studies on the treatment of HT with acupuncture-moxibustion were mostly about the immune dysfunction. The observed indexes included cyclic adenosine monophosphate (cAMP), cAMP/cyclic guanosine monophosphate (cGMP), killer cells, circulating immune complex (CIC), and lymphocytes, etc. The research results revealed that acupuncture-moxibustion can regulate the indexes related to immune function and correct the immune dysfunction to some extent, which are possibly the action mechanism of acupuncture-moxibustion in treating HT.

4.2.1 Regulation of herb-partitioned moxibustion on cAMP and cAMP/cGMP in thyrocytes

Chen HP, *et al*^[7] and Wang XY^[10] found that the serum content of cAMP and cAMP/cGMP increased significantly after the intervention with herb-partitioned moxibustion in HT couple with hypothyroidism, while the indexes in healthy subjects didn't show obvious changes. Moreover, the serum content of cAMP and cAMP/cGMP were more significantly changed in patients with yang deficiency compared to that in the patients with qi deficiency, after intervened by herb [*Fu Zi (Radix Aconiti Lateralis Preparata)*] cake-partitioned moxibustion.

4.2.2 Regulation of herb-partitioned moxibustion on killer cells

Killer cells are a type of lymphocyte distinct from T cells and B cells, killing target cells via the mediation of the specific antibodies. Due to immune dysfunction in HT, the thyroid antibodies will attack thyroid follicular epithelial cells, which are closely related to the antibody-dependent cell-mediated cytotoxicity (ADCC).

Hu GS, *et al* studied the action mechanism of herb [*Fu Zi (Radix Aconiti Lateralis Preparata)*] cake-partitioned moxibustion in treating HT. After intervened by moxibustion, the ADCC and binding rate of thyroid microsomal antibodies (MCA) declined significantly.

Since the toxicity reaction of thyroid tissues depends on the binding of killer cells and thyroid antibodies, and the titer of MCA has a positive relation with the infiltration of thyroid lymphocytes, the decline of ADCC and binding rate of serum MCA indicated that the attack to thyroid follicular epithelial cells by thyroid antibodies was improved. Therefore, the therapeutic efficacy of moxibustion for HT is possibly related to the down-regulation of ADCC of killer cells and the activation of MCA^[20].

4.2.3 Regulation of herb-partitioned moxibustion on the ratio of lymphocytes

Lymphocyte is a type of immunocyte in human body, and normally its subsets maintain relatively constant ratios between each other, keeping the immune system in balance. Some studies held that the failure to maintain normal lymphocytes ratios should be related to autoimmune disorder.

Chen HP, *et al*^[22] and Hu GS, *et al*^[23] found that the OKT4⁺ ratio, OKT4⁺/OKT8⁺, and autorosette forming cells (ARFC) count in the peripheral blood of HT patients were higher than that of normal people. It suggested that HT patients have disordered T lymphocytes ratios and autoimmune disorder. After herb-partitioned moxibustion, the OKT4⁺ ratio and OKT4⁺/OKT8⁺ declined significantly, and the OKT8⁺ ratio increased markedly, indicating that herb-partitioned moxibustion can regulate the immune function, which should be through modulating the T lymphocytes ratios.

4.2.4 Regulation of herb-partitioned moxibustion on CIC

CIC is a type of medium-sized soluble immune complex, detectable in the serum of patients with autoimmune diseases. The change of CIC content is significant in determining the activity, treatment result, and prognosis of HT.

It's found that the transmission phenomena (e.g. feeling of a hot current flowing gently through the Governor Vessel or Bladder Meridian) in moxibustion treatment should be associated with the content of CIC^[21]. The CIC concentration significantly decreased in patients who had transmission phenomena; the concentration didn't show a significant change in those who didn't have transmission phenomena. CIC is the production after the binding of thyroid antigens and antibodies. The decline of CIC demonstrates a decrease of the binding and improvement of the abnormal immune state. Hence, we should pay attention to the transmission phenomena in moxibustion treatment.

5 Reflection and Prospect

Western medicine usually treats HT with long-term administration of thyroid hormone; a comparatively

smaller dose for those accompanied by hyperthyroidism; for severe cases, operation will be suggested. Although thyroid hormone can improve thyroid function, regular thyroid hormone test is required to adjust the dose of the drug. Otherwise, there may occur unstable symptom conditions and abnormal thyroid antibody levels, severely affecting the quality of life of the patients. Based on the relevant literatures, we believe that acupuncture-moxibustion, and acupuncture/moxibustion plus medication can improve the symptoms of HT, correct the immune state to some extent, and improve the quality of life. Unfortunately, the relevant literatures were mainly from 1990s, and rarely from the lately, mainly on moxibustion. Therefore, systemic studies on acupuncture and moxibustion in treating HT should be brought up in the future. In addition, there also existed following problems in the current literatures.

5.1 To standardize the study design

There is no unified standard for evaluating the therapeutic efficacy in treating HT, and the treatment result is usually judged by the improvement of symptoms, body signs, or thyroid function. Current clinical trials often lack of a rigorous design; the sample sizes are usually small and follow-up studies are various in length; the ethics and mental factors are rarely mentioned in the studies. Thus in the future, unified objective protocols are required to develop^[24], for evaluating the therapeutic efficacy and follow-up studies; multicenter large-sample-sized clinical trials are expected, with rigorous randomization, blinding, and control designs, for a higher credibility.

5.2 To explore the moxibustion features

HT patients usually present yang deficiency in the later stage, and moxibustion can effectively tonify yang qi and thus produce a satisfactory effect in treating HT. Nevertheless, the existent clinical trials are mostly focused on herb [*Fu Zi (Radix Aconiti Lateralis Preparata)*] cake-partitioned moxibustion, not involving other types of moxibustion, such as suspended and pressing moxibustion. Besides, although it's known that acupuncture-moxibustion plus medication is effective for HT, the relative studies are not deep enough, and it's still a question whether the combination of acupuncture/moxibustion can reduce the dose of Western medication.

5.3 To deepen the study on the action mechanism

It's kept unclear how acupuncture-moxibustion acts in the treatment of HT. Currently, most of the mechanism studies are clinical. More laboratory studies are needed to observe the regulatory effects of acupuncture/moxibustion from multiple aspects and layers. Th17 is a subset of T cells, mainly involved in autoimmune diseases and body defense^[25]. It's found that Th17 is closely associated with the onset and development of HT, and is a crucial T cell subset

participating in the abnormal immune responses in HT^[26]. 1, 25-dihydroxyvitamin D3 directly inhibits the proliferation of T cells, and thus can possibly regulate the immune function of HT patients^[27]. The positive expression of intercellular adhesion molecule 1 (ICAM-1), also known as cluster of differentiation 54 (CD 54), is obviously higher in HT patients than in healthy subjects. So, it's believed that CD54 also contributes to the work of antigen-presenting cell (APC)^[28]. Therefore, in the future, the mechanism of acupuncture/moxibustion in treating HT should be studied in association with the pathological and physiological process of HT. Moreover, it's unveiled that HT is a high risk factor of thyroid cancer and there is a link between the increase of thyroid autoantibodies and thyroid cancer^[29]. Hence, it's become an important project to prevent and treat HT and reduce its risk of developing into thyroid cancer. It's revealed by both domestic and overseas studies that HT has a predilection for females, manifested by methylation accompanied by X-chromosome inactivation (XCI), which is closely related to the onset and development of HT^[30-31]. Therefore, epigenetics is another channel to study the mechanism of acupuncture/moxibustion in regulating DNA methylation in HT, and to provide laboratory evidences for the clinical application of acupuncture/moxibustion for HT.

Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

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