

Discussion on the Treatment of Tourette Disorder in Children from the Spleen Perspective

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Abstract: In recent years, the incidence rate of tic disorder in children has gradually increased, and the etiology and pathogenesis are more complex, the course of disease is longer, which has caused adverse effects on children's learning, social life, etc., and has attracted more and more people's attention. According to the physiological characteristics of children with "spleen deficiency" and combined with the main clinical manifestations of this disease, many doctors believe that children with tic disorders are closely related to the spleen. Starting from the physiological function and characteristics of the spleen in traditional Chinese medicine, this article reviews the current situation of treating tic disorders from the spleen perspective.

1. Introduction

Tic disorder (TD) is a common neurological and psychiatric disorder in pediatrics, more common in childhood or adolescence. Its clinical manifestations include sudden, rapid, repetitive, involuntary movements and involuntary vocalizations in one or more areas. According to its clinical characteristics and duration, it can be classified as Tourette syndrome (TS) Chronic TD and transient TD are classified into three categories [1]. The pathogenesis of this disease is currently unclear, and studies have shown that its onset may be related to changes in neurological factors, genetic factors, immune function, social environment, and psychological factors [2]. Western medicine treatment mainly includes typical antipsychotic drugs such as tiaclopid, sulpiride, aripiprazole, and clonidine, as well as atypical antipsychotic drugs [3]. However, these drugs are prone to strong drug dependence and have a high recurrence rate after discontinuation. Long term medication can also bring many adverse reactions. Compared to this, traditional Chinese medicine has significant advantages in treating tic disorders based on syndrome differentiation. It can not only effectively improve tic symptoms, but also reduce the recurrence rate with fewer adverse reactions [4]. This disease does not have a specific name recorded in ancient literature, but can be classified into categories such as "dampness", "muscle swelling", "slow convulsions", and "convulsions" based on its clinical symptoms [5]. Traditional Chinese medicine believes that the occurrence of TD is influenced by a combination of multiple factors, but the root cause lies in innate and acquired factors. Children are born with the essence of their parents. If their parents are

born with insufficient essence and blood, it is easy for the children to have insufficient innate endowment, weak physique, and be easily affected by evil energy, leading to the imbalance of yin and yang in the organs and causing convulsions. Children are a body of childish yin and yang, with delicate organs that are not fully filled with qi. The five organs and six organs are incomplete and not yet strong. Improper postnatal care, damage to diet, and lack of emotional support can lead to the occurrence of tic disorders. At present, there is no unified TCM syndrome type and efficacy evaluation standard for this disease. There are many factors that lead to the occurrence of tic disorders in children, and many doctors have different understandings of the etiology and pathogenesis of this disease. Therefore, traditional Chinese medicine has a wide range of ideas in treating this disease. The book "Su Wen Xuan Ming Wu Qi" states: "The five organs store energy, the heart stores spirit, the lungs store soul, the liver stores soul, the spleen stores meaning, and the kidney stores energy." Its main pathological changes are closely related to the four organs of the heart, liver, spleen, and kidney. Therefore, this review starts from the characteristics of the spleen in traditional Chinese medicine and summarizes the current situation of treating tic disorders from the spleen as follows.

2. The basis for treating from the spleen

2.1. Primarily promoting and nourishing Qi and blood

The essence and qi stored in the five internal organs are the core of human life activities, and the spleen located in Zhongzhou is the source of qi and blood biochemistry, transforming all the necessary qi and blood for human life activities. As stated in the "Su Wen Bao Ming Quan Xing Lun": "People are born with the Qi of heaven and earth." As stated in the "Nan Jing": "Qi is the fundamental essence of human beings." The "Jing Yue Quan Shu Chuan Zhong Lu Zang Xiang Bie Lun" explains that "the use of the madam's body is to stop this Qi and blood. Although all five organs have Qi and blood... The so-called Qi governs the warming, and blood governs the nourishing" [6], the organs and tissues of the human body, as well as all four limbs and bones, all rely on the Qi and blood to nourish the spleen.

In the five elements of traditional Chinese medicine, the spleen belongs to the earth and can conceive life and nourish all things. The "Hongfan Chapter of the Book of Commerce" states: "The earth is the mother of all things. If the spleen and soil are well nourished, then the diet water and grains will be refined, which can reach the whole body, nourish the body, nourish the five internal organs of the human body, and make the body strong and healthy. The "Complete Book of Jingyue - Blood Syndrome" states: "If a person has yin and yang, it is qi and blood... life depends on this, only then oneself." Qi governs warmth, blood governs nourishment, and one yin and one yang, forming and maintaining vitality. Qi and blood depend on the circulation function of the spleen and stomach, mainly derived from the subtle transformation of water and grain essence. Therefore, the spleen and stomach are referred to as the "source of qi and blood biochemistry".

2.2. Nurturing innate and acquired

Yuanqi is the driving force required for life activities, which is transformed by the innate kidney essence. After birth, although people no longer rely on their parents' innate essence, Yuanqi can still continuously fill and develop, relying on the continuous nourishment of the acquired spleen and stomach qi. The "Spleen and Stomach Theory" states: "The abundance of vital energy is caused by the Qi of the spleen and stomach, which is not damaged, but can nourish the vital energy... The Qi of the spleen and stomach is damaged, but the vital energy cannot be replenished, and all diseases are born from it. Only by ensuring the abundance of qi in the spleen and stomach can the vital

energy be nourished and replenished. If the spleen and stomach are weak, the vital energy will lose its nourishment. The primordial energy transformed by congenital kidney essence has been constantly consumed, and the reason for its continuous filling and development is that it is constantly nourished and enriched by the water grain essence that is transported by the spleen and stomach.

The essence of water and grain generated by the transformation of the spleen and stomach has a pure and gentle nature, and those parallel to the meridians are called Yingqi; It has the characteristics of being fierce and slippery, and those that run parallel to the outside of the pulse are called Wei Qi; And Zongqi is called for the combination of the essence of water and grain generated by the spleen and stomach, and the clear qi flowing in and out of the lungs; Rong Qi, Wei Qi, and Zong Qi all belong to the acquired Qi, which is generated from the valley qi absorbed by the spleen and stomach.

2.3. Main Ascending, Clearing, Transporting, and Removing Moisture

Diet enters the stomach, and through the functions of spleen circulation and clearance, the refined substances in the diet are delivered to the bones and muscles of the body and limbs, providing nutrition for the body and making it strong. The "Su Jian · Wei Lun" states that "the spleen governs the muscles of the body". If the spleen is deficient and lacks energy, the clear yang will not be distributed, and all nourishment will be lost, resulting in weak and weak muscles throughout the body. Supplementing water and grain essence to the spleen helps to regulate the flow of stomach qi; The stomach receives nourishment and reduces turbidity, which in turn helps the spleen to ascend. The ascending and descending of the spleen soil in Taiyin and the stomach soil in Yangming are related to each other, and the absorption and transportation are coordinated. Therefore, the clearing, ascending, and turbidity lowering are normal. The clear yang is on the top, the turbid yin is on the bottom, the clear qi is transmitted through the spleen, and the turbid qi is transmitted through the stomach. The stomach yang is opposed to the spleen yin, and the rise and fall are due to each other, so that the middle qi is healthy and there is no worry of dampness and evil.

2.4. Warm and Rising Yang, Dry and Damp

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Under the joint action of qi qi and spleen yang warming, the spleen and stomach transform the included diet into water and grain essence, providing the most basic material basis for life activities. In the "Spleen and Stomach Theory", it is said: "When food enters the stomach, it first enters the Yang channel, and the Yang qi rises and floats. When it floats, the Yang qi is scattered throughout the skin; when it rises, it fills the top of the head, and the nine orifices are unblocked." "The spleen

is a viscera of the Tai Yin, which is evil for dampness and likes dryness. When dryness occurs, the clear Yang qi of the spleen rises to warm the heart and lungs." It is also said: "In general, the spleen and stomach are weak, and the Yang qi cannot grow... The Qi of the five organs is not generated. If the spleen and stomach are weak, the yang qi does not rise. As stated in the "Lingshu": "The spleen serves as the guard" [7]. If the spleen's "yang" deficiency weakens and is unable to transport and transform water, it will lead to internal stagnation of water, dampness, and phlegm.

3. Starting from the Spleen for Treatment

3.1. Spleen deficiency and phlegm accumulation

The function of the spleen in regulating the circulation and transformation is mainly played by the spleen qi and spleen yang. If one's temper is insufficient and develops gradually over time, it will accumulate spleen yang. On the one hand, spleen yang can decompose and transform food and water grains, and on the other hand, it has the function of yang and water grains playing a warm and warm role [8]. If the spleen yang is insufficient, the normal operation of qi, blood, and body fluids is disrupted. As the foundation of postnatal development, the spleen can not only nourish the body's organs and bones by transforming dietary substances into water grains, but also serves as an important hub for the body's fluid metabolism. Based on its physiological characteristics of being a soil organ, liking dryness and detesting dampness, the spleen is prone to being trapped by internal and external dampness. As recorded in "Su Wen Zhi Zhen Yao Da Lun", "All dampness and swelling belong to the spleen. The spleen is responsible for the circulation of water and dampness, but the spleen loses its healthy circulation and cannot normally circulate water and dampness. The water and liquid stop flowing and accumulate into phlegm. There are also "many diseases caused by phlegm", where phlegm can reach the head, face, and clear the body along the meridian, causing blinking, sniffing, mouth twitching, language repetition, and obscene language; It can flow down to all four limbs and cause involuntary twitching of the limbs muscles. Spleen deficiency leads to dysfunction of the main transport function, and the water in the body stops accumulating to produce dampness and phlegm. Those with insufficient innate endowment or acquired disease and subsequent malnutrition are prone to damage the spleen and stomach, resulting in spleen deficiency, retention of water and moisture, and accumulation of phlegm. The combination of phlegm and wind and evil is easy to block the channels and collaterals of the internal organs and orifices. The eyelids, as early as in traditional Chinese medicine, are called cellular eyelids and flesh rings. They belong to muscle tissue, and the spleen is the main muscle. Therefore, they belong to the spleen in the viscera. If the wind and phlegm agitate and clear the upper body, it can be seen as squeezing the eyebrows and blinking the eyes. The spleen opens the mouth, and its bloom is on the lips. If wind and phlegm obstruct the meridians, abnormal movements such as crooked mouth and twisted mouth can be seen in the mouth and lips. The spleen governs the muscles, with insufficient qi and blood. If the muscles and veins lose their nourishment, muscle movements can be seen, resulting in involuntary twitching of the limbs. The spleen loses its healthy circulation, the water and grain essence undergoes abnormal circulation, and there is a lack of biochemical source of qi and blood. Insufficient qi and blood can lead to a loss of mental health, resulting in inattention and difficulty in learning. Phlegm accumulates in the chest, obstructing the mind, leading to a grumpy temper, chest tightness, coughing, and a strange sound in the throat. Phlegm is easy to accumulate and disperse, so convulsions can be seen at different times, with mild and heavy movements. The function of the spleen in regulating the circulation and transformation is mainly played by the spleen qi and spleen yang. If one's temper is insufficient and develops gradually over time, it will accumulate spleen yang. On the one hand, spleen yang can decompose and transform food and water grains, and on the other hand, it has the function of yang and water grains playing a warm and warm role. If the spleen

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Wang Chunrong [9] believes that the spleen governs the muscles, and the occurrence of tic disorders in children is closely related to the spleen. Spleen deficiency and phlegm accumulation, For those with symptoms related to the spleen, such as eyebrow blinking, grinning, and crooked mouth, and those with recurrent tics that persist but cannot be cured, Xiangsha Yigong San and Sijunzi Tang can be added and reduced to achieve the goal of regulating qi and strengthening the spleen, while the tics gradually disappear [10].

3.2. Spleen deficiency and liver hyperactivity

Children's spleen is not fully formed, their temperament is not strong, and they are fond of eating fat, sweet, and thick flavors, which can transform dampness and generate heat, accumulate stagnation in the gastrointestinal tract. Over time, the spleen loses its vitality, and soil deficiency leads to numbness and internal movement of the liver wind. As stated in Wan Quan's "Secret to Infant Care": "Spleen deficiency leads to vomiting and diarrhea, which leads to wind. This spleen soil fails and the liver wood takes advantage of it." Children's inherent physiological spleen is often insufficient, and their diet is not self regulated. If they overeat fatty, sweet, thick, and greasy foods, it is very easy to damage the spleen and stomach, causing spleen deficiency without sufficient biochemical qi and blood. If they cannot nourish the liver wood normally, it can lead to liver wood

hyperactivity and wind. Wind is the root of all diseases, and when done well, it can cause frequent and unstable convulsions in multiple parts of the head, face, and limbs; Children are the body of childish yang, with excess yang often present. They have the physiological characteristics of "liver often having excess yang, spleen often lacking". The liver is the organ of wind and wood, and the spleen is the soil of excessive yin and dampness. The two can mutually restrict and promote each other in physiology to maintain the balance of yin and yang. If indulging in fatty, sweet, and flavorful foods, as well as craving for raw and cold foods, causes damage to the spleen and stomach function, then the spleen deficiency and liver hyperactivity are excessive and cannot be controlled, resulting in the syndrome of spleen deficiency and liver hyperactivity; Or due to the child's lack of emotional desire, the liver qi may rise too much, causing a retrograde attack on the spleen, which can also form the syndrome of spleen deficiency and liver hyperactivity. The Criterion for the Diagnosis and Treatment of Preschool Medicine - Slow Shock "states:" Aquatic liver wood, wood is weathered, wood overcomes spleen soil... shoulders slightly raised, hands drooping, and shaking constantly from time to time, called slow shock. "As also stated in the" Miscellaneous Works of Ming Medicine ":" If the spleen and stomach are deficient, the liver wood will invade, and doctors will see various symptoms such as convulsions, convulsions, and shaking. "The spleen is the source of phlegm, with a preference for food that harms the qi in the spleen and stomach, resulting in the loss of spleen circulation, phlegm dampness, and internal generation, causing liver wind to cause muscle twitching, Disturbance along the meridians can lead to symptoms such as blinking and nasal dilation [11].

Wang Sumei believes that the root cause of children's tic disorder is spleen deficiency, where phlegm obstructs the meridians due to spleen deficiency. Spleen deficiency cannot control liver numbness and produce wind. She proposes the pathogenesis of spleen deficiency, liver hyperactivity, and disturbance of wind and phlegm, emphasizing the fundamental treatment method of "supporting soil and suppressing wood". In clinical practice, Jianpi Zhidong Tang is often used with modifications [12].

4. Summary and Outlook

The name of children with tic disorders is not recorded in ancient Chinese medicine literature, but based on its clinical manifestations, this disease can be classified as chronic convulsions, convulsions, spasms, and other categories. However, the relationship between this disease and the spleen is closely related. The loss of spleen function, spleen deficiency, and liver dysfunction can all lead to the occurrence of this disease. The spleen is the source of qi and blood biochemistry, the foundation of the five zang organs, and its visceral image system is centered around "the spleen governs the circulation and circulation of blood" [13]. Internal injury to the spleen and stomach not only causes internal organ diseases due to its own functional impairment, but also affects other four organs and even leads to abnormal overall qi movement, leading to multi organ and multi system diseases [14]. Traditional Chinese medicine believes that "if the spleen is healthy, external evil will not invade, and if the spleen is deficient, external evil will invade." If the spleen loses its vitality, the water and grain essence will have no biochemical activity, resulting in a lack of firmness in the defense of the yang and a weakened body's defense ability, making it easy to be confused by external evil [14]. The physiological function and characteristics of the spleen can well explain the close relationship between children's tic disorders and the spleen in traditional Chinese medicine. In clinical practice, methods such as regulating qi and strengthening the spleen, soothing the liver and resolving phlegm are used for treatment. Traditional Chinese medicine has a definite therapeutic effect on children with tic disorders, with minimal side effects, and high recognition among children and parents. The treatment of children with tic disorder from the perspective of spleen deserves

further in-depth research, providing new treatment ideas and methods for clinical treatment of this disease. At present, the "treatment of tic disorders in children based on the spleen" still requires long-term large-scale, multicenter, and large sample clinical randomized controlled trials to provide accurate evidence-based medical evidence and ensure the accuracy and effectiveness of research results, in order to better apply them in clinical practice.

References

- [1] Arbanas G. *Diagnostic and statistical manual of mental disorders (DSM-5)* [J]. Washington, DC: American Psychintripub, 2013:81-82.
- [2] Lori L Olson. *Tourette Syndrome: Diagnosis, Strategies, Therapies, Pathogenesis, and Future Research Directions* [J]. *Journal of Child Neurology*, 2006, 21(8):630-641.
- [3] Tagwerker Gloor Friederike, Walitza Susanne. *Tic Disorders and Tourette Syndrome: Current Concepts of Etiology and Treatment in Children and Adolescents* [J]. *Neuropediatrics*, 2016, 47(2):84-96.
- [4] Rong Ping, Ma Rong, Zhang Xilian, et al. *Multicenter consistency evaluation of clinical diagnosis and treatment guidelines for pediatrics of traditional Chinese medicine: tic disorders* [J]. *Tianjin Journal of Traditional Chinese Medicine*, 2018, 35(08):580-582.
- [5] Wu Dahua. *Clinical review of traditional Chinese medicine in the treatment of tic-Tourette syndrome* [J]. *Traditional Chinese Medicinal Research*, 2006(02):52-54.
- [6] Chen Jing, Li Lan. *Study and Analysis on the Medication Rules of 'Jingyue's Complete Works-Children's Ancient Prescription'* [J]. *Journal of Zhejiang Chinese Medical University*, 2021, 45(10):1098-1103+1106.
- [7] Li Shenghua, Liu Yifei, Xie Xingwen, et al. *Discussion on Correlation Between Osteoporosis and Intestinal Immunity Based on the Theory of "The Spleen for Defend"* [J]. *Chinese Journal of Information on Traditional Chinese Medicine*, 2019, 26(10):7-10.
- [8] Wei Xinyi, Huang You, Zhou Jingwei, et al. *Experimental Research of Piyangxuzheng and Critical Issues of Related Clinical Diseases* [J]. *Pharmacology and Clinics of Chinese Materia Medica*, 2022, 38(04):154-161.
- [9] Wang Chunrong. *Analysis of the treatment of pediatric multiple tics from the spleen and stomach* [J]. *Research on Integrated Traditional Chinese and Western Medicine*, 2017, 9(02):109-110.
- [10] Zhang Xinxin, Ma Rong, Li Yaping. *Research progress of TCM on tic disorder in children* [J]. *China Journal of Traditional Chinese Medicine and Pharmacy*, 2020, 35(12):6241-6244.
- [11] Zhang Yuan, Wu Liqun. *Treatment of Tourette Disorder in Children from the Liver Perspective* [J]. *World Journal of Integrated Traditional and Western Medicine*, 2016, 11(04):582-584.
- [12] Liu Fang, Wang Sumei. *Wang Sumei's experience in using Futu wood suppression method to treat children's tic disorders* [J]. *Journal of Traditional Chinese Medicine*, 2021, 62(24):2131-2134.
- [13] Wang Caixia, Cui Jiapeng, Qin Wei, et al. *On the spleen as the foundation of the five internal organs* [J]. *Liaoning Journal of Traditional Chinese Medicine*, 2016, 43(4):744-746.
- [14] Yuan Dongchao, Wang Caixia, Cui Jiapeng, et al. *Discussion on Core Pathogenesis of Spleen-Related Diseases Based on Ontology* [J]. *Liaoning Journal of Traditional Chinese Medicine*, 2017, 44(11):2304-2306+2462.