

Advances in Chinese and Western Medicine Research on Autism Spectrum Disorders

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Abstract: Autism spectrum disorder is a pervasive developmental disorder that occurs before the age of 3 years. It is a disorder of abnormal neurodevelopment in children caused by a combination of genetic and multiple unknown causes. In this paper, we collected a large number of samples of children with autism spectrum disorder from the perspectives of Chinese and Western medicine etiology and Chinese and Western medicine treatment. By systematically summarizing and analyzing the principles of its occurrence, we summarize the most effective ways to solve the problems of children with autism spectrum disorder at present, so that social workers and parents who carry out diagnosis, education and training of children with autism can choose more targeted educational methods or diagnosis methods that are beneficial to children. This will enable more and more autistic children to regain their mental health and move towards a normal life as soon as possible, thus reducing family education and social pressure.

1. Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that occurs primarily in children before the age of 3 years and is also known as autism; it has three core clinical manifestations: impaired interaction and communication, narrow interest areas, and repetitive stereotyped activities, and is accompanied by varying degrees of intellectual, sensory, and emotional disorders, and gastrointestinal disorders. It is often combined with neurological activity problems, such as sleep disturbances, attention issues, impulsive hyperactivity, and sensory abnormalities. Approximately 70% of children with ASD have co-morbid cognitive impairments such as learning and memory difficulties [1]. ASD has common co-occurring issues: (1) co-occurring growth and developmental related problems (intellectual disability, language development disorders, and attention deficit hyperactivity disorder); (2) co-occurring somatic problems (nutritional problems, eating behavior problems, gastrointestinal problems, sleep disorders, and epilepsy); (3) co-occurring emotional behavior disorders (vulnerability to external stimulus behavior, anxiety disorders)[2]. According to the World Health Organization, the total number of children with autism in China is currently about 600, 000-1, 800, 000, but some researchers propose that its actual total can exceed 2, 600, 000-8, 000, 000[3], and with the gradual increase in incidence,

this will put a lot of pressure on families and society. In this report, we will collect data on ASD patients from various sources, systematize and dig out their occurrence patterns, and summarize the effective methods currently used to prevent and treat children with autism, so as to provide reference for social workers and parents who are carrying out diagnosis, education and training of children with autism to choose training or care methods that are more beneficial to children according to their different conditions, so that more children with autism can recover as soon as possible. In this way, more children with autism can recover their physical and mental health and return to normal life as soon as possible, thus reducing the pressure on families and society.

2. Progress in research on the etiology of autism

2.1 Traditional Chinese medicine etiology

The study of autism in children started relatively late in traditional Chinese medicine, and there is no name of "autism spectrum disorder in children" in ancient Chinese textbooks. However, the clinical manifestations of "dullness", "fetal weakness", "delayed speech", etc. described by traditional Chinese medicine practitioners are quite similar to those of ASD. According to TCM, the main site of autism is the brain, and is associated with the heart, liver, kidneys and other organs [4].

The heart is the master of the mind. If the heart orifice is not working, it is because the mind has lost its nourishment. The "Spiritual Pivot" says: "The heart is the house of the gods", which means that the heart plays a leading role in human survival activities, but if the patient's clinical manifestation is gibberish or confused thinking, the physiological function of the heart, which is the master of the gods, is malfunctioning. If there is a communication problem, slurred speech, slurred spelling, or self-talk, the heart meridian is not working; "Su Wen - Yin Yang Ying Xiang Da Lun" says: "The heart opens the orifice in the tongue", that is, the heart qi passes through the tongue, so as long as the heart qi is abundant, the tongue body can be soft and dexterous, so as to express smoothly and speak eloquently.

The liver is the master of drainage, if the body's qi is out of order, it is because the liver is out of order. The "Suwen - Linglan Secret Discourse" says: "The liver is the Commander's official, and the strategy comes out." The rise and fall of liver qi plays an important role in the emotional regulation of the child. If the liver is not drained, the patient's expression will be apathetic, impatient and irritable. If the liver meridian is open to the eyes, if the patient is clinically averted in the eyes or does not communicate with the eyes at all in interactions, it is because the liver qi is stagnant, the essence and blood of the liver cannot reach the eyes, and the eyes are not moistened by the essence and blood and malfunction.

The kidneys are the main reservoir of essence, so if a child has a deficiency of kidney essence, it is mostly due to congenital defects. The "Yellow Emperor's Classic of Internal Medicine" says: "The kidneys collect essence, the essence produces marrow, and the marrow nourishes the bones." The "Spiritual Pivot - Sea Theory" says: "The brain is the sea of marrow." The kidneys are the foundation of the innate nature, harboring essence and producing marrow. If the kidneys are deficient in kidney essence, the brain and marrow of the child will be defective, which is manifested by the malfunction of mental activities, because the vital energy cannot be nourished by the brain and marrow. If the mother's emotions are strongly affected during pregnancy or the body is deprived of essential nutrients, this will cause the fetus to have a congenital lack of endowment, a deficiency of kidney essence, a defect in the development of the brain marrow, and the child will exhibit mental retardation.

The spleen is the master of transportation and transformation, and the spleen and stomach are the sea of water and grain, the foundation of the latter. However, because of the physiological characteristics of children, the spleen and stomach are often deficient, so the function of the spleen

and stomach is not yet fully developed, incompetent in transportation and transformation, and insufficient in biochemistry, resulting in the inability of water and grain essence to reach the heart, and the loss of nourishment for the heart and mind, which is clinically manifested by the child's atrophy, preference for curling up to sleep, and abnormalities in spirit, consciousness, and thinking activities.

In summary, based on the investigation of the causes of autism spectrum disorders, modern scholars of Chinese medicine have made dialectical typing of autism through dialectical studies of the eight syllabuses, six meridians and internal organs of TCM, and most researchers have proposed that the locus of autism is mainly in the brain and associated with the heart, liver, spleen and kidney[5], ancient medical practitioners proposed that the brain is associated with human mental activity and with people's sight, hearing, language and action[6], while the rest of the internal organs are mostly responsible for the different clinical manifestations of autism patients by directly influencing the formation of the brain marrow, so the brain is most closely related to the pathogenesis of autism. The types of identification of children with autism can be mainly divided into liver and kidney deficiency type, heart and spleen dual deficiency type, as well as spleen deficiency and phlegm obstruction type, and spleen and kidney incompatibility type.

2.2 Western medical etiologies

At present, the cause of ASD is unknown in modern medical research, and there is no specific drug treatment. In clinical practice, treatment is difficult and diverse. With further research, it has been found that ASD is a disease caused by a combination of genetic and environmental factors, and is closely related to genetics.

Genetic inheritance-the causative factor of autism spectrum disorders[7]. Currently, studies have demonstrated that the prevalence of ASD in siblings is as high as 50% and may be associated with 5-6 important genes and up to 30 other genes. At the 2003 International Congress of Human Genetics in the United States, some geneticists suggested that the occurrence of ASD is associated with certain inherited variants of human chromosome 7q.

The environment-the main influencing factor of autism spectrum disorders[8]. The occurrence, development and prognosis of ASD may be induced indirectly or directly by environmental factors. External physical and chemical environmental factors can trigger the onset of ASD and may also be a factor in the exacerbation of ASD symptoms. Thus, some chemical agents such as pesticides, insecticides and food additives can be harmful, while some toxic heavy metals such as cadmium, lead and cadmium can be harmful to the human nervous system. The influence of the environment on the generation, development, and prognosis of autism is also increasing and has received great attention as a future social priority for scientific research[9].

3. Chinese and Western medicine treatment of autism spectrum disorders

3.1 Traditional Chinese Medicine Treatment

The treatment of autism in TCM is mainly based on Chinese medicine and acupuncture therapy, of which acupuncture therapy is the mainstay[10], but also auricular compresses and pediatric tui-na are used as auxiliary treatments.

3.1.1 Acupuncture treatment

The protocol has been experimented and studied by various scholars, and the following are the main ones: head acupuncture, Jin San acupuncture, tongue acupuncture, electro acupuncture,

auricular acupuncture, acupoint injection, plum blossom acupuncture[11], abdominal acupuncture, and seven-star acupuncture[12]. For head acupuncture therapy: (1)Yuan Qing et al[13]used traditional Jin San acupuncture for acupuncture point treatment, (2)Zeng Haihui et al[14], on the other hand, used head acupuncture to moxibustion parietal lobe, temporal lobe and other cortical projection sites to improve their regional blood circulation, and added temporal three acupuncture and tongue three acupuncture based on ancestral Jin San acupuncture, and the main mechanism of this protocol to prevent and treat autism may be to improve the patient's consciousness function[15]. Tongue acupuncture: Li Ling et al[16] demonstrated that tongue acupuncture is highly effective in the targeted treatment of pediatric imitation, somatic coordination, and social cognitive functions, and other studies have also shown that tongue acupuncture can also modify several co-occurring phenomena in children with autism, which includes: partiality, sleep disturbance, inattention, and hyperactivity.

3.1.2 Traditional Chinese medicine treatment

The main treatment is the combination of the four organs: heart, liver, spleen, and kidney, mainly through the four diagnoses of Chinese medicine and the diagnosis and treatment of the symptoms. The main types: liver and kidney deficiency type, heart and spleen dual deficiency type, spleen deficiency and phlegm obstruction type, and spleen and kidney incompatibility type.(1)Liver and kidney deficiency type that is the lack of innate essence, need to fill the marrow, nourish the liver and kidney, so Zuo Gui Wan plus or minus treatment, kidney essence deficiency is more can be combined with Liu Wei Di Huang Wan, so as to nourish the liver and nourish the kidney, smart ears;(2)Heart and spleen two deficiency type that is the sea of water and grain supply is insufficient, need to nourish the heart and spleen qi, strengthen the spleen and nourish the body, so the treatment with GUI PI Tang combined with Yang Xin Tang plus reduction, ASD patients are often accompanied by intellectual developmental disorders, can be equipped with calamus, Yu Jin and other phlegm-opening drugs;(3)Spleen deficiency and phlegm obstruction type, that is, the spleen is weak, unable to transport and transform, and the water is unevenly distributed and condensed into phlegm, all diseases are caused by phlegm, so it is necessary to regulate the qi and strengthen the spleen to resolve phlegm, so it is necessary to add and reduce Di Tan Tang with Er Chen Tang. This method should be noted that children are born with a weak spleen and stomach, so after resolving and cleaning phlegm, it is necessary to use Shen Ling Bai Zhu San and other tonics to protect the acquired spleen and stomach;(4) Spleen-kidney incompatibility type that is if the child is congenitally insufficiently endowed with a deficiency of kidney essence and also has an acquired weakness of the spleen and stomach, it is important to take care of the acquired spleen and stomach while strengthening the congenital constitution, on one hand, regulating the balance of intestinal flora and improving the gastrointestinal symptoms of the child, and on the other hand, adjusting the balance of yin and yang of the whole body of the child. Professor Wang Junhong attaches great importance in regulating the spleen and stomach to suppress all diseases, and the treatment is Baohe Wan with the Shiwei Wendan Tang to transport the spleen and tonify the kidneys, resolve phlegm and open the orifices[17].

3.1.3 Tui-na therapy

The use of pediatric Tui-Na method can solve the problem of difficulty in taking medication for some children, and through the dredging of meridians, it can promote the regulation of internal qi and blood, and the dredging of peripheral meridians, so as to alleviate the clinical phenomenon of treatment for autistic children, thus effectively improving the internal functions of children, balancing the body's yin and yang, regulating the "essence, qi, and spirit" of the peripheral body and

"constipation" and other gastrointestinal symptoms and "Constipation" symptoms of the gastrointestinal tract, thus significantly improving the consciousness, movement, speech and action of autistic children. Qiu Lihua et al[18] randomly divided 70 children with ASD into an observation group and a control group, where the control group took general care and behavioral treatment, while the observation group took pediatric Tui-Na treatment basically in the control group. The results of the trial showed that the total effective rate of the control group was 57.14%, while the total effective rate of the observation group was 80.00%, which was significantly better than that of the control group. The difference between the two groups was more statistically significant ($P < 0.05$). The test demonstrated that the efficacy of TCM pediatric massage in preventing autism spectrum problems is more significant, and pediatric massage has the advantages of being simple, inexpensive and effective, providing new methods and new ways for the treatment of autism.

3.2 Western medical treatments

Since the cause of ASD is still unclear, there are no specific drugs available, and the clinical treatment is complex and controversial. As people continue to study the condition in depth, modern medicine treats ASD mainly by taking antipsychotic drugs for medical treatment.

3.2.1 Drug treatment

There is no specific medicine for ASD, but to improve some of the clinical manifestations of children with ASD such as stereotypy[19], withdrawal, aggressive behavior, hyperactivity, fidgeting, attention deficit disorder, irritability, excitability, repetitive and self-injurious behavior, antipsychotic and antidepressant drugs can be used reasonably[20], which can directly or indirectly improve the effect of educational training and improve the social interaction ability of children with ASD[21]. There are different drugs that have been widely used in clinical practice, and for psychiatric problems that are emotionally prone to shock and hyperactivity[22], there are also risperidone, aripiprazole, haloperidol, olanzapine, buspirone, fluoxetine, sertraline, and valproate[23]; antidepressants and colistin have shown significant improvement in the clinical manifestations of hyperactivity, irritability, and psychotic disorders. The FDA has also approved risperidone and aripiprazole for agitation and movement disorders in patients with ASD[24]. Because of the adverse effects associated with the long-term use of these drugs, physicians should consider the severity and impact on children. In future experimental studies, we have yet to increase the total number of samples, extend the experimental period, and monitor the changes of patients' various systems, so as to provide more theoretical and practical support for clinical use.

3.2.2 Non-pharmacological interventions

There are many pharmacological treatments for ASD, but most of them have different side effects and adverse reactions, and drug treatment can only improve the clinical manifestations of some co-morbidities or secondary morbidities, but does not address the core symptom of their mutual communication impairment[25], in contrast, parents of children with ASD prefer non-pharmacological interventions.

3.2.2.1 Education and training

Children with ASD have problems with many aspects of self-care in daily life, including verbal communication, social interaction, and interpersonal relationships, so intensive educational training is needed to improve the child's performance of these skills. The current mainstream idea of comprehensive treatment of ASD is to provide educational interventions for children, to study

educational intervention programs individually and to develop appropriate programs according to the different clinical manifestations of different children. So there are many ways to educate these children, and one of them is to integrate rehabilitation training into classroom training so that the two are integrated. The most targeted teaching and training plans are developed for the specific symptoms of the child, individual assessment, educational training, and in individual assessment, and so on and so forth, with continuous exercise in the home under the guidance of a professional doctor. From kindergarten to elementary school, from elementary school to primary education, until the child has the ability to take care of themselves.

3.2.2.2 Music therapy

Currently, the most widely accepted standard complementary therapy is music therapy, in which children listen to specially modulated music. Music can be seen as a stimulant that plays a positive role in promoting recovery in children with ASD. By listening to music and undergoing musical self-healing, the child can reduce stereotypical behaviors and alleviate anxiety and isolation, thus stimulating auditory function, brain activity and the central nervous system, and in this way improving the child's communication, emotional and behavioral disorders. Some data also suggest that music therapy has a positive impact on selective attention skills in children with ASD.

3.2.2.3 Psychological treatment

Some domestic scholars have studied the effects of the role of parents of children with ASD as guardians of their children, their mental health status, and their understanding of the disease on their children's recovery, and found that a positive psychological state of the child's parents can be of great benefit to the child's recovery[26]. Therefore, the role of guardian psychotherapy in the treatment of children should be strengthened, and the whole society should be called upon to correctly understand autism spectrum disorders and pay attention to psychotherapy, training and education for children with the disorder[27].

4. Summary

ASD is an extremely complex developmental disorder. Its etiology is still unclear and its clinical presentation is complex. It is usually accompanied by a variety of developmental disorders and abnormal emotional behaviors that interact with each other[28]. The incidence of the disease is gradually increasing and is extremely disabling[29], with a long diagnostic period and slow outcome. When the cause of autism is unknown, people can use the "holistic view" and "diagnosis and treatment" of Chinese medicine to diagnose autism, and treat the disease by combining holistic diagnosis and dialectical analysis from the manifestations of autistic children; they can also reduce the incidence of autism by improving the child's physical fitness and strengthening the child's resistance, and even actively intervene in the early stages of autism when the disease is still mild to avoid deterioration. Hence, TCM has a good prospect in the prevention and treatment of autism[30]. Meanwhile, scientific studies in recent years have shown that acupuncture therapy, auricular pressure patch, and Tui-Na therapy can achieve good efficacy. Through molecular genetic studies of autism, modern medicine can further understand the etiology and pathogenesis of autism at the genetic level and explore effective ways to control the incidence of autism, with the aim of achieving early screening, early diagnosis, early prevention and effective treatment of autism by combining Chinese and Western medicine in the near future.

References

- [1] Zablotsky B, Black LI, Maenner MJ, et al. Estimated prevalence of autism and other developmental disabilities following questionnaire changes in the 2014 national health interview survey[J]. *Natl Health Stat Report*, 2015, 2015(87):1-20.
- [2] Developmental Behavior Group of the Pediatrics Branch of the Chinese Medical Association, Child Health Professional Committee of the Pediatrics Branch of the Chinese Medical Association, Research Group on Techniques and Standards for the Diagnosis and Prevention of Childhood Autism Project. Principles of identification and management of common co-occurring problems in children with autism spectrum disorders [J]. *Chinese Journal of Pediatrics*, 2018, 56(3):174-178.
- [3] Li Jing. Research Report on the Status of Children with Autism. Beijing Autism Rehabilitation Association, 2009, <http://www.guduzheng.net/2009/6/20908.html>.
- [4] Qu Lifang. On the relationship between autism in children and the Huangdi Nei Jing's "making the dao inaccessible" and "the mind is the director of things"[J]. *Chinese Journal of Traditional Chinese Medicine*, 2012, 27(10):2727-2729.
- [5] Hongyi Y U, Aiping L. Current Situation of Chinese and Western Research on Hair Disorders[J]. *Journal of Liaoning University of Traditional Chinese Medicine*, 2019.
- [6] Li Yewen, Zhang Rong. Progress of research on acupuncture treatment of autism in children [J]. *Acupuncture Research*, 2012, 37(3):242-246.
- [7] Kidd PM. Autism, an extreme challenge to integrative medicine. Part 1: the knowledge base [J]. *Altern Med Rev*, 2002, 7(4):292-316.
- [8] Guo Dehua, Yang Guangxue. Environmental factors and autism [J]. *China Chronic Disease Prevention and Control*, 2012, 20(5): 599-603.
- [9] Li Nuo. Current status of Chinese medicine's understanding and treatment of autism [A] // China Rehabilitation Research Center. Proceedings of the Third Beijing International Rehabilitation Forum [C]. Beijing: China Rehabilitation Research Center, 2008:1.
- [10] Yuan Qing. Column on the promotion of appropriate technology for rural Chinese medicine by the State Administration of Traditional Chinese Medicine (66): Jin San Acupuncture technique for the treatment of autism in children [J]. *Chinese Rural Medicine*, 2012, 19(9):85-86.
- [11] Wang Yuxing, Li Lei. Analysis of research ideas on the treatment of pediatric autism with acupuncture [J]. *Chinese Medicine Guide*, 2012, 10(32):68-70.
- [12] Ouyang Junhui, Chen Tiantian, Ma Bingxiang. A literature study on acupuncture for the treatment of autism in children [J]. *Modern distance education in Chinese traditional medicine*, 2016, 14(4):144-145.
- [13] Zeng Haihui, Chen Shuang, Yang Xiaoqin, et al. Clinical observation of 30 cases of autism in children treated with Jin San Acupuncture Therapy as an adjunct [J]. *Journal of Traditional Chinese Medicine and Pediatrics*, 2014, 10(2):47-50.
- [14] Sun Zhongren, Lu Xiaolin, Hao Jishun, et al. Overview of research on head acupuncture in the treatment of autism [J]. *Chinese Journal of Traditional Chinese Medicine*, 2017, 32(12):5499-5501.
- [15] Li Lin, Jiao Yun, Liu Liyan et al. Analysis of the efficacy of tongue acupuncture plus comprehensive intervention for autism [J]. *Chinese Journal of Child Health Care*, 2011, 19(5):96-98.
- [16] Zhou Yishan, Liu Lingjia, Ding Yiyun et al. Wang Junhong's experience in treating autism spectrum disorders from the spleen theory [J]. *Journal of Chinese Medicine*, 2019, 34(10): 2134-2137.
- [17] Qiu Lihua, Ye Bing. Clinical observation on the treatment of autism in children by Tui Na in Chinese medicine [J]. *Inner Mongolia Traditional Chinese Medicine*, 2017, 36(20): 104.
- [18] Al J M E. The application of evidence-based medicine to clinical research on diabetes treated with a combination of Chinese and western medicine.[J]. *Chinese Journal of Information on Traditional Chinese Medicine*, 2000.
- [19] Mccracken JT, MCGOUGH J, Shah B, et al. Research units on pedi-atric psychopharmacology autism network, Risperidone in children with autism and serious behavior problems, *J Pediatr*, 2003, 142:86-87.
- [20] Lopes L, Mário J Goncalves, Greten H J, et al. Traditional Chinese Medicine (TCM) approaches for Autism Spectrum Disorders (ASD)[J]. 2019. DOI:10.13140/RG.2.2.16088.44807.
- [21] DeLong GR, Teague LA, Mcswain KM. Effects off luoxetine treat-ment in young children with idiopathic autism [J]. *DevMed Child Neurol*, 1998, 40:551-562.
- [22] Eigard RJ, Zimnitzkyb, Demaso DR, et al. Sertraline treatment of transition-associated anxiety and agitation in children with autistic disorder [J]. *J Child Adolesc Psychopharmacol*, 1997, 7:9-11.
- [23] Leskovec TJ, Rowles BM, Findling RL. Pharmacological treatment options for autism spectrum disorders in children and adolescents. *Harv Rev Psychiatry*, 2008, 16(2):97-112.
- [24] Germone MM, Gabriels RL, Guérin NA, et al. Animal-assisted activity improves social behaviors

inpsychiatrically hospitalized youth with autism[J].*Autism*, 2019, 23(7):1740-1751.

[25] Liu Juan, Huang Xuehua, Liu Ya. *Research progress of clinical nursing interventions for children with autism* [J]. *Journal of Nursing*, 2017, 24(14):36-39.

[26] Ye Yaping, Lin Huimin. *The positive role of psychological care in autism care* [J]. *Clinical rational drug use*, 2014, 7(4): 152.

[27] Feng Yajing, Wang Yan. *Diagnostic tools for children with autism: current status and outlook* [J]. *China Special Education*, 2012, 147(9): 45-52.

[28] Tianyou,Guo, Weiqian,et al. *Catechol-O-methyltransferase Val158Met polymorphism and risk of autism spectrum disorders.*[J].*Journal of International Medical Research*, 2013.DOI:10.1177/0300060513479871.

[29] Han Xiao, Lin Chengren, Ren Junguo, et al. *Chinese medicine understanding of the three core disorders in children with autism* [J]. *Chinese Journal of Basic Chinese Medicine*, 2016, 22(3): 431-433.

[30] Zhou Shihong, Xu Yuehua, Wang Lianping, et al. *Advantages and development strategies of Chinese medicine characteristic rehabilitation* [J]. *Journal of Traditional Chinese Medicine Management*, 2019, 27(17): 4-6.