

Discussion on TCM treatment of hydrocephalus after cerebral hemorrhage in children from "unfavorable blood is water"

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Abstract: Hydrocephalus after cerebral hemorrhage in children is mostly secondary to trauma and spontaneous hemorrhage. At present, complications of western medicine surgery treatment are inevitable, while TCM treatment with drugs of warming yang, promoting blood circulation and removing blood stasis may play a certain role in reducing complications. At present, there are few research reports on this at home and abroad. Based on the theory of "adverse blood is water", combined with the thought of brain water stasis syndrome of Zhang Xuewen Master of Traditional Chinese Medicine, Professor Song Hujie's experience in treating hydrocephalus and related cases reported in recent years, this paper discusses the application of oral administration, external application and acupuncture treatment of traditional Chinese medicine in hydrocephalus after cerebral hemorrhage in children, which explores a new direction for further clinical treatment and has certain clinical value of traditional Chinese medicine.

1. Introduction

Hydrocephalus after cerebral hemorrhage in children mostly occurs after craniocerebral trauma, spontaneous cerebral parenchymal hemorrhage or subarachnoid hemorrhage, which is a disease with abnormal accumulation due to excessive secretion, insufficient absorption or blocked circulation of cerebrospinal fluid. The secretion of cerebrospinal fluid in normal people is 0.20~0.35mL/min, there is 50ml cerebrospinal fluid in newborns and 100~150ml cerebrospinal fluid in children, which is in a balanced state of constant production, circulation and reflux. After cerebral hemorrhage, brain swelling occurs first due to the change of intracranial pressure. If the progress of cerebral edema after hemorrhage cannot be effectively slowed down in time and the mechanism of cerebrospinal fluid circulation is blocked, hydrocephalus will further occur. According to cerebrospinal fluid dynamics classification, hydrocephalus after cerebral hemorrhage in children is mostly obstructive hydrocephalus, and rarely traffic hydrocephalus and external hydrocephalus. After cerebral hemorrhage, hydrocephalus can show the occurrence of hemorrhage focus on CT, but the imaging

features of hydrocephalus are not clearly divided. According to the CT findings of hydrocephalus in children, it is the progressive expansion of ventricular system or (and) subarachnoid expansion. Infants and young children may have large heads, drooping eyes, ineffective movement of both lower limbs, strabismus, convulsions and so on; Children have headache, head swelling, vomiting, lethargy, irritability, vision loss, limb convulsions, etc. In severe cases, incontinence, progressive dementia, blurred vision, occasional diplopia, dizziness and epilepsy, and often accompanied by stunting; Signs often include enlarged head circumference, high tension of fontanelle, difficulty in looking up, papilledema, etc., which can be diagnosed after lumbar puncture observation [1-2]. Liu Xiaofang and others reported [3] that intracranial hemorrhage is the primary cause of neonatal hydrocephalus, especially premature infants are more prone to intracranial hemorrhage and coagulation dysfunction. The latest foreign studies have found that TLR4 inflammation and iron content are overloaded in the brain after intraventricular hemorrhage, which leads to excessive secretion of cerebrospinal fluid, which is an important mechanism of hydrocephalus after hemorrhage. At present, the basic treatment of western medicine is the application of diuretics to reduce intracranial pressure; Or repeatedly puncture through the anterior fontanelle or lumbar vertebrae, drainage and drainage of lumbar cistern; Cerebrospinal fluid shunt is the most common surgical treatment, and the main methods are ventricular shunt and third ventriculostomy under ventriculoscope. However, there may be risks such as blockage of shunt system, infection, insufficient shunt or recurrence of disease after operation [4]. Comparatively speaking, TCM treatment can avoid the complications after invasive operation to a certain extent by using the drugs of warming yang and promoting diuresis, promoting blood circulation and removing blood stasis. At present, there are few reports on this research at home and abroad, which need further clinical research, and whether choosing the best time combined with traditional Chinese medicine treatment on the basis of western medicine non-surgical treatment or surgical treatment can achieve the best expected effect and effectively avoid the occurrence of complications after western medicine treatment. At present, most of the collected literature reports are based on Western medicine basic treatment as routine control group. On this basis, we explore the clinical efficacy of oral and external application of traditional Chinese medicine combined with acupuncture and other comprehensive therapies. This article will discuss the treatment of hydrocephalus after cerebral hemorrhage in children with traditional Chinese medicine.

2. Chinese medicine's understanding of hydrocephalus after cerebral hemorrhage in children

2.1 The mechanism of "unfavorable blood is water"

The theory of "unfavorable blood is water" comes from "Golden Chamber". "The teacher said: Cunkou pulse sinks late, sinking is water, late is cold, cold water beats ... Women can't pass through water; Meridian is blood, while adverse blood is water, which is named as "Blood Divide". Here, it is discussed in water-qi article. Pathogenesis originally refers to weakness of spleen and stomach yang, unsmooth blood flow, and edema caused by water invading skin. Its disease is "water". Because it lies in "blood disadvantage", later doctors applied the theory of "blood disadvantage is water" to various diseases. It is based on the fact that both physiological water and blood are derived from the subtlety of Shui Gu, which are derived from the acquired spleen and stomach, and are the basic substances of human life activities. For example, "Su Wen Meridian Bie lun" said: "Drinking in the stomach, swimming over essence, losing in the spleen, losing temper and dispersing essence ... water essence four cloth." "Lingshu Gangrene" said: "The stomach is affected by the valley ... the middle jiao is like dew, and the upper part is injected into the valley, while the sun pulse is infiltrated, the body fluid is harmonious, and the change is red as blood." "Lingshu Evil Guest" said: "Those who camp Qi secrete their body fluid, inject it into the pulse and turn it into blood." Blood runs like a ring in the pulse channel, so it can't run outside the pulse channel. Water and fluid run inside and outside

the pulse channel everywhere. Water seeps into the pulse as a part of blood, while subtle substances in the blood seep outside the pulse, so it is fluid. Water and subtle substances in the blood permeate each other around the whole body, nourishing the viscera skin and the five senses and nine orifices together. Under pathological conditions, a part of blood seeps out of veins to form water, which is pathological water [5-6]; Water wet condensation hinders blood circulation and can also cause blood stasis; Just as "Lingshu, all diseases begin to be born", it says: "Coagulation is wrapped but not scattered, body fluid is seeped, and it does not go, but the accumulation is completed." It can be seen that blood and water interact with each other, and the interaction is a disease.

2.2 Pathogenesis of TCM

Ediatic hydrocephalus is attributed to the category of "relieving cranium" and "filling" in TCM, but also to "headache", "dizziness" and "madness", while cerebral hemorrhage belongs to the category of "stroke disease" in TCM. Hydrocephalus after cerebral hemorrhage has no special name in traditional medicine, so it is attributed to "relieving cranium" and "filling" according to hydrocephalus. The pathogenesis of hydrocephalus after cerebral hemorrhage is a complex process of interaction and mutual influence between the two. Blood stasis can dissolve water, while wet water can cause blood stasis, which leads to unsmooth brain fluid and mental retardation. As the doctor Tang Rongchuan said in "Blood Syndrome Theory", "Blood stasis and water also cause edema, which is a blood disease and water." "Blood disease is inseparable from water, and water disease is inseparable from blood." "Water disease accumulates blood" and "blood accumulates for a long time, and it can also turn into sputum water", which clearly reveals the pathological phenomenon that "blood is unfavorable, it is water". According to the dialectical classification in "Guidelines for Clinical Diagnosis and Treatment of Pediatrics of Traditional Chinese Medicine (Cranocerebral Disease)" edited by Professor Song Hujie and others, the clinical manifestations of traditional Chinese medicine include head enlargement, cranial fissure, overdue discrepancy of fontanelle, sunset, etc. Brain swelling and hydrocephalus are common clinical symptoms in the acute stage of cerebral hemorrhage. Modern doctors also apply this theory to various diseases of water and blood stasis. In the study of encephalopathy, the pathogenesis of hydrocephalus after cerebral hemorrhage is closely related to the theory that "adverse blood is water".

3. Chinese Medicine Treatment

3.1 Chinese Medicine Treatment

Based on Zhongjing's theory of "adverse blood is water", the master of Chinese medicine in Zhang Xuewen put forward the idea of hydrocephalus "brain water stasis syndrome". Blood stasis is blocked in the brain collaterals, or blood stasis is caused by blood spilling from the collaterals. When blood seeps out of the veins, it is easy to generate water, and when water accumulates, it is water drinking and phlegm turbidity. Blood stasis is the pathological basis. Phlegm turbidity and water drinking are secondary pathological factors, which are pathogenesis of each other. Water and blood stasis intersect and influence each other. Blocked brain collaterals are brain water stasis syndrome. Kidney deficiency is the root of this kind of disease, and blood stasis, turbid phlegm, and water-drink combination in brain collaterals are the standard. Li Jun and others reported [8] the experience of the master of traditional Chinese medicine in Zhang Xuewen, who believed that the brain orifices should be clear and smart, while the brain orifices should be clear and smart, and once they could not be clear and smart, they would become blocked, and the brain would lose nourishment and become sick and sick. Zhang Huiyun and others reported [9] Zhang Xuewen's experience in treating hydrocephalus after cerebral hemorrhage, and proposed that the evil of brain water and blood stasis should be eliminated

as the first treatment, so Naoquotong Decoction can be used only after dredging orifices, activating blood circulation and promoting diuresis. The medicinal properties are as follows: *Salvia miltiorrhiza*, *Paeonia lactiflora*, Chuanxiong, peach kernel, safflower, *Angelica sinensis*, *Poria*, *Cyathula officinalis*, lalang grass rhizome, motherwort, amber, musk, ginger. The whole prescription takes promoting blood circulation and removing blood stasis, promoting diuresis and reducing turbidity, refreshing brain and dredging orifices as the treatment principles, and according to the disease and syndrome, flexible cutting is carried out. Generally, the dosage of *Poria cocos* and *Radix Cyathulae* should be heavy, and Sanqi should be taken for those with obvious blood stasis, and hematoxylin should be added for those with trauma; At the later stage of treatment, *Eucommia ulmoides* Oliv., Parasite, *Astragalus membranaceus*, etc. can be added. Intracerebral hemorrhage under the theoretical thought of brain water stasis syndrome is based on kidney deficiency, with the disorder of spleen and kidney, and blood stasis as the standard. Considering the inherent factors, this kind of hydrocephalus after bleeding may be related to bleeding due to abnormal coagulation caused by congenital vitamin K deficiency. Abnormal prothrombin content or coagulation factor distribution in the body will cause prolonged coagulation time required for self-repair after local tissue injury. In addition, the particularity and complexity of brain tissue structure will affect cerebrospinal fluid circulation once blood stasis is formed, which will further affect the recovery of the disease. At present, it remains to be further studied whether the pharmacological targeting effect of the combined application of Chinese medicines for promoting blood circulation, removing blood stasis and promoting diuresis can change the function of coagulation factors in modern medicine.

He Shujun et al. reported that [10] among 21 cases of hydrocephalus, 7 cases were neonates with intracranial hemorrhage complicated with hydrocephalus caused by intracranial hemorrhage and late vitamin deficiency. Routine therapy was given mannitol, furosemide, dexamethasone, compound Danshen injection, etc., and oral traditional Chinese medicine was given to Shengjiang Powder. According to Cold and Warm Tiaobian, rhubarb, cattail pollen, safflower, *Bombyx batryticatus*, cicada slough, ginger peel and *Trichosanthes kirilowii*. Self-made Fengkuang Powder for external use was mixed with Tongcao, *Angelica dahurica*, honeycomb, green tangerine peel, dried tangerine peel, *Bombyx batryticatus*, cicada slough and safflower for external use. The treatment period was at least 8 weeks. The results showed that the head circumference of children was smaller than before, and the growth of head circumference was basically normal compared with that of children of the same age. The overall effective rate was higher, and the clinical symptoms of children were improved considerably. In this study, safflower, rhubarb and other drugs are widely used for oral administration and external application of traditional Chinese medicine. Pharmacological studies, such as promoting blood circulation, removing blood stasis and diuresis, show that they can improve hemodynamics, reduce capillary permeability in inflammatory areas by regulating blood rheology, thus reducing inflammatory exudation and promoting the absorption of inflammatory exudates. Yin Xiaojuan and others studied from frequency analysis [11], and the top five drugs were Chuanxiong, *Carthamus tinctorius*, *Rehmannia glutinosa*, *Poria cocos* and *Alisma orientalis* in turn; From the perspective of drug combination, Chuanxiong-*Rehmannia glutinosa* drug pair has the highest frequency, which can promote blood circulation and nourish yin, and disperse blood stasis without hurting yin. From the perspective of drug correlation, Chuanxiong-*Carthamus tinctorius* has the highest correlation, which plays the role of promoting blood circulation and removing blood stasis, and is also a common drug pair for clinical treatment of hydrocephalus. Drugs for promoting blood circulation, removing blood stasis and promoting diuresis can not only reduce whole blood viscosity and blood adhesion, but also protect the function of normal cells in the focus area by regulating neurohumoral function. In today's clinical treatment, the principle of treating neonatal intracranial hemorrhage is still based on urgency, while western medicine is the main treatment in acute stage. Traditional Chinese medicine can be used for patients with slow illness. External application is relatively convenient, and preparations

such as drinks, granules or pills should be considered for internal medicine. How to give full play to the curative effect of traditional Chinese medicine needs to be treated by clinical evidence. It should be noted that in the treatment of hydrocephalus after cerebral hemorrhage, the drugs for promoting blood circulation and removing blood stasis should be coordinated with the drugs for removing blood stasis and stopping bleeding to avoid rebleeding.

3.2 Acupuncture and moxibustion treatment

Acupuncture and moxibustion therapy is based on the TCM theory that the meridians of human body "belong to the viscera inside, and the collaterals outside". From the earliest acupuncture monograph "Acupuncture and Moxibustion Classics A and B", it can be seen that many special points for treating encephalopathy are recorded. Doctors of past dynasties have inherited and carried forward acupuncture technology so far, which has made great contributions to medicine in China and even the world. Acupuncture and moxibustion mainly uses acupuncture or moxibustion to mobilize the movement of human qi, regulate the function of viscera and meridians and the movement of qi and blood, and achieve the effect of treating diseases. Later generations of scholars have done a lot of research and discussion on the mechanism of acupuncture treatment from the perspective of modern medicine. Zhang Qinchuan and others have studied acupuncture treatment cases at home and abroad, pointing out that acupuncture can cause changes in autonomic nerve function, make sympathetic nerve excited and produce visceral somatic reflex, which causes functional changes of organs such as viscera and glands through meridian essence.

In recent years, Bo's abdominal acupuncture has a good effect on nervous system diseases, and its TCM theory is a treatment system with Shenque regulation system as the core. Modern physiology studies the characteristics of peritoneum, and thinks that its absorption and defense performance play an important role in the absorption of hydrocephalus, which may be related to the abundant capillaries under the serosa of peritoneal wall. Abdominal breathing promotes lymph reflux, and peritoneum can eliminate bacteria and limit the spread of inflammation, which provides a scientific basis for clinical treatment by acupuncture at abdominal acupoints. Zhao Liang et al. [15] treated children with external hydrocephalus caused by neonatal intracranial hemorrhage by abdominal acupuncture, selecting abdominal meridian points, extra-meridian qi points, new points and position points, etc., with Zhongwan, Guanyuan, Shuiyu, Shenque, Guishu, Wailing, and Sliding Meat Gate as the main points, stomach meridian and bladder meridian points as matching points, and deep needling on the meridians, Shenque. Abdominal acupoint therapy plays an important role in regulating metabolism, immunity and innervation of human body. How to apply abdominal acupuncture more widely to hydrocephalus patients after cerebral hemorrhage in children to achieve the best effect of removing blood stasis and eliminating hydrocephalus, we need to grasp the mechanism of clinical disease changes, and treat patients according to their time and place.

3.3 Chinese medicine combined with acupuncture and moxibustion treatment

Reported by Li Bin, etc. [16] Children with traumatic subarachnoid hemorrhage and severe traumatic hydrocephalus caused by car accident were admitted to hospital with trance, limb disuse, abnormal stools, hydrocephalus and encephalomalacia indicated by MRI of the head, and their families refused surgical drainage treatment. On the basis of lowering intracranial pressure and nourishing nerve treatment given by Western medicine, Chinese medicine mainly used Buyang Huanwu Decoction. Chinese medicines such as Radix Polygoni Multiflori, Lycium barbarum, Eucommia ulmoides Oliv., Alisma orientalis, panax pseudo-ginseng, etc. were taken orally. After 3 months of treatment, the clinical symptoms improved, and after 8 months, the limb function recovered, and there was no abnormality in the nervous system. MRI showed that hydrocephalus was basically

improved. In this case report, in order to avoid the physiological and psychological burden of simple ventricular drainage with drainage tube, TCM treatment showed good long-term effect. This also shows that the TCM treatment scheme can avoid the risk of complications caused by invasive operation of Western medicine in the treatment of some diseases, and may be more acceptable to patients and their families, but the treatment measures must be selected according to the urgency of the disease. At present, TCM treatment cannot completely replace Western medicine treatment. How to give full play to their respective advantages in clinical diagnosis and treatment, and how to combine traditional Chinese and Western medicine treatment needs to choose the best time window for joint application, which still needs further clinical research.

On the basis of inheriting the academic thoughts of Wang Xiuchun and Zhang Wenhuan, Professor Song Hujie put forward "spleen and kidney treatment" according to many years of clinical experience, and thought that traffic hydrocephalus, obstructive hydrocephalus and external hydrocephalus are directly or indirectly related to "adverse blood". The key to pathogenesis lies in "blood stasis blocking collaterals, brain impassability, stagnation of water and dampness", and its treatment is based on "opening brain orifices, dispelling blood stasis and dredging meridians" That is to say, Naokangling series should be taken orally to improve the function of viscera, eliminate blood stasis and stagnant water, tonify kidney, nourish marrow and strengthen brain; Danhong Yinao ointment was applied to the head to promote blood circulation, remove blood stasis, open brain orifices and calm the nerves. With acupuncture, massage, external counterpulsation, rehabilitation training, physical therapy and other rehabilitation therapy, to achieve the therapeutic effect of dredging meridians, activating qi and promoting blood circulation [17-19]. Zhang Ling et al. [20] selected 192 children with hydrocephalus caused by water and blood stasis to be divided into two groups, including those caused by trauma, trauma, hemorrhage, etc. The control group was treated with dehydration and intracranial pressure reduction, while the treatment group was treated with oral Chinese medicine Naokangling Capsule and Shechuan Naoli Tong, and Danhong Yinao Ointment was applied externally, and Sishencong, Shenmen, Xuehai, Yanglingquan, Zusanli, Sanyinjiao and Zhaohai were selected Massage acupoints such as Zhongwan, Tian Shu, Zusanli, Shangjuxu, Xiajuxu, Taixi, etc., combined with chiropractic therapy, etc., and observe the improvement of children's intelligence and exercise after 6 months, which proves that the improvement of intelligence development, coarse and fine exercise, living ability and psychological condition is obvious, and the curative effect is remarkable. Oral and topical drugs in this TCM treatment plan are self-produced preparations in Xi 'an Hospital of Traditional Chinese Medicine Encephalopathy, and the main medicinal components are promoting blood circulation and removing blood stasis, promoting diuresis and relieving swelling, and inducing resuscitation and dredging collaterals. In addition to the traditional oral administration of Chinese medicine, the effects of external application of Chinese medicine or acupoint application on children with hydrocephalus can be seen. The external treatment of Chinese medicine not only uses Chinese medicine, but also stimulates meridians, acupoints, skin, mucous membrane, muscles, bones and muscles to achieve the purpose of preventing and treating diseases. This "trinity therapy" can mainly relieve headache, improve psychomotor function, improve intelligence level, delay disease development and reduce postoperative recurrence. Liu Hua et al. found through data mining [21] that the drugs for external use in the treatment of hydrocephalus with Chinese medicine have the highest frequency in general, and they are classified into phlegm-resolving and resuscitation-in.

4. Summary and Prospect

There are no reports on the treatment of hydrocephalus after cerebral hemorrhage in children with single use of Chinese medicine at present. Most of the existing case reports are based on Western medicine treatment such as diuretics to reduce intracranial pressure. Because complications of

Western medicine surgery are inevitable, Chinese medicine treatment with drugs of warming yang, promoting blood circulation and removing blood stasis plays a certain role in reducing complications, which may reduce the incidence of complications after invasive operation to a certain extent. The related mechanism of clinical symptom improvement still needs further comparative study of Chinese medicine and Western medicine treatment. Based on the theory of "adverse blood is water", this paper summarizes the treatment cases of hydrocephalus related to cerebral hemorrhage in recent years, discusses the application significance of oral administration and external application of traditional Chinese medicine, acupuncture and other physiotherapy in the treatment of hydrocephalus after cerebral hemorrhage in children, and concludes that oral administration of drugs for warming yang, promoting blood circulation and removing blood stasis is the first priority, while external application is indispensable, while acupuncture and other physiotherapy play a role in another dimension. Through diversified treatment, this "Trinity Comprehensive Therapy" has a significant therapeutic effect on hydrocephalus after cerebral hemorrhage in adults or children. Unlike hydrocephalus after cerebral hemorrhage in adults, which is mostly caused by intracranial pressure changes, such diseases in children are mostly caused by spontaneous cerebral hemorrhage or trauma. When inflammation occurs in brain tissue and related changes occur in cerebrospinal fluid circulation, disorder of autonomic nerve function may have a greater impact on prognosis. In clinical practice, besides surgical treatment for acute hydrocephalus and high intracranial pressure, perioperative and postoperative Chinese medicine treatment is necessary. Whether to use Chinese medicine treatment requires effective communication with patients and their families. How to slow down the progress of hydrocephalus after cerebral hemorrhage in children in the shortest time and give the best targeted treatment plan need to be based on the identification of physical reality by Chinese medicine. Furthermore, combining the traditional medicine treatment based on syndrome differentiation with the related changes of nerve function in modern medicine, studying the modernization of traditional Chinese medicine prescription and molecular targets, summarizing the prescription rule of treating hydrocephalus after cerebral hemorrhage in children, and combining evidence-based medicine to better standardize diagnosis and treatment can provide a new research and treatment direction for clinical treatment of hydrocephalus after cerebral hemorrhage in children.

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