

The Development of Nao Li Shen and its Clinical Application

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Abstract

The traditional Chinese medicine Nao Li Shen (containing ginseng, gastrodia tuber, chuanxiong rhizome and red sage root) is used in craniocerebral injury, cervical spondylosis and cerebrovascular diseases.

The preparation, as an orally administered liquid, was tested in Mongolian gerbils and shown to increase tolerance to ischaemia and anoxia. Clinical use of the preparation resulted in improvement in 96% of 202 patients, as judged by right cerebral blood flow, TCD and CT examination.

We conclude that Nao Li Shen has a positive curative effect upon craniocerebral injury and sequelae of cerebrovascular diseases.

During convalescence after brain injury, patients often complain of, or develop symptoms of, headache, dizziness, hypodynamia, insomnia, tinnitus, restlessness, palpitation, decline in thinking ability and judgement, and hypomnesia. Patients who have undergone craniocerebral operations or have had cerebrovascular diseases (haemorrhagic or ischaemic) often suffer from dyskinesia, sensory disturbance or psychonosemia during convalescence. Because of the lack of efficacy of current methods in alleviating the syndrome, we turned to traditional Chinese medicine and developed the preparation Nao Li Shen, an oral liquid medicine for promoting the rehabilitation and recovery of these patients.

The symptoms and sequelae of craniocerebral injury and cerebrovascular disease during convalescence might be summarized, according to the theory of traditional Chinese medicine, as stagnation of qi, blood stasis, hypoactivity of the liver-yang, and hypoactivity of the reservoir of food stuff (one of the four reservoirs, referring to the stomach). Stagnation of qi results from hypofunction of blood circulation after trauma and blood stasis is mainly a result of the decline in the regulatory function of the blood vessels and microcirculation of the brain. Thus, hypoactivity of the liver-yang, hyperactivity of the liver-yang, and hypoactivity of the reservoir of food stuff all occur. The head is the confluence of all yang-channels and the brain is the reservoir of marrow. They are nourished by the liver-kidney essence and the blood. The essence and blood originate from the spleen and stomach. If the spleen and stomach have efficient transport and metabolizing activities, ample qi, blood, essence and fluid will be supplied to the brain. Therefore, the principle of treatment of the symptoms described above should be to promote blood circulation and remove blood stasis, tranquillize the mind and relieve mental strain, strengthen the spleen and heart, and tonify the heart and replenish the blood (Liu 1992).

Ginseng is mainly used for invigorating the five viscera, relieving mental strain, tranquillizing the mind, preventing palpitation as a result of fright, removing pathogenic factors,

improving eyesight, and promoting the functional activity of the heart and brain. If taken for a long time it can improve health and prolong life. Recent studies have shown that ginsenosides (Rb₁, Re and Rg₁) can promote the blood circulation of brain tissue through the hypothalamo-portal system, i.e. neurohumoral regulation, hence alleviating the symptoms of dizziness, headache, fatigue and insomnia, and improving the short-term memory. Ginsenosides might also reduce the coagulation of blood and promote the recovery of brain function (Liu 1993).

Chuanxiong rhizome contains ligustrazine, which can promote blood circulation and invigorate qi, dispel wind and relieve pain; it is an important herb used in the alleviation of pain. The volatile oils and alkaloids in this component have an analgesic effect on the central nervous system, and can inhibit the formation of thrombus and platelet agglutination and can lyse any formed clots, thus improving the ability of the brain to tolerate cerebral ischaemia (Xu 1989).

Gastrodia tuber and red sage root contain gastrodine and tanshinone respectively, both of which can improve cerebral circulation and cerebrovascular function, hence promoting blood circulation and removing blood stasis (Zhao & Ren 1985; Yang 1986).

Materials and Methods

The main ingredients of Nao Li Shen are ginseng (8%), gastrodia tuber (15%), astragalus root (25%), chuanxiong rhizome (25%) and red sage root (15%). The active principles of the above herbs were extracted by decoction in water or alcohol and the extracts were concentrated. Nao Li Shen was formulated as a liquid stored in ampoules, each containing 10 mL, for oral administration twice daily in patients. Each course of treatment was one month; generally, one or two courses were applied.

Animal experiments

To investigate the biochemistry of the curative effect of Nao Li Shen, we designed a test using Inner Mongolian gerbils as

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Table 1. The effect of Nao Li Shen (given orally on a daily basis) in prolonging the survival time of Inner Mongolian gerbils after bilateral ligation of the internal carotid arteries.

Group	Dose (mL kg ⁻¹)	Number	Survival time (min) ± s.d.
Control	—	15	99 ± 3.2
Nao Li Shen	10	15	195 ± 27†
Nao Li Shen	25	15	220 ± 31†

† $P < 0.01$, significantly different from control.

animal models of cerebral ischaemia, and measured the effect of the preparation on survival time after ischaemia caused by bilateral ligation of the carotid artery. Animals were divided into one control and two experimental groups ($n = 15$ in each).

Patients

Patients receiving the preparation during the period of study had been admitted for one or more of: convalescence after craniocerebral injuries, convalescence after craniocerebral operations, cerebral arteriosclerosis and convalescence after cerebrovascular accidents (hypertensive cerebral haemorrhage and cerebral thrombosis), encephalatrophy and senile dementia, neurovascular headache, neurosis and neurosis, intellectual maldevelopment of children, cervical spondylopathy and vertebrobasilar ischaemia.

Results

Animal experiments

The results are shown in Table 1. The experimental groups survived significantly ($P < 0.01$) longer than the control group (Zeng & Hu 1995). It is suggested that Nao Li Shen improves the cerebral blood flow of animals and enhances their ability to tolerate cerebral ischaemia and anoxia.

Patients

The symptoms and signs of the patients described in Table 2 were alleviated after they had taken Nao Li Shen as described in Materials and Methods. To illustrate the curative effect of Nao Li Shen in clinical application, typical examples are given below. During the time they were taking the preparation, none of the patients received any other medicine.

Case 1. Male, aged 27, was admitted with brain contusion (diagnosed by computer tomography). Before taking the preparation, his dizziness was aggravated if he stood up and he could not support himself for 10 min. After taking Nao Li Shen, the symptom was significantly alleviated and he was able to walk freely for more than 1 h. After a course of treatment with Nao Li Shen he was discharged from hospital and resumed work.

Case 2. Male, aged 42, was admitted to the hospital having suffered from contusion of the dextral frontotemporal lobe (speech centre) for 5 years. On admission, he suffered from dizziness accompanied by dextral hemiparesis and aphasia (slight aphaemia). After less than a full course of treatment with Nao Li Shen, his dizziness eased and he could walk while supported by others and, eventually, independently, and was able to express himself in clear speech.

Case 3. Male, 32 years old, was admitted two weeks after an operation for glioma of the left temporal lobe. On admission the myodynamia of his left upper and lower limbs was grade II–III, and aphaemia was also found. Measurement of the right cerebral blood flow showed that the blood flow through the grey matter of the cerebral hemisphere was lower than normal for his age group; this was more pronounced in the left frontal area. After three weeks of treatment with Nao Li Shen, he was able to get up from bed and walk by himself, and had clear speech. Repeat measurement of the right cerebral blood flow showed the blood flow of the grey matter of the left and right cerebral hemispheres was slightly lower than normal for his age group; however, the rheoencephalogram was markedly improved.

Case 4. Male, 72 years old, had suffered from encephalatrophy (confirmed by computer tomography) for 5 years. He was in a trance and had a clear hypomnesia on admission. After taking Nao Li Shen for two weeks, his memory recovered to some extent, his actions speeded up, and his reading ability partly recovered; he was, for example, able to read the characters in the newspapers and recognize pictures of the Great Wall and Temple of Heaven of China.

Case 5. Female, aged 35, with transcranial Doppler (TCD)-confirmed cervical spondylopathy and spasm of the vertebral artery, had had paroxysmal headache accompanied by nausea

Table 2. Clinical data on 202 patients treated with Nao Li Shen.

Disease	Cases
Craniocerebral injury	31
Cerebrovascular disease (including cerebral haemorrhage and cerebral thrombosis)	26
Cerebral operation	5
Encephalatrophy	2
Nervous headache	12
Vascular headache	9
Cerebrovascular spasm	2
Facial spasm	1
Meniere's disease (paroxysmal sleep)	1
Parkinson's disease	1
Epilepsy	1
Cervical spondylopathy accompanied by vertebrobasilar ischaemia	111

Table 3. Curative effect of Nao Li Shen for 202 cases.

	Curative effect*		
	Excellent	Good	No effect
Cases	20	174	8
Percent	9.9	86.1	3.9

Total effective rate = 96%. *Excellent: symptoms are eliminated and signs markedly improved; the patient is able to lead a normal life or take care of himself. Good: symptoms are significantly alleviated, or alleviated, and signs show a fairly large improvement; the patient is able (or mostly able) to take care of himself. No effect: no change in symptoms and no improvement in signs; the patient cannot take care of himself.

once to twice every week. After using Nao Li Shen for two weeks, her paroxysmal headache stopped. Re-examination by TCD revealed a symmetric spectrum and a normal velocity of cerebral blood flow.

Case 6. Male, aged 65, brought to hospital a week after left cerebral thrombosis. Computer tomography examination indicated a large low-density area in the left parieto-occipital temporal lobe with the volume of blood flow significantly lower than normal. He was carried into the hospital by his family with right hemiparalysis accompanied by nominal aphasia. After taking Nao Li Shen for two weeks, he could get up and move about on his own and the nominal aphasia disappeared.

Summary of clinical results

The results of observations of all 202 patients receiving Nao Li Shen during the period of study are shown in Table 3. A total of 96% of these patients benefited from the treatment.

The effectiveness of the drugs now commonly used in our country for the treatment of syndromes after brain injury is: lysine 90% (40 cases), piracetan 60% (40 cases) (Fei & Luo 1995), Nao 91% (51 cases) (Wu & Tian 1994). All these are lower than that of Nao Li Shen. The drug Xinnao Shutong which contains furostanol and spirestanol and is now used for cerebral arteriosclerosis and sequela of cerebral thrombosis has a total effectiveness of 83% (50 cases) (Yang & Han 1991).

Discussion

Clinical observations have shown that a marked curative effect can be achieved by the use of Nao Li Shen for convalescence of craniocerebral injury, cerebral operation, cerebrovascular disease and cervical spondylopathy, and it has been verified by such well acknowledged objective indices as right cerebral blood flow, TCD and computer tomography (CT). Nao Li Shen has the desired effect because its ingredients function by

supplementing qi and removing blood stasis, nourishing the blood and tranquillizing the mind, promoting the micro-circulation of brain tissues, increasing macrophages and activating brain function. The combination of these ingredients (medicinal herbs) is beneficial to the absorption of the necrotic tissue at the focus, the neogenesis of capillaries and the improvement of microcirculation. As treatment with Nao Li Shen benefits the four important functions (i.e. promoting blood circulation and removing blood stasis, tranquillizing the mind and relieving mental strain, strengthening the spleen and tonifying the heart, and invigorating qi and replenishing the blood), the required result was achieved (Tang 1989). It should be noted that this preparation cannot be used in patients with acute craniocerebral injury and cerebrovascular accident in the haemorrhagic stage. It should be given in the restoration or convalescence stage, usually two weeks after the attack.

Certainly, other therapeutic methods such as hyperbaric oxygen and other suitable remedies should not be excluded while Nao Li Shen is in use.

The preparation contains ginseng and therefore might have a role in promoting intelligence. In addition, as its therapeutic mechanism is similar to Yan De Xin's anti-senility mechanism, this preparation might prolong life if taken continuously (Shen 1991). Clinical testing has demonstrated that Nao Li Shen is an effective preparation for the treatment of various encephalopathies.

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