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## Acupuncture, Moxibustion and Chinese herbs in prevention of nosocomial infection in patients with acute cerebrovascular accident

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### Abstract

**Background:** Nosocomial infection is a current medical issue, particularly in patients with acute cerebrovascular accident. The present study purpose is to evaluate the effectiveness of acupuncture, Chinese herbs and moxibustion in prophylaxis of nosocomial infections in patients with acute cerebrovascular disease.

**Material and methods:** The study was carried out on a group of 100 patients. Valuing the efficiency of acupuncture, moxibustion and Chinese herbs in the prevention of nosocomial infections in patients with acute cerebrovascular accident, 50 patients (treatment group) with acute cerebrovascular accident received acupuncture and moxibustion treatment on points Zusanli (ST36) and Guanyuan (CV4) and per os – decoction Banqingheji. The control group (50 patients) did not receive any prophylactic treatment of nosocomial infection.

**Results:** In Acupuncture-moxibustion group infection rate was 2% (50/1) and 18% in the control group (50/9). In the control group were recorded 9 cases of infection, 7 cases (14%) constituted respiratory tract infections and 2 (4%) urinary tract infections. Acupuncture-moxibustion group revealed 1 case of respiratory tract infection.

**Conclusions:** Acupuncture, moxibustion on Zusanli (ST36), Guanyuan (CV4) points and decoction Banqingheji are efficient in the prevention of nosocomial infections in patients with acute cerebrovascular accident. The study demonstrates that in case of nosocomial infection of patients with acute cerebrovascular accident prevalent is nosocomial infection of the respiratory tract.

**Key words:** prevention of nosocomial infections, immunity, Zusanli, Guanyuan.

### Introduction

Nosocomial infections have a long history and are associated with the occurrence of the first hospitals; they threaten not only the health and lives of patients but also cause huge economic loss for patients and society. The rate of nosocomial infections in different countries is 3%-17% [1]. The rate of nosocomial infections in the United States is approximately 5% [1], in UK is about 10% [2]. Nosocomial infections rate in China varies between 9.72–13.69% [2]. In Moldova, according to official data morbidity and lethality by nosocomial infections constitute respectively 6.5 and 2.0 per 1,000 people hospitalized [3].

The etymology of the word “nosocomial” (hospital) comes from the Greek word nosokomeion, nosos = disease and komeo = caring. At the beginning of the 19th century, it emerged the concept of transmitting infection from patient to patient and therefore in England appears first insulated four infected patients.

In the mid-19th century, Florence Nightingale in a study on military mortality remarked that: “The number of soldiers who died because of nosocomial infections is much higher than that of those who died in the war itself”. Around the same time, Ignaz Semmelweis, Hungarian obstetrician, treating patients with puerperal fever noted that infection can be spread by medical staff in contact with the patient. And washing hands before and after consultation can prevent the spread of infection [4].

Nosocomial infection in the United States has brought increasing hospital expenses connected with 40 billion dollars per year [1]. In P. R. of China due to nosocomial infection hospital costs are increased by 10 billion yuan per year [5]. Field studies show that patients with nosocomial diseases pay

for treatment 2489.89 yuan more than the patients who did not undergo a nosocomial infection and it increases hospital stay by an average of 15.68 days [6]. Currently in P.R. of China rate of nosocomial infections at patients with stroke constitutes 18.03%, at patients with hemorrhagic stroke – 29.30%, and at patients with ischemic stroke – 12.66% [7]. Clinical studies have shown that in patients with acute cerebrovascular accident prevailed nosocomial infections in the respiratory tract, so Wang Yan and Tan Jun [8] reported that the rate of respiratory infections was 6.96% (88/1265), the rate of urinary tract infections was 4.35% (55/1265), with other localization rate of infection was 1.11% (14/1265), the rate of infection with two or more locations amounted to 1.42% (18/1265). Pan Miao [9] reported that in patients with acute cerebrovascular accident, lower respiratory tract infection rate is 53.70%, 16.67% upper respiratory tract and urinary tract – 11.11%. Wang Fang and Yu Changqing [10] reported 73 cases of urinary tract infection, which is 67 cases (30,41%) of upper respiratory tract infections (27.92%), 59 cases of lower respiratory tract infections (24.58%), 15 cases of infections of the gastro-intestinal (6.25%), 10 cases of biliary tract infection (4.17%), infections of skin and soft tissue infections – 9 cases (3.75%). The etiology of bacterial nosocomial infections in patients with acute cerebrovascular accident is so diverse, that Wang Yan, Tan Jun relate to them [8] 86 cases, including *Pseudomonas aeruginosa* – 25, 21 *Escherichia coli*, fungi – 13, 9 *Klebsiella pneumoniae*, *Staphylococcus aureus* – 8, *Staphylococcus epidermidis* – 6, *Enterococcus* – 4. Wang Fang, Yu Changqing [10] reported 155 cases of bacterial infection, in 35 cases was used the microbiological examination, as a result in 24 cultures were discovered gram negative bacteria which constitutes 62.50%, *Escherichia coli* 3, *Klebsiella pneumoniae*

2, Staphylococcus aureus 3, Staphylococcus epidermidis 3, Pseudomonas aeruginosa 3, Proteus mirabilis 2, Candida albicans 2, Citobacter 2, Enterobacter cloacae 2, Acinetobacter 1.

Zheng Xiaolan and coauthor [11] during eight years of clinical studies found that the percentage of G-infections decreased from 72.73% in 1997 to 52.54% in 2004 ( $\chi^2 = 87.720$ ,  $<0.01$ ). Rate of infections caused by Staphylococcus aureus is down from 15.31% in 1997 to 7.51% in 2004.

The main methods of nosocomial disease prevention are: disinfection, isolation and preventive use of antibiotics. But, in the case of prophylactic use of antibiotics, only 36% of patients showed clinical signs of infection, the prophylactic use of antibiotics in 24-57% was found to be unnecessary. Misuse of antibiotics has caused not only serious economic loss, but the occurrence of adverse events, the occurrence of antibiotic resistant strains as well as disturbance of the immune system of patients. Lederberg said: "People, to keep as a species, battle with the spread of nosocomial infections, causing the appearance of a large number of immunodeficient patients" [1].

According to relevant statistics, the rate of nosocomial infections in patients with a stroke is much higher than the average rate of hospital nosocomial infection [8-11]. Most patients with stroke are the people of the third age, with the decline of immune function; and the critical central nervous system damage, produces neuro-endocrine complications, worsening even more pronounced immune dysfunction. The need for a more invasive treatment increases the risk of infection. Thus, patients with cerebrovascular diseases have become patients at high risk of nosocomial infections, and prevention of nosocomial infections at patients with strokes became imperative.

Numerous studies have demonstrated the benefits of Traditional Chinese Medicine in prophylaxis of diseases. In the famous ancient medical work "Yellow Emperor" it is said: "If Qi Vital is rigorous, pathological factor can not act", also is mentioned the effect of acupuncture in strengthening Vital Qi, removing pathogenic heat and detoxification, and thereby obtain an immunomodulatory and anti-inflammatory effect.

**Material and methods**

The study was conducted in №1 University Clinic of the University of Traditional Chinese Medicine in Tianjin City, P. R. of China.

100 patients were randomly divided into two groups of 50 patients each. Both groups followed the conventional treatment of acute cerebrovascular accident. The research group in order to prevent nosocomial infection received Banqing-tangji decoction 150 ml once a day for 6 days, followed by the treatment with acupuncture on Zusanli point (ST36), and a bilateral Guanyuan point (CV4) plus Moxibustion on Zusanli points (ST36) during 15 minutes per day, for 6 days. The control group did not follow any prophylactic treatment of nosocomial infection. The observation period – three weeks.

**Results and discussion**

Following the prophylactic treatment of nosocomial infection applied in Acupuncture-moxibustion group infection

rate was 2% (50/1) and 18% in the control group (50/9). In the control group were recorded 9 cases of infection, 7 cases (14%) constitute respiratory tract infections and 2 (4%) urinary tract infections. Acupuncture-moxibustion group had 1 case of respiratory tract infection.

**Table 1**

**Comparison between 2 groups by age**

Groups	40-50	50-55	56-60	61-65	66-70	71-75	Over 76
Acupuncture moxibustion group	2	9	6	6	9	8	10
The control group	3	2	4	9	9	5	16

(P>0.05)

**Table 2**

**Comparison between 2 groups according to sex**

Groups	Acupuncture-moxibustion group	The control group
Male	30	30
Female	20	20

(P>0.05)

**Table 3**

**Ranking systems of nosocomial infection in the Acupuncture-moxibustion group**

Localization	The number of cases	(%)
Respiratory system	1	2
The urinary system	0	0
Digestive system	0	0
Other locations	0	0

**Table 4**

**Ranking systems of nosocomial infection in the control group**

Localization	The number of cases	(%)
Respiratory system	7	14
The urinary system	2	4
Digestive system	0	0
Other locations	0	0

Most patients with acute cerebrovascular disease are elderly, because of illness and old age, the body's resistance is low, and the likelihood of infection increases significantly. Traditional Chinese medicine treatise lacks direct entries on the prevention of nosocomial infections, but two thousand years ago there was already the concept of disease prevention and "prevention and disease exacerbation". The treatise "Yellow Emperor" stated "if Qi Vital is vigorous, pathogenic fac-

tor can not act”, so the state of Vital Qi is a decisive factor in the emergence of disease. Chinese medicine offers methods to strengthen Vital Qi respectively, regulating the immune response, effectively protected from infection, including the nosocomial ones. The basic components of Banqingtangji decoction are the following plants: Folium Isatidis and Radix Isadidis.

Table 5

### Comparison of 2 nosocomial infection prevention groups

Groups	Ineffective	Total patients(n)	Infection rate (%)
Acupuncture moxibustion group	1	50	2
The control group	9	50	18

Note: n-number of patients, (P<0.01).

Folium Isatidis plant has a cold nature, bitter taste, is distributed on the meridians of heart and lungs, removes heat and toxins, cools the blood and removes macules. In “Chinese Materia Medica” [12] it is mentioned that, Folium Isatidis plant: “Treats toxic fire and macules caused by pestilence, treats macules and papules caused by wind and heat treating intestinal ulcers and lung pain, stops hemoptysis and epistaxis. For patients with toxic heat is indicated using the juice of the leaves”. Radix Isadidis has a cold nature, bitter taste, is distributed on the meridians of heart and stomach. It possesses detoxification effect, removes the heat, favors throat and cools the blood. Mostly indicated in febrile diseases, headache, rash, toxic heat retention. Folium Isatidis plant and Radix Isadidis both have cold nature, bitter taste, are distributed on the meridians of the heart, lungs, stomach, have detoxification effect, cool the blood, remove heat from the lungs, stomach and heart, so they are highly effective in infections.

Point name Guanyuan(CV4) means: Guan – close, lock, store, and Yuan concerns Yin and Yang energies. This point is at the uterus level which is “Essence home”. In the famous ancient work “Su Wen-Qi xue lun”, it is mentioned that this point belongs to Ren meridian, above is the – Mu point of Small Intestine Meridian of hand Taiyang, also is the confluent of the Three Yin Meridians: Liver, Spleen and Kidney, is located on the midline, three cun below the navel. Nearby are abdominal veins and arteries, nerves ramifications, this area is called Dantian. Guanyuan point stores Premordial Essence and Qi (Yuan Qi). The area between the lower and kidney umbilical region is considered the home of the 12 meridians and life. The ancient works and contemporary studies point out the efficiency in the treatment of diseases of the urinary system, genicologic, reproductive disturbances, due to its function of regulating Qi and blood.

Ancient doctors appreciated very much curative action and health maintenance effect of the point Zusanli (ST36). This is the point – He of the Stomach meridian. In the ancient

books it is said: “The stomach is the sea of five organs Zhang and the six organs Fu”. “The stomach is the sea of water and cereals”. Stomach interacts with spleen through the connection type interior – exterior. According to Chinese medicine theory bases, spleen is the postnatal source of life, the source of Qi and blood, vital based activities. In the ancient medical work it is said that, point Zusanli (ST36): “Controls stomach, controls distension and fullness of sensations in the abdomen and chest, controls decline of visceral Qi, constipation, abdominal pain, cardiac pain”. Doctors in later generations summarized: point Zusanli (ST36) has beneficial effect on postnatal energy maintain pre-natal energy, regulates the function of the stomach and spleen, strengthens the body and prolongs life, is indicated for patients with chronic diseases including those with the immune system diseases. Clinical studies have demonstrated that moxibustion applied on Shenque point (CV8) has immunomodulatory effect by increasing values of IgA, IgM, IgG [13]. And moxibustion applied to Zusanli point (ST36) to patients with leukopenia resulted in increased values of IgA, IgM, IgG [14].

WanWenli [15] reported that moxibustion applied to Zusanli point (ST36) increases activity of RBC-C3bRR (red blood cell C3b roeetor rosette), increases CD4 values and decreases CD8 values. Immunomodulating action of points Zusanli (ST36) and Guanyuan (CV4) was investigated by Tang Shi [16] who reported that the application of moxibustion on points Zusanli (ST36) and Guanyuan (CV4) has an anti-inflammatory and immunomodulatory effect by suppressing cytokine release, strengthening the thymus, spleen, and by adjusting the imbalance of neurotransmitters – norepinephrine (NE) and serotonin (5-HT). Moxibustion action on T lymphocytes was investigated by HanCui [17], he observed anti-tumor effect of the method of moxotherapy “tianjiu” in mice with transplanted tumor. The study showed that the method of Moxibustion “tianjiu” inhibits the growth of solid tumors S180, inhibits weight gain of the spleen and decreases thymus weight. Moxibustion method “tianjiu” significantly increases the activity of T lymphocytes T and NK cells (Natural killer cells).

Zhao Jianguo [18] studied the effect of decoction Banqingheji in the prevention of nosocomial infections in patients with acute cerebrovascular accident. The study demonstrated that in the group that used the decoction Banqingheji efficiency ratio was 91.00% and in the group that used allopathic medicine efficiency ratio was 64.50%. Therefore, decoction Banqingheji by the effect of adjusting the immune function can be used in the prophylaxis of nosocomial infections.

Immunomodulating effect of acupuncture is holistic; this is one of the basic concepts of Chinese medicine. Acupuncture can operate simultaneously at different levels of several organs and organ systems. This action is realized by the hypothalamic-pituitary-adrenal and nervous system. Due to the holistic effect of acupuncture, it can act in two ways as a regulator; it may improve immune function and inhibit the hyperactivity to decrease immune system function. This adjustment in either direction is possible due to the close link between nervous, endocrine and immune systems [19].

Song Chunfeng [20] has found that Chinese herbs also

have a holistic effect, regulating the hypothalamic – pituitary – adrenocortical system, especially in cases of kidney deficiency, aging, stress, climacteric changes.

Most scientists believe that 33% of cases of nosocomial infection could be prevented [21].

### Conclusions

1. Acupuncture and moxibustion applied on Zusanli (ST36) and Guanyuan (CV4) points in combination with BanQingheji decoction are effective in the prevention of nosocomial infections in patients with acute cerebrovascular accident.

2. In patients with acute cerebrovascular accident prevails nosocomial infection of the respiratory tract.

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