Effect of Shuxuetong injection on platelet function, hemorheology and cerebral blood flow in patients with ischemic stroke

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Objective: To investigate the effect of Shuxuetong injection on platelet function, hemorheology and cerebral blood flow in patients with ischemic stroke.

Methods: One hundred cases of ischemic stroke admitted in our hospital from February 2015 to January 2017 were randomly divided into control group and observation group. The control group was given routine treatment. The observation group was given Shuxuetong injection on the basis of the control group. The changes of platelet function, hemorheology and cerebral blood flow before and after treatment were detected in both groups.

Results: After treatment, the whole blood viscosity, plasma viscosity and fibrinogen level in both groups were significantly lower than those before treatment. The whole blood viscosity, plasma viscosity and fibrinogen level in the observation group were (4.18±0.05) mPa•s, (1.66±0.12) mPa•s and (3.45±0.08) g/L, respectively, which were significantly lower than the control group; After treatment, the levels of MCA, ACA and PCA in both groups were significantly increased. MCA, ACA and PCA levels in the observation group were (70.82±4.13) cm/s, (60.62±3.55) cm/s and (54.11±2.36) cm/s, which were significantly higher than those in the control group; After treatment, the maximum platelet aggregation rate, PLT, MPV and PDW levels in the two groups significantly decreased. The maximum platelet aggregation rate, PLT, MPV and PDW levels in the observation group were (27.93±1.44)% and (155.32±13.46) x10^9/L, (9.42±0.32) fL and (9.12±0.24) fL, respectively, which were significantly lower than those in the control group.

Conclusions: Shuxuetong injection can effectively improve the patient’s hemorheology and platelet function, improve the level of cerebral blood flow in patients with significant effect, it is worth further clinical application.

1. Introduction

Apoplexy, also known as stroke, is a common and frequently occurring disease of the nervous system. Acute ischemic stroke is a common type of stroke, accounting for about 70%-80% of all strokes[1-2]. It refers to the cerebral blood flow disorder caused by various reasons, which results in ischemic and anoxia of the related functional parts of the brain tissue, causing abnormal nerve function[3]. The clinical treatment of this disease is anticoagulant, thrombolysis, and reduction of platelet aggregation. Shuxuetong injection is a kind of traditional Chinese medicine for activating blood and removing blood stasis. It has many pharmacological functions, such as reducing the viscosity of blood and so on. It has been widely used in the treatment of ischemic disease[4]. In view of this, this study explores the effect of Shuxuetong Injection on platelet function, blood rheology and cerebral blood flow in patients with acute ischemic stroke. The present report is as follows.

2. Materials and methods

2.1. General information

One hundred cases of ischemic stroke admitted in our hospital from February 2015 to January 2017 were randomly divided...
into control group and observation group. Inclusion criteria: (1) Diagnostic criteria for ischemic stroke. (2) In a period of acute onset. (3) The family members know and sign the informed consent. Exclusion criteria: (1) Heart and liver insufficiency, blood system and mental system disease (2) Infectious disease (3) Disturbance of consciousness and patients with infarcted hemorrhage (4) Anaphylaxis. All the patients were randomly divided into the control group and the observation group, with 50 cases in each group. There were 29 men in the control group, 21 women, 40-78 years old, including 13 history of hypertension, 14 history of hyperlipidemia, 15 cases of diabetes and 8 cases of coronary heart disease. There were 28 men in the observation group, 22 women, 41-79 years old, including 14 history of hypertension, 13 history of hyperlipidemia, 14 cases of diabetes and 9 cases of coronary heart disease. The general data of the two groups showed no significant difference through statistical analysis.

2.2. Method

Patients in the control group were given routine treatment, including routine care, maintenance of water and electrolyte balance, and antiplatelet drugs, aspirin. On the basis of the control group, the observation group was given Shuxuetong injection (Mudanjiang You Bo Pharmaceutical Co., Ltd., Z200610100), 6 mL Shuxuetong injection and 250 mL 0.9% Sodium Chloride Injection mixed intravenous drip, 1 times/d for two weeks.

2.3. Observation index

Venous blood was collected from two groups before and after treatment. Blood viscosity (WBV), plasma viscosity (PV) and fibrinogen level (FIB) were measured by blood rheometer. Platelet aggregation rate, platelet count (PLT), mean platelet volume (MPV) and platelet volume distribution width (PDW) were measured by platelet function analyzer. Using Doppler ultrasound on cerebral artery blood flow velocity (MCA), middle cerebral artery flow velocity (PCA), middle cerebral artery blood flow velocity (ACA) were measured.

2.4. Statistical method

The data were analyzed by SPPS 17.0. The data were analyzed by t test. The expression was Mean ± SD (P<0.05), and the difference was statistically significant.

3. Result

3.1. Comparison of hemorheological changes in two groups

According to Table 1, there was no significant difference between the total blood viscosity, plasma viscosity and fibrin raw water in the two groups before treatment. After treatment, the total blood viscosity, plasma viscosity and fibrin raw water in the two groups were significantly lower than those before treatment. The whole blood viscosity, plasma viscosity and fibrinogen level in the observation group were (4.18 ± 0.05) mPa•s, (1.66 ± 0.12) mPa•s and (3.45 ± 0.08) g/L, which were significantly lower than those in the control group after treatment (P<0.05).

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a is compared with before treatment; b is compared with the control group, P<0.05.

3.2. Comparison of the changes of cerebral blood flow in the two groups

According to table 2, before treatment, there were no significant differences in MCA, ACA and PCA levels in the two groups. After treatment, the levels of MCA, ACA and PCA in the two groups were significantly increased. The levels of MCA, ACA and PCA in the observation group were (70.82 ± 4.13) cm/s, (60.62 ± 3.55) cm/s and (54.11 ± 2.36) cm/s, which were significantly higher than those in the control group after treatment (P<0.05).

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a is compared with before treatment; b is compared with the control group, P<0.05.

3.3. Comparison of two groups of changes in platelet function

According to table 3, before treatment, there was no significant difference in the maximum platelet aggregation rate, PLT, MPV and PDW levels in the two groups. After treatment, the maximum platelet aggregation rate, PLT, MPV and PDW levels in the two groups were

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<td>Comparison of two groups of changes in platelet function.</td>
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ab is compared with before treatment; ac is compared with the control group, P<0.05.
significantly decreased. The maximum platelet aggregation rate, PLT, MPV and PDW levels in the observation group were (27.93 ± 1.44)%,(155.32 ± 13.46) fL and (9.12 ± 0.24) fL, which were significantly lower than those in the control group after treatment (P<0.05).

4. Discussion

Acute ischemic stroke is a common type of stroke. It is a cerebral artery embolism and cerebral ischemia and hypoxia disease developed on the basis of atherosclerosis. With the side face or arms suddenly weakened and numbed, followed by headache, skew eyes and mouth, mental confusion, hemiplegia and other symptoms, not timely treatment can cause death. Patients with this disease often have a history of hypertension, hyperlipidemia, and diabetes. Long term diseases can lead to abnormal hemodynamics and infarction of vessels, resulting in disorder of cerebrovascular oxygen supply in the infarcted area, which leads to the reduction of ATP synthesis. The lack of long-term energy supply can cause brain cells to damage and brain edema, and then a series of neurological disorders[6]. On the treatment of this disease, there are drugs such as inhibition of platelet aggregation, antithrombotic, and fibrinogen reduction. Aspirin is also a common drug for clinical treatment of this disease. However, with the development of the disease, more and more evidences show that western medicine alone is difficult to control the occurrence and development of stroke, and it will also increase the incidence of hemorrhagic complications[3]. Therefore, the method of combining traditional Chinese and Western medicine has been paid more and more attention. Shuxuetong Injection is a pure Chinese medicine preparation. It is mainly made of leech and dragon. It can activate blood and dissipate blood stasis and travel through collaterals. Leech taste hampyeong. The main active ingredient is hirudin, which can effectively prevent the formation of blood stasis, promote the degradation of fibrinogen and inhibit the activity of thrombin. The taste of the dragon is salty and cold, the main component is vermis, which can effectively dredge the toxin and keep the blood flow unblocked[7]. It is found that Shuxuetong Injection can effectively improve Myocardial ischemia, reduce the incidence of atherosclerosis, reduce ischemia reperfusion injury, and protect heart, brain and kidney function[8].

Thrombosis plays an important role in the development of ischemic stroke. Platelet adhesion, aggregation and release are the key factors of thrombosis. Platelet aggregation rate, PLT, MPV and PDW are all important parameters for platelet function. The higher platelet aggregation rate, the greater the probability of thrombosis, the easier it is to form thrombus. PLT is the number of platelets in a unit volume of blood. The higher the number, the more the blood clotting. The level of MPV can effectively reflect the risk of stroke. The rise of its level indicates the proliferation of bone marrow polymerizing cells, the ability of platelet adhesion, aggregation and transformation, and the increase of blood viscosity. PDW is an important indicator of the volume difference of platelets. The elevation of the level suggests the enhancement of a variety of factors and coenzyme activity to make platelets more easily aggregated[9-11]. It is found that Shuxuetong Injection can effectively reduce the rate of platelet aggregation and improve the state of patients with ischemic stroke[3].

In the study, the platelet aggregation rate, PLT, MPV and PDW levels in the two groups were significantly lower than those in the control group (P<0.05). It is concluded that Shuxuetong Injection combined with routine western medicine can effectively reduce platelet aggregation function in ischemic stroke patients, reduce the formation of cerebral thrombosis, and relieve symptoms of patients.

The abnormal hemorheology will also have an important influence on the formation of thrombus. All blood viscosity, plasma viscosity and fibrinogen are important indicators of blood rheology. The increase of its level indicates that the ability of erythrocyte aggregation and deformability decrease, which directly promotes the formation of thrombus[12-14]. It is found that Shuxuetong Injection can effectively reduce the blood viscosity and improve the symptoms of patients with ischemic stroke[15,16]. In the study, the blood viscosity, plasma viscosity and fibrin raw water of the two groups decreased significantly after treatment, and the observation group was significantly lower than the control group after treatment (P<0.05). It shows that Shuxuetong Injection combined with conventional western medicine can effectively improve the hemorheological indexes of ischemic stroke patients and promote the rehabilitation of patients. In addition, there is a change in cerebral blood flow in patients with ischemic stroke. The formation of thrombus leads to the occurrence of arteriosclerosis, harden the cavity of the vessel, narrow the wall of the tube, and cause abnormal cerebral blood flow[17-19]. As a Chinese herbal medicine for activating blood and removing stasis, Shuxuetong Injection can effectively inhibit thrombosis and improve cerebral blood flow in patients with ischemic stroke[20,21]. In the study, the levels of MCA, ACA and PCA in the two groups were significantly increased after treatment. The levels of MCA, ACA and PCA in the observation group were significantly higher than those in the control group (P<0.05). It shows that Shuxuetong Injection can effectively improve the cerebral blood flow level and improve the ischemic state of patients with ischemic stroke.

To sum up, Shuxuetong Injection combined with routine western medicine treatment can effectively improve cerebral blood flow and improve blood rheology and platelet function in patients with ischemic stroke. The curative effect is remarkable, and it is worthy of further popularization and application.
References


