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CLINICAL RESEARCH

Therapeutic Effects of Vinpocetine as an Adjuvant therapy on Sequelae of Cerebral Infarction and Hemorheology

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Abstract

Objective To investigate Therapeutic Effects of Vinpocetine as an Adjuvant therapy on Sequelae of Cerebral Infarction and Hemorheology. **Methods** A total of 156 patients with cerebral infarction who attended our hospital between June 2019 to Jun 2020 were selected as research subjects, and they were randomly divided into observation group and control group according to the random number table method. The control group was treated with ginkgo biloba, and the observation group was further treated with vinpocetine on the basis of the control group. The clinical effect and the levels of hemorheology index were compared between the two groups before and after treatment. **Results** The total effectiveness rate of the observation group was significantly higher than that of the control group. After treatment, the level of hemorheology in both groups was sharply lower than those before treatment, with the hemorheology noticeably lower in the observation group than those in the control group. **Conclusion** The adjuvant therapy of vinpocetine showed a remarkable effect on treating sequelae of cerebral infarction, as it can greatly improve the related indexes of hemorheology.

Introduction

Cerebral infarction is a common cerebrovascular disease. The occurrence of the disease is closely related to changes in blood viscosity, platelets, thrombosis, and hematocrit (HCT) [1]. Cerebral infarction has high disability and mortality rate and death, and survived patients will often develop sequelae of cerebral infarction, whose symptoms manifest as hemiplegia, speech disorder and crooked mouth and eyes of varying degrees [2]. At present, ginkgo biloba is widely used to treat cerebral infarction, though it can improve symptoms of the disease in some cases, its effect is still controversial. Vinpocetine is gaining increasing recognition in recent years [3], but there are few reports conducted on the effect of vinpocetine on treating cerebral infarction.

Based on this, the current research investigated the therapeutic effect of vinpocetine as an adjuvant therapy on the basis of ginkgo damolon on cerebral infarction and hemorheology.

clinical data

Research objects

Totally 156 patients with cerebral infarction who attended our hospital from June 2019 to June 2020 were selected as the research objects. All the patients were randomly divided into the control group and the observation group, with 78 cases in each group, by the random number table method. The observation group consisted of 43 males and 35 females, with an average age of (53.1±7.1) years old and an average course of (3.5±0.7) years. The control group consisted of 40 males and 38 females, with an average age of (52.6±6.4) years old and an average course of (3.3±0.8) years. Diagnostic criteria were specifically in line with the clinical diagnostic criteria of Zhou Shuying et al. [4]. Patients with different degrees of cognitive dysfunction who were diagnosed with cerebral infarction by CT and MRI were included, while those with neurological diseases or other major diseases were excluded. This study was approved by the hospital Ethics Committee, and the patients and their family members signed the informed consent. There was no significant difference in clinical data between the two groups of patients (P>0.05).

Treatment methods

Both groups of patients were given anticoagulant drugs, vasodilator drugs, and antihypertensive drugs. In the control group, ginkgo biloba was intravenously injected at 20ml/time, and 250ml of 0.9% sodium chloride was injected once a day, for a total of 14 days. In the observation group, on the basis of the control group, vinpocetine injection was intravenously given at 20mg/time, and added to 250ml of 0.9% sodium chloride and injected once a day, for a total of 14 days.

Observation indicators

Effectiveness evaluation index

Significantly effective: symptoms and signs were improved, sequelae were significantly alleviated; effective: symptoms, signs and sequelae disappeared; ineffective: symptoms and signs remained unchanged. Total treatment effectiveness = (significantly effective effect + effective) / total number of cases × 100%.

Hemorheology Indexes

Before treatment and 14 days after treatment, 5 mL of venous blood was drawn from the research subjects under fasting conditions, centrifuged for 10 minutes (min) at a speed of 4000 rpm. The blood flow tester was used to determine the levels of hemorheology indexes in the two groups. The relevant operations were conducted strictly following the instrument instructions.

Statistical analysis

The software SPSS 17.0 was used for statistical analysis. The measurement data were expressed as mean ± standard deviation（$\bar{x}\pm s$），t-test was used for comparison, and x^2 test was used for comparison of the count data. Statistically significant was indicated by P<0.05.

Results

The effectiveness comparison between the two groups

The total effectiveness of the observation group was significantly higher than that of the control group (P<0.05), see Table 1.

Comparison of hemorheological indexes between the two groups

Before treatment, there was no significant difference in the levels of hemorheological indexes between the two groups (P>0.05). After treatment, the levels of hemorheological indexes in the two groups were significantly lower than before treatment

(P<0.05). The hemorheological indexes of the group were significantly lower than those of the control group (P<0.05), see Table 2.

Table 1 The effectiveness comparison between the two groups [n(%)]

Groups	Cases	Significantly effective	Effective	Ineffective	Total effectiveness rate
Observation group	78	29（37.18）	44（56.41）	5（6.41）	73（93.59）
Control group	78	12（15.38）	52（66.67）	14（17.95）	64（82.05）
χ^2					4.854
P					<0.05

Note: Compared with the control group, $^aP<0.05$

Indexes	Groups	Cases	Before treatment	After treatment	*t*	*P*
Whole blood high-cut viscosity（mPa·s）	Before treatment	78	6.52±0.71	4.85±0.53[a]	16.647	<0.05
	After treatment	78	6.48±0.65	5.48±0.69	9.317	<0.05
Cut viscosity of whole blood（mPa·s）	Before treatment	78	6.91±1.42	6.01±1.15[a]	4.350	<0.05
	After treatment	78	6.86±1.37	6.42±1.23	2.111	<0.05
Whole blood low-cut viscosity（mPa·s）	Before treatment	78	12.68±0.89	10.34±1.37[a]	12.650	<0.05
	After treatment	78	12.75±1.12	11.15±1.26	8.382	<0.05
Plasma viscosity（mPa·s）	Before treatment	78	1.75±0.24	1.54±0.18[a]	6.182	<0.05
	After treatment	78	1.69±0.31	1.61±0.14	2.077	<0.05
HCT（%）	Before treatment	78	50.21±3.12	42.15±4.33[a]	13.338	<0.05
	After treatment	78	49.65±2.78	45.75±4.15	6.896	<0.05

Table 2 Comparison of hemorheological indexes between the two groups

Note: Compared with the control group, $^aP<0.05$

Discussion

Cerebral infarction, which is one of the chronic diseases with a high incidence in the elderly in China, is resulted from impaired blood supply by multiple factors. Cerebral infarction can cause brain nerve defects or necrosis in patients, leading to clinical symptoms of patients with different degrees of sequelae such as hemiplegia, speech disorder, and

crooked mouth and eyes [2]. Epidemiology shows that the chance of developing hemiplegia in patients with cerebral infarction is as high as 60% to 80%. Therefore, actively exploring new possibilities to improve the sequelae of cerebral infarction has become an important topic in the prognostic managementof cerebral infarction.

At present, ginkgo biloba is often used to treat cerebral infarction in clinical practice. Although it can improve some symptoms of the disease, there is a problem of unstable therapeutic effect. In this study, the control group was given ginkgo biloba injection alone, while the observation group was given Vinpocetine injection combined with ginkgo biloba. After treatment, the total effectiveness rate of the observation group was significantly higher than that of the control group, indicating that vinpocetine combined with Ginkgo biloba has a better effect on treating cerebral infarction. To explain such a phenomenon, cerebral infarction is a major an obstacle to the blood supply to the brain. Vinpocetine is an indole alkaloid and can block the Ca2+ channel, inhibit the activity of Ca2+-dependent phosphodiesterase, activate guanosine cyclophosphate and protease G, relax vascular smooth muscle, and increase cerebral blood flow [5]. Yi-Shuai Zhang et al. [3] found that vinpocetine combined with idebenone treatment can significantly improve chronic ischemic cerebrovascular disease. A study demonstrated that [6] vinpocetine also shows certain effects on the treatment of acute lacunar infarction This indicated that Vinpocetine has the effect of improving cerebrovascular diseases, which is consistent with the effect of Vinpocetine combined with Ginkgo biloba in the treatment of cerebral infarction in this study.

The occurrence of cerebral infarction is closely related to changes in blood viscosity, platelets, thrombus and HCT and other hemorheological indicators [2]. In this study, by comparing the levels of hemorheological indexes of the two groups, it was found that the levels of hemorheology indexes in the observation group were significantly lower than those in the control group, indicating that the adjuvant treatment with vinpocetine can significantly improve hemorheological indexes in patients with cerebral infarction The reason we believe: Vinpocetine can enhance the deformability of red blood cells, reduce blood viscosity, inhibit platelet aggregation, thereby improving the level of hemorheological indicators, thereby improving microcirculation, increasing blood flow and cerebral blood flow, ultimately promoting the recovery of ischemic and hypoxic nerve cell function, so that the sequelae of cerebral infarction will be improvebd [7]. Studies have found that [8] Vinpocetine reduces cisplatin-induced acute kidney injury in mice by inhibiting the NF-κB pathway and activating the Nrf2/pathway, and improves the levels of hemorheological indicators in mice, indicating that vinpocetine could positively regulate hemorheological indexes. This is consistent to the results of this study.

In summary, vinpocetine as an adjuvant treatment has positive effects on cerebral infarction sequelae, and can effectively improve the level of hemorheological indexes.

Declaration of conflict-of-interest

The authors declare no conflict-of-interest.

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