Comparative Study of Aspirin Alone and Combined with Lumbrokinase Enteric-coated Capsules in Treatment of Cerebral Infarction

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[ABSTRACT] OBJECTIVE: Comparative study of clinical efficacy of aspirin alone and aspirin and lumbrokinase enteric-coated capsules (Boluoke®) combined in the treatment of cerebral infarction. METHOD: 120 patients with atherosclerotic thrombotic cerebral infarction were randomly divided into treatment group and control group. They were given either aspirin and Boluoke® capsules or simple use of aspirin. RESULTS: In the treatment group, the total significantly effective rate was 90%, and the total effective rate was 97% compared with the control group of 67% and 90%, respectively. The treatment group was significantly better than the control group. In addition, hemorheology and cranial MRI imaging changes were better in the treatment group than the control group. CONCLUSION: Boluoke® combined with aspirin can improve the clinical symptoms and the prognosis of cerebral infarction better than aspirin alone.

[Keywords] cerebral infarction; aspirin; Lumbrokinase enteric-coated capsules

Lumbrokinase enteric-coated capsules (Boluoke®) are made from a kind of cultured earthworms as raw material with the use of modern biochemical separation techniques. Its research and development benefited from Chinese medicine inspiration. Chinese Pharmacopoeia recorded Di Long (earthworms) enters the liver, spleen, urinary bladder meridians and helps to treat limb numbness, hemiplegia, joint pain, hypertension and etc. From January to November 2007, a comparative study of clinical efficacy of aspirin alone and aspirin and lumbrokinase enteric-coated capsules (Boluoke®) combined in the treatment of atherosclerotic thrombotic cerebral infarction was conducted. Report is as followed.

1.   DATA & MEHTOD

1.1 General Information   120 patients were picked from the Fourth Affiliated Hospital of Nanchang University, confirmed to have atherosclerotic thrombotic cerebral infarction by cranial MRI. Patients were randomly divided into two groups, treatment group and control group. Treatment group had 60 patients, 32 males, 28 females; age (52.2 ± 11.1) years old; course of disease 2-18d; 20 with partial aphasia; 30 with right upper limb and lower limb grade II ~ III paralysis; 4 with right upper limb and lower limb grade 0-I paralysis; 22 with left upper limb and lower limb grade II-III paralysis; 4 with left upper limb and lower limb grade 0-I paralysis; 30 had diabetes; 50 had hypertension. Control group had 60 patients, 34 males, 26 females; age (52.1 ± 13.1) years old; course of disease 2-16d; 18 with partial aphasia; 26 with right upper limb and lower limb grade II ~ III paralysis; 6 with right upper limb and lower limb grade 0-I paralysis; 24 with left upper limb and lower limb grade II-III paralysis; 4 with left upper limb and lower limb grade 0-I paralysis; 32 had diabetes; 48 had hypertension. General information between two groups had no significant difference, (P > 0.05).

1.2 Intervention   Treatment group: Boluoke® (lumbrokinase enteric-coated capsules) 2 capsules, three times daily, plus enteric-coated aspirin (Harbin Pharmaceutical Group with the Thai Pharmaceutical Co., Ltd.) 100mg, once daily in the morning, 10-15d as one treatment course. Control group: enteric-coated aspirin 100mg, once daily in the morning, 10-15d as one treatment course. Hemorheology changes were examined using BME – capillary type viscometer from Shanghai

Medical University; the indicators were according to the biophysical teaching techniques.

1.3 Observations   Record 120 patients' aphasia status, upper and lower limb activities, hemorheology and cranial MRI imaging changes before and after treatment.

1.4 Scoring Method   Scores were based on language proficiency, movement functions, comprehension and recovery status. ① Language performance: normal expression: 0 point; general expression, difficulties with naming: 1 point; words into sentences and incomplete expression: 2 points; cannot say a word or phrase: 3 points; aphasia: 4 points. ② Upper limb shoulder joint: normal: 0 point; rise fully but the myodynamia is bad: 1 point; rise to the shoulder or slightly cross the shoulder: 2 points; could not rise to the shoulder: 3 points; could not move or swing slightly: 4 points. ③ Upper limb knuckle: normal, 0 point; fingers move effectively but the myodynamia is bad: 1 point; can make a fist and open fist: 2 points; able to bend fingers, cannot make a fist or open a fist: 3 points; cannot move: 4 points. ④ Lower limb marrow joint: normal, 0 point; rise above 45º: 1 point; rise less than 45º: 2 points; able to slide: 3 points; cannot move: 4 points. ⑤ Lower limb foot joint: normal: 0 point; able to move freely, with weak strength: 1 point; cannot move freely: 2 points; minimal movement: 3 points; cannot move: 4 points. ⑥Comprehensive function: independent living style, care of oneself: 0 point; simple independent life style with some difficulties: 1 point; able to walk and care of oneself, need assistant: 2 points; able to stand, need assistant to be aside: 3 points; in bed: 4 points.

1.5 Therapeutic Evaluation   According to scoring method for stroke assessment (likely based on the Fugl-Meyer method) , therapeutic index (TI) = (pre-treatment score – post-treatment score)/pre-treatment score * 100%. Curative: TI ≥ 85%; significantly effective: 50% ≤ TI < 85%; effective: 20% ≤ TI < 50%; ineffective: TI < 20%. Total significantly effective rate = curative rate + significantly effective rate. Total effective rate (curative + significantly effective + effective)/total patients * 100%.

1.6 Safety Examination   In the two groups, perform blood, urine, stool tests and check heart, live, kidney functions before and after treatment, and observe any adverse reactions during treatment course.

1.7 Statistic Method   Data calculated by mean ± standard deviation (x ± s), t-test, x^2 test, computer statistical analysis using SPSS10.0 software package.

2.   RESULTS

All patients' blood, urine and stool tests and heart, liver, kidney functions were normal after the treatment, no adverse reactions were found.

2.1 Comparison between two groups Treatment group: total significantly effective rate of 90%, total effective rate of 97%; control group: total significantly effective rate of 67.7%, total effective rate of 90%. Treatment group was more effective than control group, difference was significant. See table 1.

Table 1 comparison of two groups before and after treatment (%)

Group	n	Curative	Significantly Effective	Effective	Ineffective	Total Significantly Effective (%)	Total Effective (%)
Treatment	60	40 (66.7)	14 (23.3)	4 (6.7)	2 (3.3)	90.0*	96.7*
Control	60	28 (46.7)	12 (20.0)	14 (23.3)	6 (10.0)	66.7	90.0

*note: compared with control group, *P<0.05.

2.2 Hemorheology Comparison
Comparison of hemorheology index before treatment, the difference was not significant; after treatment, there was significant difference between control group's and treatment group's whole blood high-shear viscosity and low-shear viscosity, (P<0.05). See table 2.

Table 2. Hemorheology comparisons of the two groups before and after treatment.

Category	Group	Before Treatment	After Treatment
Whole blood high-shear viscosity/ (mPa*s)	Treatment	7.32±2.71	6.73±2.15*
	Control	7.37±2.48	7.36±2.37
Whole blood high-shear viscosity/ (mPa*s)	Treatment	25.12±11.26	23.42±10.45*
	Control	22.23±11.53	25.41±12.26
Plasma relative viscosity/ (mPa*s)	Treatment	1.56±0.17	1.52±0.13
	Control	1.56±0.21	1.49±0.18
Hematocrit (%)	Treatment	0.38±0.08	0.41±0.04
	Control	0.45±0.06	0.45±0.011

*note: compared with control group, *P<0.05.

2.3 Comparison of Cranial MRI Images
After treatment, treatment group: 50 with changes, 10 without changes; control group: 34 with changes, 26 without changes. The difference in the changes of cranial MRI images (cranial MRI changes according to lesion sizes) in the two groups after treatment was significant.

3. DISCUSSIONS
Cerebral infarction (CI) also known as ischemic stroke, it is the ischemic necrosis of brain tissue or brain softening as a result of brain blood supply barrier, ischemic, hypoxia, and often seen as a clinical common and frequently occurring disease. According to the national statistical information, 150 millions of patients reported with cerebrovascular disease every year, of which 70% with cerebral infarction, and the recurrence rate was as high as 20% ~ 40% [1].

Modern pharmacology research suggested that Boluoke® (lumbrokinase enteric-coated capsules) can hydrolyze fibrin directly, can activate the plasminogen system, can lower blood viscosity, can improve platelet aggregation, can decrease activities of plasminogen activator inhibitor, can increase fibrin degradation products and can prevent thrombosis [2]. Boluoke® is useful for thrombosis and embolic diseases and has a significant thrombolytic effect. It is a secure, non-toxic, no significant adverse reactions and widely used as clinical anti-thrombotic drug. The main mechanism of Boluoke® is to improve cerebral blood flow in cerebral infraction patients and to inhibit platelet aggregation, thereby improving the symptoms of cerebral ischemia [3]. The results of this study also showed that the use of enteric-coated aspirin and Boluoke® in treatment group had 67% curative rate, the total significantly effective rate was 90% and the total effective rate was 97%, compared with the simple use of enteric-coated aspirin in control group, the difference was significant. Treatment group was more effective in reduction of high-shear viscosity and low-shear viscosity and in changes of cranial MRI imaging compared with the control group. Thus, enteric-coated aspirin and Boluoke® in treatment of cerebral infarction were more effective than a simple use of enteric-coated aspirin treatment, with only little adverse reactions, is worthy of clinical application.

4. REFERENCE

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