

## The Efficacy of Lumbrokinase in the Prevention and Treatment of Ischemic Stroke

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**[ABSTRACT]** **OBJECTIVE:** To evaluate the effect of lumbrokinase in prevention and treatment of ischemic stroke. **METHODS:** Subjects were from Wuhan Iron and Steel Company's second employee hospital: outpatient and inpatients (above 40 years old and pose risk factors for ischemic stroke). In addition to the conventional interventions, treatment group was given lumbrokinase. Observe the changes in hemorheology and ischemic stroke incidences before and after treatment. **RESULTS:** One and half year after treatment, lumbrokinase group had significant reduction in all of the indicators of hemorheology changes. There were no obvious adverse reactions during treatment. **CONCLUSIONS:** Lumbrokinase can reduce blood viscosity and improve microcirculation in the brain, thereby reducing the incidences of ischemic stroke.

**Key Words:** Ischemic Stroke; Lumbrokinase; Hemorheology

To evaluate the effect of lumbrokinase (manufactured by Beijing Baiao Pharmaceutical Co, Ltd) in prevention and treatment of ischemic stroke, this experiment had patients that were 40 years old or older and pose risk factors for ischemic stroke during October 2006 to March 2008 in the hospital. Efficacy was determined by examination of the indicators of hemorheology changes. Report is as followed:

### 1. SUBJECT AND METHOD

**1.1 Subject:** Patients posed risk factors (including hypertension, heart disease, diabetes, smoking, excessive drinking and abnormal blood lipid levels) to ischemic stroke within that one and half year. Hemorheology was used to examine and to randomly divide subjects into two groups. Treatment group had 145 subjects: there were 85 males and 60 females, given additional lumbrokinase; control group had 110 subjects: 65 males and 45 females. Two groups were given conventional medications, included controlling hypertension and body weight, treating for heart disease, diabetes and hyperlipidemia, stop smoking and limiting salt and alcohol consumption. Examine hemorheology before and after treatment and observe incidences of ischemic stroke. Ischemic stroke diagnosis was according to WHO's cerebrovascular disease diagnosis standard <sup>[1]</sup>, and 100% had skull CT examination report.

**1.2 Hemorheology Examination Standard:** the Huike Electronic Instrument Co. Ltd's HK-2500 model device was used to examine blood viscosity. Whole blood viscosity high-shear: male (6.0±0.4) mpa-s; female (5.2±0.5) mpa-s; low-shear: male (8.5±1.0) mpa-s, female (7.0±1.0) mpa-s; Hematocrit: male (0.42±0.015) mpa-s, female (0.36±0.016) mpa-s; plasma viscosity: (1.7±0.05) mpa-s; fibrinogen normal range: (2.70±1) g/l; if three or more of the parameters were above the normal range, it is marked as an increased in blood viscosity.

**1.3 Statistical method:** results were represented by  $\bar{X} \pm s$ ; *t test* was used to do comparisons between the two groups.

## 2. RESULTS

**2.1 Hemorheology:** After treatment, the treatment group's results showed that parameters in hemorheology have decreased; compared with before treatment, they were statistically significant ( $P < 0.01$ ); after treatment, the control group's results showed that there was a reduction difference in whole blood viscosity (low shear) and erythrocyte, and other indicators remained the same. When compared the two groups, indicators in the treatment group were lower than the control group, and the difference had statistical significance ( $P < 0.01$ ). See table.

**2.2 Comparison of incidences of ischemic stroke between the two groups:** lumbrokinase treatment group had two patients with anemic ischemic stroke. Control group had four patients with anemic ischemic stroke. Two groups' incidence rates were 1.3% and 3.63%, and the difference showed statistical significance ( $P < 0.01$ ).

**2.3 Adverse Reaction:** treatment group had three patients with stomach discomforts; when adjustment was made to have lumbrokinase taken after meal, the symptoms disappeared.

## 3. DISCUSSION

Lumbrokinase is a protein extracted from a special earthworm. Its major functions are to decrease fibrinogen, reduce blood platelet aggregation, activate blood vessel endothelial cell to release t-PA and decrease PAI. It strengthens filament hydrolysis system and controls red blood cell aggregation; thus, it prevents thrombus formation and helps to unclog blocked blood vessel<sup>[2][3]</sup>.

The results from this experiment showed that treatment group had better improvement in indicators of hemorheology compared with control group. This represented that lumbrokinase is effective in improving blood viscosity in brain blood vessels and decreasing incidences of ischemic stroke. Treatment group had few stomach discomforts; this might be due to individual causes. After changing medication time, symptoms disappeared.

Table: Hemorheology comparisons of the two group before and after treatment

	Treatment Group		Control Group	
	Before Treatment	After treatment	Before treatment	After treatment
Blood viscosity (high shear) mpa.s	8.76±0.89	6.40±0.79 <sup>**□</sup>	8.40±0.79	6.70±0.74 <sup>*</sup>
Blood viscosity (low shear) mpa.s	16.47±2.04	11.76±1.78 <sup>**□</sup>	15.41±2.11	12.07±1.78 <sup>*</sup>
Plasma viscososity	2.71±0.11	2.62±0.11 <sup>**</sup>	2.72±0.12	2.68±0.10
Hematocrit	1.02±0.02	0.88±0.01 <sup>**</sup>	0.97±0.03	0.89±0.01
Fibrinogen (g/l)	5.06±1.46	3.26±1.18 <sup>**□</sup>	4.86±1.75	3.84±1.40 <sup>*</sup>

Note: treatment group, control group comparisons within the group before and after treatment: <sup>\*</sup>  $P < 0.05$ , <sup>\*\*</sup>  $P < 0.001$ ; <sup>□</sup> treatment and control group comparisons after treatment  $P < 0.05$

## REFERENCE

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