

ANTIHYPERLIPIDEMIC CAPSULES IN THE TREATMENT OF HYPERLIPIDEMIA AND ITS CLINICAL EFFECT ON HEMORRHEOLOGY AND AGGREGATION OF THROMBOCYTES

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The authors treated 54 cases of hyperlipidemia with the antihyperlipidemic capsules and the total short-term effective rate was 77.8%. The capsules also showed obvious effects in improving hemorrheology, reducing aggregation of thrombocytes, and lowering the blood pressure. The authors believe they would be useful in the prevention and treatment of ischemic apoplexy and coronary disease.

It has been established that hyperlipidemia is one of the factors leading to arterial atherosclerosis. Therefore, the search of effective antihyperlipidemic drugs is of practical significance in the prevention and treatment of arterial atherosclerosis and its cardiovascular and cerebrovascular complications. The authors treated 54 cases of hyperlipidemia with the Chinese herbal antihyperlipidemic capsules, and observed the patients' hemorrheology, aggregation rate of thrombocytes and other indices, with satisfactory therapeutic effects. A brief summary is given as follows.

CLINICAL DATA

Patients with one or more of the following 3 blood lipid indices (blood cholesterol, β -lipoprotein and triglyceride) over the normal upper limit by more than 10% were selected for ob-

servation. All 54 cases in this series were inpatients from the coronary clinic of our department. They were 30 males and 24 females, and the age ranged from 45 to 72 years, averaging 58.5 years. The clinical course was from 10 months to 15 years. Among these 54 cases, 30 patients had hypertension of stage I to stage II, 8 patients were complicated by coronary disease, and 16 cases suffered from only hyperlipidemia.

METHODS AND RESULTS

Therapeutic Method

A daily dose of nine antihyperlipidemic capsules, to be taken 3 capsules tid, was prepared from *Ramulus Loranthi*, *Herba Epimedii*, *Rhizoma Alismatis*, *Rhizoma Polygonati Odorati*, *Fructus Leonuri* and *Fructus Crataegi* 15gm each. Six weeks constituted a therapeutic course and 10 days before and during the treatment, all other Chinese medicinals or western drugs were suspended.

Indices for Observation

Blood lipids, blood rheology, aggregation rate of thrombocytes, liver and kidney function tests, blood glucose and ECG were tested before medication, and 3 and 6 weeks after medication. The pulse features were also recorded.

Blood cholesterol was determined by the acetic anhydride-sulphuric acid direct colorimetric method (the normal value in our laboratory was 171.5 ± 28.4 mg%). β -lipoprotein was determined by the turbidimetric method (normal value 497.1 ± 56.8 mg%). Triglyceride was determined by the acetylacetone colorimetric method (normal value 112.6 ± 12.6 mg%). Blood rheology was measured with the SDZ-3 automatic electronic chronoviscometer of Wuxi Electronic Instrument Factory, Jiangsu Province, in accordance with the procedure adopted by Shanghai First Medical College.¹ Thrombocyte aggregation rate was estimated with the PAM-Z PPP thrombocyte aggregation apparatus produced by the Department of Biophysics, Shanghai First Medical College in cooperation with Dan-yang Radio Factory, Jiangsu Province, using the turbidimetric method, and the concentration of ADP (inducing agent) was $1 \mu\text{m/ml}$ and $10 \mu\text{m/ml}$.

Therapeutic Results

1. Short-term efficacy: Of the 54 cases with hyperlipidemia, 19 cases (35.2%) were evaluated as markedly effective with blood lipid levels reduced to normal and subjective symptoms relieved; 23 cases (42.6%) were evaluated

as effective with 1 or 2 blood lipid indices reduced to normal, and subjective symptoms basically relieved; and the other 12 cases (22.2%) were ineffective. The total effective rate was 77.8%.

2. Changes in blood lipids content: Before treatment, blood cholesterol, β -lipoprotein and triglyceride were higher than normal in 36, 11 and 26 cases respectively. After treatment for 6 weeks, the elevated values decreased significantly ($P < 0.01$, see Table 1).

Table 1. Blood lipid levels before and after treatment (mg %)

	Cholesterol (Mean \pm SD) (36 cases)	β -lipoprotein (Mean \pm SD) (11 cases)	Triglyceride (Mean \pm SD) (26 cases)
Before treatment	250.7 \pm 15.8	691.2 \pm 60.2	188.7 \pm 14.2
After treatment	201.9 \pm 13.8*	610.3 \pm 51.4*	130.2 \pm 11.3*

* Compared with values before treatment, $P < 0.01$.

3. Blood rheological changes: As shown in Table 2, before treatment the whole blood

Table 2. Blood rheological changes after treatment (Mean \pm 2SD)

Indices	Normal controls		Before treatment		After treatment	
	Male (n=220)	Female (n=140)	Male (n=30)	Female (n=24)	Male (n=30)	Female (n=24)
Whole blood viscosity	4.56 \pm 0.44	3.35 \pm 0.35	5.46 \pm 0.47**	4.50 \pm 0.47**	4.60 \pm 0.04†	4.16 \pm 0.32†
Plasma viscosity	1.68 \pm 0.064	1.66 \pm 0.065	1.79 \pm 0.075*	1.76 \pm 0.095*	1.69 \pm 0.066	1.68 \pm 0.064
Whole blood reduced viscosity	7.40 \pm 0.46	7.20 \pm 0.46	8.12 \pm 0.79**	8.10 \pm 0.85**	7.46 \pm 0.60†	7.40 \pm 0.76†
ESR (mm/h)	18.6 \pm 6.4	20.8 \pm 3.5	18.2 \pm 6.8	16.6 \pm 8.6	16.8 \pm 8.6	10.3 \pm 8.5
Hematocrit	46.6 \pm 3.6	39.4 \pm 3.4	51.8 \pm 2.75**	48.9 \pm 2.14**	48.2 \pm 2.8†	45.8 \pm 2.11†
K value in equation	55.3 \pm 24.0	50.0 \pm 21.5	80.6 \pm 19.7**	81.0 \pm 19.7**	78.4 \pm 16.8	76.6 \pm 15.9

Note: * Compared with the normal group of the same sex, $P < 0.05$; ** compared with the normal group of the same sex, $P < 0.05$; † compared with values before treatment of the same sex, $P < 0.01$.

viscosity, whole blood reduced viscosity, plasma viscosity, hematocrit and K in the equation were higher than those of the normal controls. After medication for 6 weeks, significant improvement was seen in whole blood viscosity, whole blood reduced viscosity and hematocrit.

4. Changes in thrombocyte aggregation

rate: The thrombocyte aggregation rate was investigated in 44 cases before and after treatment. The thrombocyte counts were within normal ranges before and after treatment. The thrombocyte aggregation rate of the hyperlipidemic patients before treatment was higher than that of the normal group ($p < 0.01$), but

Table 3. Thrombocyte aggregation rate before and after treatment (Mean \pm 2SD)

Thrombocyte agg. rate	Normal controls (40 cases)	Before treatment (44 cases)	After treatment (44 cases)
1 μ m ADP			
1 min	30.4 \pm 7.0	40.3 \pm 13.6*	35.5 \pm 11.3††
5 min	54.0 \pm 6.0	63.6 \pm 17.0*	57.6 \pm 11.4††
10 μ m ADP			
1 min	40.5 \pm 4.5	55.0 \pm 11.3*	44.6 \pm 18.5††
5 min	60.0 \pm 5.0	68.5 \pm 10.8*	54.0 \pm 7.3††

Note: * Compared with the normal group, $P < 0.01$; †† Compared with values before treatment, $P < 0.01$.

significantly improved after medication for 6 weeks ($p < 0.01$) (see Table 3).

5. Antihypertensive effect: Of the 54 patients with hyperlipidemia, 30 cases were complicated by hypertension, 11 cases of stage I and 19 cases of stage II. According to the criteria revised at the Zhengzhou Conference in 1979 for the evaluation of therapeutic antihypertensive efficacy, 11 cases in this series were evaluated markedly effective after treatment, 14 cases effective, and 5 cases ineffective, the total effective rate being 83.3%.

DISCUSSION

Hyperlipidemia is frequently seen in elderly persons, and conducive to the pathogenesis of atherosclerotic cardiovascular and cerebrovascular diseases. In recent years, the morbid age tends to shift to the middle-aged.² The clinical manifestations include dizziness, tinnitus, headache,

weakness and pain in the back and knees, feeling of oppression in the chest, shortness of breath and the tongue dark red in color. According to TCM, deficiency of kidney is the root-cause and blood-stasis the secondary external manifestations of excessiveness. Ramulus Loranthi, Herba Epimedii, Rhizoma Alismatis and Rhizoma Polygonati Odorati are used to tonify the kidney Yin and Yang; Fructus Leonuri, Rhizoma Alismatis and Fructus Crataegi are used to invigorate the blood circulation and to eliminate stasis, thus tonification and reduction are accomplished at the same time. Current pharmacological researches prove that Ramulus Loranthi, Herba Epimedii and Fructus Crataegi have antihyperlipidemic and antihypertensive properties. The combined use of these 6 Chinese medicinals in this study indicated that the antihyperlipidemic efficacy was definite, with a

short-term effective rate of 77.8%, and the blood lipid indices markedly decreased after treatment. The improvement in blood rheology and thrombocytic aggregation rate, as well as antihypertensive effect were also apparent. Besides, no untoward toxic or adverse side-actions were observed.

Thrombocytes play an important role in the pathogenesis of arterial atherosclerosis,³ and changes in thrombocytic function is one of the intermediate links in arterial wall changes under hyperlipidemic conditions.⁴ The present study indicated that in hyperlipidemia, thrombocytic aggregation rate was markedly raised, but reduced significantly after treatment by the capsules. Blood lipids go parallel with thrombocytic aggregation, and both are improved after treatment.

In blood rheology, hyperlipidemia pertains to the high blood viscosity syndrome. It is est-

ablished that hyperlipidemia induces an increase in blood viscosity and slows down blood circulation, leading to thrombosis. This is in accord with the belief of blood-stasis in TCM, and thus supports the use of herbs for activating blood circulation and dispersing blood-stasis in treatment of the disease.

The authors are of the opinion that use of antilipidemic capsules may well be beneficial in the prevention and treatment of ischemic apoplexy and coronary disease.

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