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Effect of Jiuwei Jiangzhi tablet on liver homogenate in rats with hyperlipidemia model

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Abstract. To observe the effect of Jiangzhi tablet on liver homogenate of hyperlipidemia model rats, seventy-two rats were randomly divided into 6 groups: blank control group, model group, Xuezhikang group and Jiangzhi tablet group. Except for the blank group, the rats were fed with high fat diet and the compound factors of intragastrically fat milk to establish hyperlipidemia model. The corresponding drugs were given intragastrically for 21 days in each administration group, and the eyeballs were removed 2 hours after administration on the 21st day, and the whole blood viscosity was measured. The rats were killed, the liver was taken, and the content of TC, TG in liver homogenate was measured. Hyperlipemia model rats were successful in the replication. Compared with the model group, the levels of TC and TG of the liver homogenate ($P < 0.01$) could be significantly reduced in the high, middle and low dose lipid-lowering tablet groups. Jiangzhi tablet can significantly reduce blood lipid and regulate lipid metabolism in rats with hyperlipidemia.

1. Introduction

The nine-flavor lipid-lowering tablet is a hospital-in-hospital agreement formulated by the Chinese People's Liberation Army (PLA) at the 371 Central Hospital of the Chinese People's Liberation Army (PLA) according to the theory of traditional Chinese medicine and the research results of modern pharmacology. The traditional Chinese medicine preparation has the functions of promoting digestion, removing blood stasis, clearing liver and improving eyesight, and is used for treating hyperlipidemia and fatty liver. It has a good clinical effect. In addition, with the improvement of human living standards in recent years, hyperlipidemia is still a high incidence disease that seriously threatens human health. According to statistics, the incidence of hyperlipidemia in the normal population has reached $20\% \leq 40\%$, and is still increasing [1]. From the experimental point of view, the effects of Jiangzhi tablets on whole blood viscosity and antioxidant activity in experimental hyperlipidemia rats were observed.

2. Materials

2.1. Experimental animal

Rat, germline: Wistar, grade: SPF, male, 180-220g, Certificate No.: 37009200001785, Provider: Shandong Lukang Pharmaceutical Co., Ltd. License number SCXK (Lu) 2014005.

2.2. Experimental drugs and reagents



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Jiuwei Jiangzhi tablets, provided by Xinxiang 371 Hospital preparation Department, batch number 20150806, oral, 3 times a day, three times a day, each weighing 0.3g; Xuezhikang capsule, produced by Beijing Peking University Weixin Biotechnology Co., Ltd., Batch No.:20150718; Propylene Glycol, Tianjin Zhiyuan Chemical Reagent Co., Ltd., Lot No.:20150320; Twin-80, Tianjin Fuyu Fine Chemical Co., Ltd., batch number: 20150410; Sodium deoxycholate, produced by Beijing Oboxing Biotechnology Co., Ltd., batch number: 20160112; Propylthiouracil tablets, Shanghai Chaohui Pharmaceutical Co., Ltd., batch number 1506N18; Cholesterol, Zhengzhou Pini Chemical Reagent Factory production, batch number 20151220; The production and lot number of the normal saline and Henan Shuangli Huili Pharmaceutical Co., Ltd. is 20160108; Total cholesterol (T-CHO) test box, Nanjing Institute of Bioengineering, batch number A111; Glycerol (TG) test box, Nanjing Institute of Bioengineering, batch number A1101 ≤ 1 ; High density lipoprotein cholesterol (HDL-C) test box, Nanjing Institute of Bioengineering, batch number A112 ≤ 1 ; Low-density lipoprotein cholesterol (LDL-C) test box, Nanjing built bioengineering research institute, lot number A113-1. Aspartate transaminase (AST) test box, Nanjing Institute of Bioengineering, batch number C010-1. Glutamic acid transaminase (ALT) test box, Nanjing Institute of Bioengineering, batch number C009-2. Glutamyl Transpeptidase (Y-GT) Test Box, Nanjing Institute of Bioengineering, batch number C017. The configuration of high fat emulsion: lard 25g, cholesterol 10g, propylthiouracil tablet 1g, Tween-80 25ml, aqueous phase: distilled water 30ml, 1,2-propanediol 20ml, sodium deoxycholate 2g. The preparation method is as follows: oil phase: lard 25g is put into 200ml beaker, heated to 100°C, cholesterol 10g is added to melt, then propylthiouracil tablet 1g is added, fully mixed with Tween-80 25ml, aqueous phase: distilled water 30ml is added to 200ml beaker, 60 °C water bath pot water bath, Adding 20 ml of 1,2-propylene glycol and 2 g of sodium deoxycholate, and then adding the water phase into the oil phase, fully stirring, cooling, and keeping the refrigerator at 4 °C for standby.

The high-fat feed is prepared by 10% of lard, 5% of egg yolk powder, 1% of cholesterol and 0.2% of prothionin. The proportion of sodium deoxycholate 0.5%, sucrose 5% and basic feed 78.3%

2.3. Laboratory apparatus

FA (N) / JA (N) series electronic balance, Shanghai Minqiao Precision instrument Co., Ltd.; HWS 12 electrothermal constant temperature water bath pot, Shanghai Yiheng Scientific instrument Co., Ltd.; KDC-160HR high-speed freezing centrifuge, Zhongjia Branch of University of Science and Technology Innovation Co., Ltd.; 6.8 enzyme Standard instrument, BIO-RAD Company, USA; adjustable liquid shifters, Shanghai Leibo Analytical Instruments Co., Ltd.

2.4. Statistical processing method

The data analysis was carried out by SPSS17.0 medical statistical package, and the measurement data were expressed by mean $\pm$ standard deviation ($\pm$ s). One factor variance analysis was used for each group, LSD method was used for variance test, Games-Howell method was used for uneven variance, and Redit test was used for grade data.

3. Methods

72 male rats were randomly divided into 6 groups, and 12 rats in each group were the blank control group, the model group, the Xuezhikang group, the high, middle and low dose lipid-lowering group. In addition to that normal feed fed by the blank control group, the other group establishes the rat hyperlipidemia model by feeding the high-fat feed and the compound factor model of the intragastric fat emulsion[2], and simultaneously, in addition to the blank control group and the model group, the same volume of physiological saline is administered. At the same time, the same volume of physiological saline was given to the blank control group and the model group. The corresponding drugs were given intragastrically every morning and fat emulsion was given intragastrically in the afternoon[3]. Xuezhikang group ($0.2\text{g} \leq \text{kg}$, the concentration was $0.2\text{g} \leq \text{ml}$, equivalent to 10 times the clinical dose), high, middle and low dose Jiangzhikang tablet group (at $1.5\text{g} \text{ kg}$, $0.75\text{g} \text{ kg}$,

0.375g ·kg), 0.375g ·kg ~ (- 1), 0.375 g ·kg ~ (- 1). The concentration was 0.15g / ml, 0.075g / ml, 0.0375g / ml, equivalent to 20 times, 10 times and 5 times of the clinical dose. The rats in each group were given high fat emulsion in the afternoon except the blank control group. And each treatment group was given a corresponding drug 21d. The eyeball was removed 2 hours after the last day of administration, and the blood was used to determine the whole blood viscosity of high, middle and low shear blood stasis [4]. The rats were killed by cervical cone dislocated method. After weighing, a little liver tissue was taken, and normal saline was added in the proportion of 1:9 and placed in glass homogenate tube, which was operated on the whole ice, and the liver homogenate was prepared by centrifugation at 3 000 rpm ·min⁻¹ for 15 min, after grinding, and the TC, TG level of liver homogenate was measured. In each group, the tissues of the same part of the middle lobe of the liver were fixed with 4% paraformaldehyde, embedded in paraffin, sectioned and stained with hematoxylin-eosin (HE) staining to observe the liver tissue.

4. Results

4.1. Effect of Jiangzhi tablet on TC

As can be seen from Table 1, Compared with the blank group, the content of TC, TG in the liver homogenate of the model group was significantly higher than that of the blank group ($P < 0.01$), which indicated that the hyperlipidemia model was successful. Compared with the model group, high, middle and low dose Jiangzhi tablet group and Xuezhikang group could significantly reduce the content of TC, TG in rat liver homogenate ($P < 0.01$).

Table 1. Effect of Jiangzhi tablet on TC, TG level in liver homogenate of rats with hyperlipidemia

Group	n	TC (mmol/L)	TG (mmol/L)
Blank group	12	0.51±0.05**	0.74±0.06**
model set	12	1.59±0.26	1.75±0.29
Xuezhikang group	12	0.86±0.13**	1.05±0.11**
high-dose lipid-lowering group	12	0.85±0.17**	1.02±0.15**
Middle dose Jiangzhi tablet group	12	0.93±0.18**	1.12±0.18**
Low - dose lipid - reducing tablet group.	12	1.02±0.09**	0.99±0.19**

Note: Compared to the model group, ** $p < 0.01$, * $p < 0.05$

4.2. Effect of Jiangzhi tablet on whole blood viscosity of hyperlipidemia model in rats

Table 2. Effect of Jiangzhi tablet on whole blood viscosity of hyperlipidemia model in rats

Group	n	Kawche	midcut	Low cut
Blank group	12	3.44±0.13**	3.95±0.18**	6.18±0.43**
model set	12	3.77±0.19	4.61±0.31	9.16±0.83
Xuezhikang group	12	3.57±0.23*	4.21±0.32**	6.98±0.65**
high-dose lipid-lowering group	12	3.58±0.12*	4.22±0.21**	7.15±0.67**
Middle dose	12	3.58±0.19*	4.30±0.38*	8.24±0.51**

<i>Jiangzhi tablet group</i>				
<i>Low - dose lipid - reducing tablet group.</i>	12	3.67±0.21	4.42±0.42	8.30±0.68**

Note: Compared to the model group, ** $p < 0.01$, * $p < 0.05$

It can be seen from Table 2 that compared with the blank group, the whole blood viscosity of the model group was significantly higher than that of the blank group ($P < 0.01$), which indicated that the hyperlipidemia model was successful. Compared with the model group, the high-dose lipid-lowering group and the Xuezhikang group can obviously reduce the whole blood viscosity of the rat ($P < 0.05$), and the high-dose lipid-lowering group and the Xuezhikang group can obviously lower the whole blood viscosity of the rat ($P < 0.01$). Middle dose Jiangzhi tablet group could significantly reduce the whole blood viscosity of rats with high shear rate. ($P < 0.05$); High, middle and low dose Jiangzhi tablet group and Xuezhikang group could significantly reduce the whole blood viscosity of rats with low shear rate ($P < 0.01$).

5. Discussion

Hyperlipidemia can lead to atherosclerosis, and then lead to coronary heart disease, stroke, diabetic complications, myocardial infarction and other diseases, many important diseases of other systems are also closely related to it, is the number one killer of human health. By 2030, cardiovascular disease will still be the leading cause of human death, with nearly 23.6 million people dying of cardiovascular disease. Although there are many western drugs that can be used in clinic, such as gastrointestinal reactions, liver damage, rhabdomyolysis and so on, there are some adverse reactions such as gastrointestinal reactions, liver damage, rhabdomyolysis, and even long-term administration of certain toxic and side effects[5]. We should give full play to the characteristics of traditional Chinese medicine and apply traditional Chinese medicine and its proprietary medicine to treat it. In this experiment, the hyperlipidemia model of rats was established by high fat diet and high fat emulsion perfusion. Because the high fat diet was in line with the characteristics of human hyperlipidemia caused by diet, it was widely used, but it was used for a long time in model replication, and because the high fat diet was in line with the characteristics of human hyperlipidemia caused by diet, the model was established for a long time, and because the high fat diet was in line with the characteristics of human hyperlipidemia.

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The results showed that high, middle and low dose Jiangzhi tablets could significantly reduce the level of TC, TG in liver homogenate, reduce the pathological changes of rat liver, and significantly reduce the whole blood viscosity of high, middle and low blood, and the effect of high dose Jiangzhi tablet

group was stronger than that of high dose Jiangzhi tablet group. The effect of Jiangzhi tablet on blood lipid and liver in rats with experimental hyperlipidemia can reduce the blood viscosity of high, middle and low whole blood, and inhibit the deposition of TC in liver. It can be inferred that Jiangzhi tablet may be effective in the treatment of hyperlipidemia, mainly hypercholesterol. At the same time, Jiangzhi tablet can significantly reduce the level of TC, TG in patients with hyperlipidemia, especially in patients with elevated TC, and can increase the level of HDL-C, and has no obvious adverse reactions, nor does it affect liver and kidney function, and even has a certain therapeutic effect on patients with abnormal ECG. At the same time, because lipid peroxide is closely related to atherosclerosis and coronary heart disease, From the point of view of prevention and treatment of cardiovascular and cerebrovascular diseases, Jiangzhi tablet may have a good development prospect.

6. Acknowledgement

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