Original article

Effect of lipid lowering tablet on blood lipid in hyperlipidemia model rats

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A R T I C L E   I N F O

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A B S T R A C T

Observe the effect of lipid-lowering tablets on body weight, liver index and serum biochemical indexes of hyperlipidemia rats. The hyperlipidemia rat model was replicated successfully. Compared with the model group, high, medium and low dose lipid-lowering tablets group could significantly increase the body weight of rats with hyperlipidemia (P < 0.01, P < 0.05); High and middle dose lipid-lowering tablets group could significantly reduce the liver index of high fat rat (P < 0.01); High, medium and low dose lipid-lowering tablets group could significantly decrease levels of TC, TG, LDL-C, AST, ALT, ALP, Y-GT in serum (P < 0.01, P < 0.05), and significantly increase the level of HDL-C (P < 0.01). Lipid-lowering tablets can effectively regulate the body lipid metabolism of rats, and have a certain therapeutic effect on hyperlipidemia.

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1. Introduction

With the rapid development of social productivity and social economy, people's living standard has been improved to some extent. The gradual intake of high-sugar, high-fat and high-protein foods has changed people's dietary structure, so that the body lipid metabolism disordered, antioxidant capacity reduced, lipid oxidation products increased, resulting in atherosclerotic vascular injury (Ye et al., 2014). Hyperlipidemia can lead to atherosclerosis, and then lead to coronary heart disease, stroke, diabetes complications, myocardial infarction and other diseases, and many other diseases of other systems of the body are also closely related to it, being the first killer of human health. By 2030, cardiovascular disease will still be the leading cause of death in humans, and nearly 23 million 600 thousand people will die from cardiovascular disease (Wang et al., 2013; Gao et al., 2017). As a traditional feature of our country, the traditional Chinese medicine has its unique effect and obvious advantages in prevention and treatment of hyperlipidemia (Gohar et al., 2017). We should take comprehensive measures to give full play to the advantages of combining traditional Chinese and Western medicine, to prevent and reduce the risk factors of atherosclerosis, and this is also an important aspect of cardiovascular disease research in China (Ge et al., 2016; He et al., 2016). This model of hyperlipidemia was established by compound factor modeling of high fat diet and fat emulsion, to observe the intervention effect of lipid-lowering tablets on body weight, liver index and serum biochemical indexes of hyperlipidemia rats.

1.1. Animals

Rat, Species: Wistar, Grade: SPF, male, 180–220 g, Certificate Number: 3700920001785, Provide Unit: Shandong Lukang Pharmaceutical Co. Ltd. License No. SCXK (Lu) 2014005.

1.2. Experimental drugs and reagents

Lipid-lowering tablets, preparation room of the 371st Central Hospital of PLA in Xinxiang, batch number 20150806; Xuezhihikang Capsule, Beijing Beida Weixin biotechnology Co. Ltd., batch number: 20150718; Propylene glycol, Tianjin Zhiyuan Chemical Reagent Co. Ltd., batch number: 20150320; Twain -80, Tianjin Fu Yu Fine Chemical Co. Ltd., batch number: 20150410.

Sodium deoxycholate, Beijing Aoboxing biotechnology limited liability company, batch number: 20160112; Propylthiouracil...
Tablets, Shanghai Zhaohui Pharmaceutical Co. Ltd., batch number: 1506N18; Cholesterol, Zhengzhou Paini chemical reagent factory, batch number: 20151220; Saline, Beverly Henan Shuanghe Pharmaceutical Co. Ltd., batch number: 20160108; T-CHO test kit, batch number: A111-1; TG test kit, batch number: A110-1; ALT test kit, batch number: C009-2; Y-GT test kit, batch number: C017. The test kit was purchased Nanjing Jiancheng Institute of biological engineering.

High fat emulsion configuration: oil phase: lard 25 g, cholesterol 10 g, propylthiouracil tablets 1 g, polysorbate 80 20 ml; aqueous phase: distilled water 30 ml, propylene glycol 20 ml, sodium deoxycholate 2 g. Preparation method: oil phase: add lard 25 g into a 200 ml beaker, heat to 100 °C, add cholesterol 10 g to melt, add propylthiouracil tablets 1 g, and after a fully mix, add polysorbate 80 20 ml; aqueous phase: add distilled water 30 ml to a 200 ml beaker, bath with a temperature of 60 °C, add propylene glycol 20 ml, sodium deoxycholate 2 g to fully dissolve; then add aqueous phase into the oil phase, stir, and cool down in the 4 °C refrigerator for further use (Muhammad et al., 2017a).

High fat diet configuration: 10% lard, 1% cholesterol, 5% egg yolk powder, 0.2% propylthiouracil, 0.5% sodium deoxycholic acid, 5% sucrose, 78.3% basic feed for proportion.

2. Experimental instrument

FA (N)JA (N) series electronic balance, Shanghai Mingqiao Precision Instrument Co. Ltd.; HWS12 type electric thermostatic water bath, Shanghai Hengyi Scientific Instrument Co. Ltd.; KDC-160HR high-speed refrigerated centrifuge, Zhongjia branch of Keda Instrument Co. Ltd.; HWS12 type electric thermostatic water bath with 60°C-80°C for further use (Muhammad et al., 2017a).

3. Results

As can be seen from Table 1, for the first time, there was no difference among groups, meaning that grouping was uniform (Yu and Gao, 2016). Compared with the control group, rats in the model group had significantly slower weight growth in one week, two weeks, and three weeks, having significant differences in body weight with the blank control group (P < 0.01), which showed that the model of hyperlipidemia was successful. Compared with the model group, in the first week, high, medium and low dose lipid-lowering tablets group and Xuezhikang group could significantly increase the body weight of hyperlipidemia rats (P < 0.01); in second weeks, high dose lipid-lowering tablets group and Xuezhikang group could significantly increase the body weight of hyperlipidemia rats (P < 0.05); in third weeks, the high and middle dose lipid-lowering tablets group and Xuezhikang group could significantly increase the body weight of hyperlipidemia rats (P < 0.01). As can be seen from Table 2, compared with the blank control group, the liver index of model group significantly increased.

Table 2
Effect of lipid lowering tablet on liver index of hyperlipidemia model rats.

| Group           | n   | Liver index (mg/g) |
|-----------------|-----|--------------------|
| Control group   | 12  | 28.33 ± 2.36       |
| Mode group      | 12  | 33.80 ± 1.64       |
| Xuezhikang group| 12  | 29.37 ± 2.20       |
| High dose group | 12  | 30.38 ± 1.73       |
| Middle dose group| 12 | 30.59 ± 1.86     |
| Low dose group  | 12  | 31.33 ± 3.28       |

Notes: Compared with model group.
** p < 0.05.
*p < 0.01.

Table 1
Effect of lipid lowering tablet on body weight of hyperlipidemia model rats (N = 12).

| Group           | First time | One week     | Two weeks    | Three weeks |
|-----------------|------------|--------------|--------------|-------------|
| Control group   | 211.53 ± 7.62 | 280.68 ± 13.12 | 312.68 ± 13.69 | 347.43 ± 17.97 |
| Model group     | 209.26 ± 6.48 | 249.90 ± 9.75  | 258.18 ± 14.02 | 256.79 ± 16.87 |
| Xuezhikang group| 210.00 ± 9.49 | 264.02 ± 10.38 | 271.38 ± 12.87 | 274.98 ± 15.13 |
| High dose group | 207.68 ± 5.02 | 270.36 ± 10.73 | 274.42 ± 11.11 | 276.08 ± 9.92  |
| Middle dose group| 208.73 ± 6.41 | 273.55 ± 14.70 | 270.58 ± 9.63  | 272.72 ± 10.72 |
| Low dose group  | 210.61 ± 6.12 | 269.44 ± 9.99  | 266.27 ± 9.92  | 259.00 ± 10.47 |

Notes: Compared with model group.
** p < 0.05.
*p < 0.01.
Effect of lipid lowering tablet on serum biochemical index of hyperlipidemia model rats (N = 12).

Our results show that the high, medium and low dose lipid-lowering tablets group could significantly increase the body weight of hyperlipidemia rats; could significantly decrease the liver index of hyperlipidemia rats (p < 0.01). The results of this study provide a scientific basis for the good clinical efficacy of lipid lowering tablets, and lay the foundation for further research of related preparations.

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