Saudi Pharmaceutical Journal (2016) **24**, 322–328

King Saud University

Saudi Pharmaceutical Journal

www.ksu.edu.sa
www.sciencedirect.com

ORIGINAL ARTICLE

Effect of cynomorium flavonoids on morphology of perimenopausal depression mice model

Tan Wang, Mingsan Miao *, Yan Li, Min Li, Ying Zhang, Shuo Tian

Henan University of Chinese Medicine, Zhengzhou 450008, China

Available online 24 April 2016

KEYWORDS

Cynomorium flavonoids;
Thymus;
Spleen;
Uterus;
Tissue morphology

Abstract *Objective:* In this report, the effects of cynomorium flavonoids on mouse model of perimenopausal depression were investigated. *Method:* 60 ovariectomized female mice were randomly divided into 6 groups evenly: high, medium and low doses of cynomorium flavonoids groups (400 mg kg^{-1}, 200 mg kg^{-1}, 100 mg kg^{-1}), Gengnian'an capsule group (675 mg kg^{-1}), soy isoflavones soft capsule group (250 mg kg^{-1}), and model group. Give the corresponding drug five days after surgery once a day, consecutive thirty days. The model group and control group were given the water of same volume. The model related groups were applied with different stress for consecutive eighteen days. Kill the mice and remove the thymus, spleen, uterus and one hand of brain when it is 2 h after the last administration in mice of each group. Observe the histological changes of each group under light microscope. *Results:* By observing the pathological section, compared with model group, the pathological changes of the uterus and hypothalamus of mice were significantly improved. The thymic cortex markedly thickened, volume of splenic nodule also significantly increased, and the number of lymphocytes significantly increased ($p < 0.01$). Simulation results show that the high dose of cynomorium flavonoids group has the best effective. *Conclusion:* Cynomorium flavonoids on mouse uterus, hypothalamus, thymus and spleen lesions have a significant role in the improvement. Cynomorium flavonoids have a good therapeutic effect on mice with perimenopausal depression

1. Introduction

Perimenopausal depression is a mood disorder that occurs during the perimenopause period. They become prone to mood depression, unresponsiveness, slow thinking, irritability, and pessimism (Ma, 2013). Nowadays, the incidence of perimenopausal depression is on the rise. Over the years, to investigate the effect of cynomorium flavonoids on a mouse model of perimenopausal depression is more and more important. In this report, the effects of cynomorium flavonoids on mouse model of perimenopausal depression were investigated (Tan, 2014).

* Corresponding author at: No. 1, Jinshui Road, Henan University of Chinese Medicine, Zhengzhou 450008, China.
E-mail address: miaomingsan@126.com (MS. Miao).

Peer review under responsibility of King Saud University.

Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.jsps.2016.04.007

Cynomorium flavonoids are extracted from cynomorium, which is a succulent perennial herb of a parasitic plant in the Cynomorium genus, Cynomorium family. They have multiple functions, such as scavenging free radicals, anti-oxidation, anti-aging and anti-stress, regulating immune and endocrine systems, and improving sexual function (Tian and Miao, 2014). In this report, the effects of cynomorium flavonoids on mouse model of perimenopausal depression were investigated.

2. Materials

2.1. Animal

KunMing mouse, female, 27–30 g, Provided by Wuhan Experimental Animal Center, Certificate of Quality No.: 00009520.

2.2. Drugs and reagents

Cynomorium flavonoids, extracted by Henan University of TCM medicine Laboratory, No. 20110303; Gengnian'an capsule, Changchun YingPing Pharmaceutical Co., Ltd., No. 2011020104; Soybean isoflavones Soft capsule, produced by GARLANDFOND (US) HEALT HLAREER IND. GROUP.INC, No. 00683209; Chloral hydrate, produced by Tianjin Kemiou chemical preparation development center, No. 20111018; and Cefazolin sodium for injection, produced by Zhuhai Federal Pharmaceutical Co., Ltd., Zhongshan branch, No. 90801302.

2.3. Instrument

Electronic balance, Produced by Shanghai MinQiao Medical Instrument Co., Ltd. No. JY601; Electronic analytical balance, Produced by Ohaus (Shanghai) Ltd. No. AR1140/C.

Electric thermostatic water bath, Produced by Shanghai a constant Scientific Instrument Co., Ltd. No. HWS12; Intelligent discharge instrument, Produced by Shanghai Institute of Nuclear Research Institute of the Fourth Ring instrument, No. Sn-895B.

3. Method

Take 80 mice of Kunming, female mice, 27–30 g, 10 female mice were randomly divided into control group, and others made perimenopausal depression: Removing both of the ovaries, and ligating fallopian tubes (including fat) to make the mice of perimenopausal depression. They are being intramuscular injection cefazolin sodium once a day, for 3 d (20 u/mL, 0.1 mL each one) to prevent infection. Vaginal smears examination one by one 5 d after surgery to determine ovarian removal. Abandon the mice whose smears show emotional responses (Zhang et al., 2013). 60 ovariectomized female mice were randomly divided into 6 groups evenly: large, medium and small dose of cynomorium flavonoids groups (400 mg kg^{-1}, 200 mg kg^{-1}, 100 mg kg^{-1}, 20 mg kg^{-1}, 10 mg kg^{-1}, 5 mg kg^{-1}), Gengnian'an capsule group (675 mg kg^{-1}, 33.75 mg mL^{-1}), Soy isoflavones Soft capsule group (250 mg kg^{-1}, 12.5 mg mL^{-1}), and 5 days after surgery. The volume is 0.2 mL/10 g. Model group and control group were given the same volume of water, once a day continuously 30 d. Each cage is with 1 mouse, and there are 9 kinds of stressors in a random application on the mice everyday continuously for 18d and each stimulation cannot be consecutive: (1) 5 min (160 Hz)horizontal oscillation; (2) swimming in ice water (4 °C, 5 min); (3) heat stress (45 °C, 5 min); (4) shake (1 time/s, 5 min); (5) clip tail (1 min); (6) fasting (24 h); (7) all night lighting (24 h); (8) prohibition of drinking water (24 h); and (9) Behavior limitations (6 h). Mice were dissected at 29 days of administration. At the same time, Remove and weigh thymus, spleen, uterus, and calculate the organ index (organ index = organ wet weight mg/mice weight). Take the brain and isolated hypothalamus. Observe the changes of the structure and morphology of the groups under the light microscope. Data analysis used SPSS 13.0 for statistical treatment l (Han and Lu, 2012a). Measurement data is represented by mean ± Standard Deviation ($\bar{x} \pm s$). Single factor analysis of variance (LSD, SNK) was used in all groups, and Ridit analysis was used to analyze the level of data.

4. Result

4.1. Effect of the index of viscera in the model mice

From Table 1, Compared with the control group, thymus and spleen index of model group significantly reduce ($p < 0.05$), and Uterine index decreases significantly ($p < 0.01$). Prove that the thymus, spleen and uterus tissue of the mouse model of the peri menopausal syndrome were observed. Compared with the model group, soybean isoflavone soft capsule group and gengnianan capsule group can significantly improve the thymus, spleen and uterus index ($p < 0.05$); large dose of cynomorium flavonoids group can significantly increase the thymus, spleen and uterus index ($p < 0.01$); middle dose Cynomorium flavonoids can significantly improve the animal model of thymus gland, uterus index ($p < 0.05$), and significantly increase the spleen index ($p < 0.01$); small dose of Cynomorium flavonoids can obviously increase the thymus index and spleen index ($p < 0.05$), and significantly increase the uterus index ($p < 0.01$).

4.2. Effects of the morphology of the uterus in the model mice

After Ridit test, it was found that the model group was significantly more than that in the control group ($p < 0.01$), and the model group was successful in the model of peri-menopausal mice. Ratio, in which the each of the drugs can significantly improve the mouse uterus pathological changes ($p < 0.01$), including large and middle doses of Cynomorium flavonoids group has the best effect. The pathological sections are seen in Appendix A (see Table 2).

4.3. Effects of the morphology of the hypothalamus in the model mice of the peri menopausal syndrome

Through Ridit test, Compared with the control group, the model mice hypothalamus changes prominently ($p < 0.01$). Compared with the model group, the drug groups could significantly improve the mice pathological lesions ($p < 0.01$), whose large and middle doses of cynomorium flavonoids