Saudi Journal of Biological Sciences (2016) 23, S148–S157

King Saud University

Saudi Journal of Biological Sciences

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

ORIGINAL ARTICLE

Effects of verbenalin on prostatitis mouse model

Mingsan Miao *, Lin Guo, Xiaoli Yan, Tan Wang

Henan University of Traditional Chinese Medicine, Zhengzhou 450008, Henan Province, China

Received 11 September 2015; revised 8 October 2015; accepted 12 October 2015
Available online 24 October 2015

KEYWORDS

Verbenalin;
Prostatitis;
Mouse model

Abstract The aim of this study was to observe the treatment characteristics of verbenalin on a prostatitis mouse model. Give Xiaozhiling injection in the prostate locally to make a prostatitis mouse model. High, medium and low doses of verbenalin were each given to different mouse groups. The amount of water was determined in 14th, 28th. The number of white cells and lecithin corpuscle density in prostatic fluid were determined. Morphological changes in the prostate, testis, epididymis and kidney were detected. Compared with the model control group, the mice treated with high, medium and low doses of verbenalin had significantly increased amounts of water, and prostate white blood cell count and prostate volume density (Vv) were decreased significantly, the density of lecithin corpuscle score increased, and pathologic prostatitis changes were significantly reduced. Pathological change in the testis was significantly reduced and the change in the epididymis was obviously reduced. The thymic cortex thickness and the number of lymphocytes increased significantly and could reduce the renal pathological changes in potential. Verbenalin has a good therapeutic effect on the prostatitis mouse model.

1. Introduction

Verbena, belonging to verbena family Verbena officinalis L., has the property to activate blood circulation to dissipate blood stasis, prevent attack (or recurrence) of malaria, and has application in amenorrhea, dysmenorrhea, edema, infection, etc. (NPC, 2010). Pregnant women shouldn't use it (NUCM, 2006). Yang et al. (2013) noted that modern research proves, Verbena whole plant contains Verbena glycoside (verbenalin), chemical composition of tannin, volatile oil and so on. And Guo and Miao (2014) mentioned that it has anti-inflammatory, anti fungal anti-virus pharmacological action. Gao and Li (2013) indicated that prostatitis is a common disease in adult males, about 25–30% resulting in urinary surgery, mostly occurring in 20–40 year old young adults, mainly because of pain or discomfort in the pelvic region and various voiding symptoms in a group of diseases. This disease lingers and seriously affects the patient's mental health and quality of life. Therefore, the research on prostatitis is particularly important. Verbena had a good effect on chronic prostatitis, hematuria and other male diseases (Yang et al., 2013), but the basic research data are only about Verbena's antibacterial, anti-inflammatory, and other pharmacological effects. This paper reports the verbenalin effects on a prostatitis mouse model.

* Corresponding author.
E-mail address: miaomingsan@163.com (M. Miao).
Peer review under responsibility of King Saud University.

Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.sjbs.2015.10.006

Table 1 Effect of verbenalin on the volume of water drunk in the prostatitis mouse model (ml).

Group	*n*	14th	The percentage compared with model group (%)	28th	The percentage compared with model group (%)
BC	10	48.3	5.0	49.5	19.8
MC	10	46.0		41.3	
PC	10	47.2	2.6	46.2	11.9
Verbenalin-HD	10	47.3	2.8	49.2	19.1
Verbenalin-MD	10	47.1	2.4	47.4	14.8
Verbenalin-LD	10	46.2	0.4	44.5	7.7

2. Materials and methods

2.1. Animals

SPF grade KM mice (weight, 25.0 ± 1.0 g) were supplied by Hebei Laboratory Animal Center (animal permit number, 9040134).

2.2. Medicines and reagents

Verbenalin was provided by Nanjing Zelang Pharmaceutical Technology Co., Ltd., whose content was 50.13%, detected by the HPLC; Qianliekang Pian was provided by Zhejiang Conba Pharmaceutical Co., Ltd. (batch number: 20090122); Xiaozhiling injection was provided by Beijing China Resources Hi-Tech Nature Pharmaceutical Co., Ltd. (batch number: 20070405); Sodium pentobarbital was provided by China National Pharmaceutical Group Corporation Shanghai Chemical Reagent Co., Ltd. (batch number: F20060715); Penicillin sodium for injection was provided by North China Pharmaceutical Group Corporation (batch number: X0901038); Medical alcohol was provided by Luoyang Jiekang Disinfectant Factory (batch number: 20080003); Physiological saline was provided by Zhengzhou Yonghe Pharmaceutical Co., Ltd. (batch number: 090217221); Glacial acetic acid was provided by Kaifeng Chemical Reagent Factory (batch number: 061208); Methanal was provided by Lai Yang of China Shuangshuang Chemical Co., Ltd. (batch number: 20070152).

2.3. Instruments

FA-N/JA-N Series was purchased from Shanghai Minqiao Precise Science Instrument Co., Ltd.; BL-2000 Medical Image Analysis System was purchased from Chengdu TME Technology Co., Ltd.

2.4. Methods

60 KM male mice (weight, 24–26 g) were randomly divided into blank control (BC), model control (MC), positive control (PC) and verbenalin high dose (verbenalin-HD), medium dose (verbenalin-MD) and low dose (verbenalin-LD) groups. The blank control group underwent sham operation, and the rest of the groups operation. Respectively model mice were weighed, and then intraperitoneal injection of Sodium

Table 3 Effect of verbenalin on prostate in the prostatitis mouse model.

Group	*n*	–	+	++	+++
BC	10	10	0	0	0
MC	10	0	0	7	3
PC	10		2	3	5
Verbenalin-HD	10	4	6	0	0
Verbenalin-MD	10	2	8	0	0
Verbenalin-LD	10	0	2	5	3

"–" The prostate gland, glandular epithelium and stroma were normal; " + " Prostate glands were few expansion, glandular epithelium was flat, glands around less fiber hyperplasia and a small amount of inflammatory cells infiltration; "++" Hyperplasia of the prostate gland significantly and gland cavity expansion and glandular epithelium flat, interstitial hyperplasia of fiber and a small amount of inflammatory cell infiltration; "+++" Hyperplasia of prostate gland significantly and gland cavity expansion and glandular epithelium flat, interstitial has obvious fiber hyperplasia and inflammatory cell infiltration.

Table 2 Effect of verbenalin on the number of white blood cells in the prostate tissue and the influence of the lecithin corpuscle density in the prostatitis mouse model ($\bar{x} \pm s$).

Group	*n*	No. of WBCs ($\times 10^9$/L)	Density of lecithin corpuscles
BC	10	1.58 ± 0.69**	3.36 ± 0.58**
MC	10	6.62 ± 1.80	1.55 ± 0.50
PC	10	2.10 ± 0.57**	3.00 ± 0.40**
Verbenalin-HD	10	1.47 ± 0.38**	3.36 ± 0.58**
Verbenalin-MD	10	2.05 ± 0.89**	3.20 ± 0.80**
Verbenalin-LD	10	2.19 ± 0.67**	2.82 ± 0.59**

** Compared with MC group, $P < 0.01$.

Table 4 Effect of verbenalin on the Vv of the prostate gland in the prostatitis mouse model ($\bar{x} \pm s$).

Group	*n*	Dosage (mg/kg)	Vv (%)
BC	10		2.3 ± 0.4**
MC	10		6.2 ± 0.6
PC	10	1500	4.6 ± 0.5**
Verbenalin-HD	10	200	0.3 ± 0.1**
Verbenalin-MD	10	100	0.5 ± 0.1**
Verbenalin-LD	10	50	3.4 ± 0.2**

** Compared with MC group, $P < 0.01$.