TANG [HUMANITAS MEDICINE]

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Brief Communication

A proposal for an experimental model of the static blood syndrome in the traditional Korean medicine

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ABSTRACT

Static blood (SB) is a traditional Korean medicine disease symptom caused by a blood amassment, which refers to a pathological product of blood circulating poorly or accumulating in the interior. The growth and denaturalization of various organizations, inflammatory response and blood circulation disorder are regarded pathological conditions of SB. Endometrial hyperplasia (EH) is a state of excessive proliferation of the cells of the endometrium. Therefore, we suggest the EH mouse model as the experimental animal model of SB.

Keywords static blood, traditional Korean medicine, experimental animal model, endometrial hyperplasia

Static blood (SB) in traditional Korean medicine (TKM)

SB is a pathological product of blood stagnation, including extravasated blood and the blood circulating sluggishly or blood congested in a viscus, all of which may turn into pathogenic factor, the same as blood stasis or stagnant blood. Major causes of SB are a blood heat, blood cold and bleeding caused by traumatic injury or others. Many classic medicine books introduced the symptoms of the SB are as follows; Pain (疼痛) (血證論, Tang rong chuan, 1884), chills (惡寒), fever (發熱), and alternating chills and fever (寒熱往來) (血證論, 名醫指掌·瘀血篇; 金匱要略, 婦人産後病篇, 婦人雜病篇, Zhang zhong jing, 217), abdomen fullness (腹部硬滿) (金匱要略, 驚悸吐衄篇; 讀醫隨筆, Zhou xue hai, 瘀血內熱, 1891), abdomen aggregation-accumulation (腹部積聚) (黃帝內經, Huang di, 168 BC), manic psychosis (發狂), depressive psychosis (癲狂), forgetfulness (善忘, 健忘) (傷寒論, Zhang zhong jing, 217; 諸病源候論, 卒被損瘀血候篇, Chao yuan fang, 610), thirst(口渴) (金匱要略, 驚悸吐衄下血胸滿瘀血病脈證治), bluish purple tongue and lip (青紫舌), encrusted skin (肌膚甲錯) (諸病源候論, 卒被損瘀血候篇), etc. Although SB is a pathological product, formed SB causes various diseases including neuropsychiatric disorders (Kim, 2001), cardiovascular system disorder, musculoskeletal disorder (Lee et al., 2007), and obstetrics and gynecology diseases by disturbing blood circulation (Nam et al., 2006). Furthermore, the abnormal growth and denaturalization of various organizations and inflammatory response are regarded pathological conditions of SB.

Endometrial hyperplasia (EH)

EH is a condition of excessive proliferation of the endometrium caused by excess estrogen without progesterone (Lax, 2011). It is not cancer, but the abnormal growth of lining of the uterus can lead to cancer of the uterus as endometrial adenocarcinoma in a small percentage of women (Yang et al., 2015). The endometrium is divided into a basal layer and functional layer, and the functional layer consists of a single-layered prismatic epithelium and its basal lamina, uterine glands, and the endometrial stroma containing a rich supply of blood vessels. The functional layer periodically repeats the growth and expulsion by the influence of estrogen and progesterone during the menstrual cycle. In the proliferative phase of the uterine cycle, the endometrium grows along with the vascularization, and then the endometrium is fallen out of the uterus at the menses (Krstic, 1997). In the process, continuous release of only estrogen caused by ovary dysfunction induces the excessive growth of endometrium. Furthermore, amenorrhoea resulted from the absence of progesterone obstructs the endometrium emission and therefore aggravates endometrium hyperproliferation (Michael et al., 2002).

The relation between EH and SB in the TKM

In the TKM, uterus (胞宮) is also called blood chamber (血室). The menstruation is described as follow; Menstruation is formed in the uterus. Under the action of tian-gui (天癸), which develops the reproductive organs and maintains the reproductive function, the Conception Vessel (任脈) and Thoroughfare Vessel (衝脈) are exuberant and flushed with abundant qi and blood. The excessive qi and blood will empty into the uterus and produce regular menses, and then the blood

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overflows periodically (Dongui Bogam (東醫寶鑑)). In the process, due to the many reasons including bad blood circulation (血流不暢 或 停滯) and blood congestion (血液停積), the blood that should be outflowed accumulates in the uterus. The accumulated blood, namely, static blood (血瘀) leads to many gynecological diseases including profuse menstruation (月經過多), amenorrhea (無月經), flooding and spotting (崩漏) and dysmenorrhea (月經痛) (Yoon, 2009). In terms of the abnormal blood accumulation, the endometrium growth along with the vascularization is very similar to the SB.

Suggestion for an experimental animal model of SB related with obstetrics and gynecology diseases

From the viewpoint of TKM, EH is similar to pathological condition of SB because it is abnormal blood stagnation and an excessive proliferation of tissue. Therefore, we suggest the EH mouse model as the experimental animal model of SB related with obstetrics and gynecology diseases.

Animal treatment

Oophorectomized Balb/c mice were randomly divided into three groups: 1) Negative control group: oophorectomized mice without any treatment, 2) Positive control group: unopposed estradiol-induced EH mice without any drug treatment, 3) Drug treatment group: unopposed estradiol-induced EH mice with drug treatment. 17-beta estradiol hemihydrate (4 mg/kg) was administered once a day by oral gavage for 3 days (Erdemoglu et al., 2009). The blood-activating and stasis-resolving medicinal (活血化瘀藥) was orally administered after 2 h of estrogen administration.

Histological analysis

EH is a hyperplastic disorders characterized by abnormal proliferation of the cells of the endometrium. To investigate pathological changes, the histological study of the endometrial tissue should be performed. Tissue paraffin sections were stained with hematoxylin and eosin solution to assess luminal epithelial cell height and density of endometrial glands. Randomly selected sections of the slides were captured, digitized and evaluated using Image Pro-Plus 5.1 software.

Immunohistochemistry

B-cell lymphoma 2 (Bcl-2) and Thioredoxin reductases (TrxR)-1 are protein associated with endometrial pathological abnormalities in the EH. Endometrium with EH showed increasing these proteins expression. Thus, expressions of TrxR-1 and bcl-2 protein were investigated by using immunohistochemical examination (Kim et al., 2005; Park et al., 2009).

DISCUSSION

SB is a kind of pathological state, including stagnated blood and blood overflowed out of the vessels. Abnormal growth of organizations, inflammatory response and blood circulation disorder are also regarded pathological conditions of SB. EH means an excessive increase of the endometrium with the vascularization. In that sense, the abnormal endometrium growth in the EH is very similar to the SB. Thus, we suggest the EH mouse model as the experimental animal model of SB.

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None.

CONFLICT OF INTEREST

The authors declare that there was no conflict of interest.

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