Research Thinking of Low-intensity laser For the Treatment of Menopausal Syndrome

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Abstract. Female climacteric syndrome is a clinical syndrome due to autonomic nerve dysfunction occurring in women during climacteric period, which may affect their physical and mental health. Therefore, how to pass climacteric period for women without any problems, avoid or reduce the occurrence of climacteric syndrome, prevent geriatric diseases and improve life quality is a key issue now for great attention. Looking for a convenient, effective, and safer method without toxic-side effects to control the disease is a modern medical problem. By analyzing the relationship between laser technology and traditional acupuncture and moxibustion, the advantage and the existing problems on acupuncture and moxibustion for the treatment of menopausal syndrome, the application of laser methods for the mechanism research on TCM diagnosis and treatment of menopausal syndrome was discussed. It’s pointed out that the laser acupuncture is safe and effective to treat menopausal syndrome. Breakthrough will be achieved from the research of the selection of the acupoint prescription and mechanism of Acupuncture and Moxibustion for the treatment of menopausal syndrome by utilizing the advantage of interdisciplinary intersection. Laser technology will make the development of acupuncture and moxibustion science possess an unprecedented field.

1. Introduction

With the problems of side-effects of drugs and drugs induced diseases, the world voice of “Return to Nature” is stronger and stronger. So it is an aspiration for Medicine to seek a therapeutic method, which is effective in the clinic and without toxic and side-effect.

Acupuncture, an important component of Traditional Chinese Medicine (TCM), is widely used to treat various kinds of diseases and it played an important role in the medical practice over the centuries in China. Especially at the present day, with the increasing of drug-induced diseases, the strengths of acupuncture therapy are more outstanding and valuable. Therefore, more and more countries begin to pay attention to it and apply and study it in the clinic. However, in recent years because of the problem of ideas, institutions and policies, further more the lack of integration between acupuncture system and modern natural science, the medicine shares of acupuncture and moxibustion are declining and its development becomes more and more difficult. So, only if there is the innovation in theory and technology can acupuncture and moxibustion get out of the trouble and make a due contribution in the Medicare system. Laser acupuncture is the achievement in scientific research on the combination of the traditional acupuncture and the modern
laser technology. In recent years, researches on using laser-irradiating acupoints instead of needling to ease pain and treat disease have drawn great attention from the biology community. This article will simply analyze and probe the application of low-intensity laser for the treatment of menopausal syndrome.

2. Prevalence and treatment of female menopausal syndrome

Menopause is a physiological period from middle age to old age. At the same time, it’s a turning point for body physiological function from exuberance to recession. The climacteric syndrome (CS) appears at female menopause and assumes a group of syndromes by vegetative nerve functional disturbance, such as hot flash, red cheek bone, sweating, paramenia and emotional instability. Hence CS can influence women’s health and work, how to avoid or relieve the symptoms of CS and make women spend menopause more smoothly is a key problem at present. That is why the World Menopause Society assigns Oct.18 for “the World Menopause Day”.

According to the statistics, the age of menopause is often 45–55yrs. The average age in American and British is 50yrs, but 47.81±3.97yrs in China according to the investigation on 3364 women above 40yrs in Guangdong province. There are about 75–88% menopause women having some menopausal symptoms, but only 15% go to see a doctor because of their severe symptoms [1]. The morbidity is 89.5% in menopausal women, 85.9% in premenopausal women and P<0.05 [2].

For CS, the modern medicine mainly adopts hormone replacement therapy (HRT) and symptomatic treatment [3-4]. However, the necessity and safety of HRT are always the discussion point and at the same time HRT has too many contraindications and adverse reactions [5]. A large study by American women’s health program (WHIMS) in 2004 found that the application of HRT in a long time could increase the risk of stroke, thrombus and breast cancer, carcinoma of endometrium, ovarian cancer, etc. A successive therapeutic method is bound to normalize the deficit in the metabolic network and not to disturb those normal. Therefore, it is still one of problems we are facing to find a safer and more effective method to prevent and treat CS.

For CS, the TCM mainly starts with the theory “Kidney Governing Reproduction” to improve symptoms and make quality of life better on the basis of the syndrome differentiation and treatment. In recent years, acupuncture is under observation in medical community for its exact effect and little side-effect. Acupuncture prevents and treats diseases through regulating action of human body and it also has weak-points, for examples, patients fear to needle, it’s easy to relapse due to too short time of needling, and the treatment course is too long. So, only if there is innovation in theory and technology can make acupuncture and moxibustion get out of the trouble and bring a big effect into play.

Laser acupuncture is a therapeutic method to prevent and treat diseases by irradiating acupoints with low-intensity laser under the guidance of TCM meridian theory. The core of laser acupuncture is using laser irradiation instead of needle or electricity. In some sense, it is an improvement of needle and acupuncture method. Laser acupuncture uses laser as stimulation so it is safe, painless, wide-use. Therefore, it is easily accepted by patients especially children and those who fear needle comparing with the traditional acupuncture which is painful and easier to infect or have an accident. So it is worth to be popularized in clinic. The study showed that low-intensity laser could defer senility and regulate endocrine function which lay the foundation for using it to treat CS. However, the clinical mechanism of laser acupuncture is not studied too much at present.

3. Principles of Selecting Acupoints for Low-level Laser Irradiation Treatment of CS

TCM holds that the disorder of zangfu organs and body metabolism caused by the recession of kidney qi is the root cause for CS, and the kidney is the origin of congenital constitution, the spleen is the root of acquired constitution. So the therapeutic principle of laser acupuncture for the treatment of CS should be strengthening spleen and kidney, regulating zang and fu organs, balancing yin and yang. About the acupoints prescription, those meridians related to CS or points having specific function should be chosen. Shenshu (BL 23) is a specific point at back where the qi of the kidney meridian pour into. The clinical research shows that this point has relative specificity for CS [6-7] and has a good effect. Sanyinjiao (SP 6) belonging to the spleen meridian is a key point to regulate reproductive endocrine system [8]. Guanyuan (CV 4) belonging to Ren meridian is good at strengthening primordial Qi. Our pilot study found that catgut implantation at BL 23, SP6 and CV4 in ovariectomized rats could not only change the weight of rats, but
also enhance the estrogen level and lower the level of GnRH, FSH, LH of rats [9-11], and it had got a very good effect in clinical [12-13]. So we choose BL 23, SP6 and CV4 as the chief points to establish the prescription for the treatment of CS.

4. Investigations on the Effects of Low-level Laser Irradiation for the treatment of CS

Laser acupuncture has been widely used in the treatment of clinical conditions, and the type of laser used in this therapy is safe when its power output is below 1 W [14]. Recent studies show that laser acupuncture has useful healing effects on visceral postmenopausal obesity [15]. Negative results have been reported in a investigation examining laser acupuncture for the treatment of menopausal woes [16]; however, that particular study contained some limitations in parameters setting. Overall, the clinical efficacy of laser acupuncture for the treatment of female menopausal syndrome remains controversial.

Breakthrough might be obtained from the animal experimental research. Therefore, the aim of our study is to investigate the effects of laser acupuncture treatment using an animal model in which uterus and pituitary glands were also observed. The research showed that the semiconductor laser irradiation could exert beneficial effects on O VX rats through reducing body weight and increasing pituitary ER α expression, and 30 J/cm2 was the most effective among the doses used.

A critical analysis of some well-known negative studied on low-level laser therapy showed that it is all in the parameters: low doses, inclusion criteria, lack of control group, treatment technique, systematic effect, tissue condition, power density, mixed parameters, influence of ambient light, meta-analysis [17]. It indicated that the parameters must be carefully concerned to evaluate the efficacy of laser acupuncture for the treatment of CS either clinically or experimentally.

5. Thinking on the Research of Therapeutic Mechanism of low-level Laser Irradiation for CS

5.1. Mechanism research thought

Recently, it is widely believed that the cause of CS is the disorder of Hypothalamic-pituitary-ovarian axis (H-P-O-A) and hypothalamic-pituitary-adrenal axis (H-P-A-A) resulted from low-level estrogen. However the exact pathological mechanism is still unknown. Estrogen is the important component of internal environment of body and the estrogen receptor (ER) exists in almost all kinds of tissues studied not only in uterus and vagina. When the estrogen and ER combined, a wild physiological effect would be produced. So when the estrogen reducing, these tissues or organs will retrogress or change in mechanism and then appear a series of symptoms. So the reducing of the number and the function of ER may make the tissues inactive to estrogen and play a role in the occurrence of CS.

One kind of body function is influenced by many factors at the same time, so if you want to study the function of one specific factor to the metabolism course you must keep other factors stationary. Due to the restriction of its own condition, the clinical study of needling is unable to be blinded, so it is inevitable to be influenced by individual, society and mentality. However, the laser acupuncture could be double blinded. Further more, animal model can avoid ethical issues and social restriction, even some methods, which are not allowed to apply to human, can be adopted. So, animal experiment is always used when we want to research the mechanism of one stimulating method or drug in order to cover the shortage of clinical study. For this research, we can choose ovariectomized SD rats or natural aging SD rats as the animal model.

Laser acupuncture uses laser as stimulus so it is safe, painless, adjustable and has the function of both needling and moxibustion at the same time. In recent years, some researchers [17-19] who studied the biological effect of laser found that 808nm semiconductor laser could reach hypoderm through corium and get a good effect without pain. Therefore, we could choose 808nm semiconductor laser beam instead of needle to stimulate points, which also can improve patient compliance, reduce bias from researchers and subjects [20-22], and objectify evaluation therapeutic effect of acupoints.

5.2. Complement and Explanation
For CS, the western medicine has side-effects and the traditional acupuncture exists defects too. So the World Federation of Acupuncture and Moxibustion Societies indicate that it is the important direction in 21st century to find a long-acting, painless acupuncture therapy. Since 1970s the laser acupuncture with painlessness and asepsis has been a development in acupuncture therapy history. However, most of recent researches are limited to traditional acupuncture and moxibustion methods and few related to the mechanism of laser acupuncture. For this reason, several points should be noticed in the future research as follows:

- Give close attention to triumphs of modern Physics, Optics and their interdiscipline subjects and apply them to clinical studies which can keep the research of laser acupuncture for CS at a high starting point and level;
- Adopt recognized diagnostic and response criteria, and design experiment according to the Clinical research design, measurement and evaluation (DME);
- Research animal models which are closer to clinical situation and much more correspondent with syndrome differentiation and treatment of TCM. Ovariomize rats model through imitating other influencing factors and observe behavior science with modern analytical testing techniques to approximate animal models with CS symptoms;
- The development of modern life science speeds up the fusion of multiple disciplines and then produces lots of new subjects and technology platforms, such as genomics, proteomics, metabonomics, bioinformatics, etc. With the advantage of multiple disciplines such as TTM, HPLC, NMR, etc., observe the physiological and pathological changes of menopause women in vivo, strive for discussing the pathological mechanism of CS and the mechanism of action of acupuncture for CS from multi-angle of multi-levels (whole, cell, molecular and gene level), multi-criteria (direct and indirect indicator) and multiple disciplines, and finally improve the theory of acupuncture, optimize the acupoints prescription and enhance the clinical effect.

Acknowledgments
This work was supported by the Post-doctor Foundation of China under grant No. 20070410242 and the Guangdong Natural Science Foundation under grant No. 8451063101001809, and Post-doctor Foundation of Guangzhou University of Chinese Medicine under grant No.B3YH1005.

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