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## Using acupuncture to treat premenstrual syndrome

Received: 23 July 2001 / Accepted: 8 October 2001

**Abstract** More than 60% of the women in both groups suffered from premenstrual syndrome (PMS) symptoms, such as anxiety, mastalgia, insomnia, nausea and gastrointestinal disorders, whereas a smaller number of women suffered from phobic disorders, premenstrual headaches and migraines. There were three women from the first group and seven women from the second group who continued the medication treatment with progestins, whereas one woman from the first group and nine women from the second group continued to take fluoxetine. In the first group, nine women stopped having PMS symptoms after two AP treatments, eight women stopped having them after three treatments and one woman stopped having them after four treatments. In four women from the first group and 16 women from the second group, PMS symptoms appeared during the following period (cycle) or continued even after four treatments, so the medication was continued. In the first group, one woman had a smaller subcutaneous hematoma after the AP acupoint Ren 6. There was a statistical and relevant reduction in PMS symptoms with the AP treatments in the first group ( $P < 0.001$ ), whereas their reduction was irrelevant in the placebo AP group ( $P > 0.05$ ). The success rate of AP in treating PMS symptoms was 77.8%, whereas it was 5.9% in the placebo group. The positive influence of AP in treating PMS symptoms can be ascribed to its effects on the serotonergic and opioidergic neurotransmission that modulates various psychosomatic

functions. The initial positive results of PMS symptoms with a holistic approach are encouraging and AP should be suggested to the patients as a method of treatment.

**Keywords** Acupuncture · Premenstrual syndrome

### Introduction

The menstrual cycle is the result of a carefully orchestrated sequence of interactions between the hypothalamus, pituitary, ovary and endometrium, in which the sex hormones act as modulators and effectors at each level. Estrogen and progestins have potent effects on central serotonergic and opioid neurons, modulating both neuronal activity and receptor density [9].

Premenstrual syndrome (PMS) refers to a group of menstrually related disorders that are estimated to affect up to 40% of women of childbearing age. Approximately 5% of women with PMS suffer from premenstrual dysphoric disorder (PMDD), a more disabling and severe form of PMS, in which mood symptoms predominate. PMDD appears in the appendix of the DSM-IV under the heading, “depressive disorder not otherwise specified” [5, 9, 13]. After diagnosing PMS, the first line of treatment for these symptom clusters continues to be lifestyle changes, including stress management, healthy diet, regular aerobic exercise, cognitive-behavioral therapy and fortified coping strategies. Women whose symptoms are not controlled adequately with lifestyle modifications may benefit from medications, including benzodiazepine (alprazolam), oral progestins or contraceptives (desogestrel), diuretics (spironolactone), magnesium, piridoxin, and antidepressants-selective serotonin re-uptake inhibitors (SSRIs: paroxetine, fluoxetine) [5, 9, 11].

PMS and PMDD are increasingly recognized as medical entities that adversely affect the quality of life for a subset of women. Complementary, alternative therapies (acupuncture and massage) are popular with women who have PMS. Currently, no hard data exist yet concerning

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the effect of acupuncture (AP) treatment on PMS [1, 7, 10, 12].

We can explain the action of AP in acute and chronic pain syndromes, allergies, addiction and psychosomatic disorders through the role of central neurotransmitters and the modulatory systems that are activated by acupoints (opioid, non-opioid and central sympathetic inhibitory mechanisms). The transmitter or "information" substances for which research data have established a connection with AP include  $\alpha$  and  $\beta$ -endorphins, leu and met-enkephalins, dynorphin A and B, substance P, serotonin, noradrenalin, dopamine, epinephrine, acetylcholine, the adrenocorticotrophic hormone (ACTH), glycine, glutamic acid, the prostaglandins, and cyclic AMP and GMP [4].

The purpose of this study was to evaluate effectiveness of AP in treating PMS.

## Materials and methods

A randomized prospective, placebo-controlled trial included 35 women with PMS in the Department of Gynaecology and Obstetrics at the Health Centre of Bjelovar. During the initial orientation and interview, each woman completed a patient history form containing questions about demographics, medical and gynaecologic history, psychological makeup and prior treatment by AP. All the women agreed to this treatment voluntarily after they had been acquainted with the functioning mechanism, indications, contraindications and side effects of the AP. AP treatments were conducted during the third luteal phase of the menstrual cycle, every second day (7 days) for a period of 30 min a day.

Of the 35 women, 18 were treated with manual AP points: Du 20 (Baihui), bilateral LI 4 (Hegu), bilateral H 3 (Taichong), Ren 3 (Zhongji), Ren 4 (Guanyuan), Ren 6 (Qihai), bilateral Pe 6 (Neiguan), bilateral GB 34 (Yanglingquan), bilateral UB 23 (Shenshu) and auriculoacupuncture-points Shenmen. The points were located by anatomic palpation according to their classical descriptions [4]. AP treatment consisted of the physician (OB/GYN) inserting thin solid sterilized stainless steel needles until the de qi effect was obtained. The other 17 women were treated with placebo-superficial AP without the de qi effect (inserting the same type of needles at points on the lateral thighs and arms that were not on the classically described meridians).

AP treatments were considered to be successful if PMS didn't occur any more, if AP and medication treatment of PMS became unnecessary or if PMS symptoms didn't occur for a year after the AP therapy.

Statistical testing of frequency data was performed by MANOVA statistical analysis and probability values of less than 0.05 were considered significant.

## Results

The mean age was  $30.6 \pm 8.4$  in the AP group and  $29.8 \pm 7.3$  in the placebo AP group.

There were 11 women in the first group and 12 women in the second group who had no children; five women in the first group and three women in the second group had one child; and two women in the first group and two women in the second group had two children. The nulliparous had more frequent PMS symptoms than the pluriipara ( $P < 0.01$ ).

**Table 1** Success of acupuncture in treating premenstrual syndrome (PMS)

n=35	Acupuncture treatment	Placebo acupuncture
Number of cases	18	17
Age (mean)	$30.6 \pm 8.4$	$29.8 \pm 7.3$
Number of children		
0	11	12
1	5	3
2	2	2
Symptoms of PMS		
Anxiety	17	17
Phobic disorders	2	6
Premenstrual migraine	4	5
Premenstrual headache	7	7
Mastalgia	16	13
Insomnia	10	11
Nausea	13	11
Gastrointestinal symptoms	10	11
Need for medicamentous therapy		
Progestins	3	7
Fluoxetine	1	9
Number of acupuncture treatments		
Two	9	1
Three	8	1
Four	1	15
Adverse effects		
Subcutaneous abdominal hematoma	1	
Success rate (%)	77.8%	5.9%

More than 60% of the women in both groups suffered from such PMS symptoms as anxiety, mastalgia, insomnia, nausea and gastrointestinal disorders, whereas another 40% of the women suffered from less common symptoms, such as phobic disorders, premenstrual headaches and migraines. According to the PDD classification, they were not included in this category. There were three women from the first group and seven women from the second group who started the medication treatment with progestins after AP had failed, whereas one woman from the first group and nine women from the second group started to also take fluoxetine after AP had been unsuccessful. In the first group, nine women stopped having PMS symptoms after two AP treatments, eight women stopped having them after three treatments, and one woman stopped having them after four treatments. In four women from the first group and 16 women from the second group, PMS symptoms appeared again during the following period (cycle) or continued to occur even after four treatments, so the medication treatment was continued. From the first group, one woman had a smaller subcutaneous hematoma (adverse effect) after the AP acupoint Ren 6.

PMS symptoms have been statistically and relevantly reduced with AP treatments in the first group ( $P < 0.001$ ), whereas their reduction has been irrelevant in the second

group ( $P>0.05$ ). The success rate of AP in treating PMS symptoms was 77.8%, whereas it was 5.9% in the placebo group. (Table 1).

## Discussion and conclusion

PMS is characterized by recurring physical (bloating, breast tenderness, headache, weight gain, joint pain, palpitations and fatigue), emotional (anxiety, irritability, depression, paranoia, increased sensitivity, decreased self-confidence, altered and negative body image, loneliness), and behavioral (social withdrawal, emotional and physical abuse, binge eating or consumption of alcoholic beverages, increased sexual activity, and suicidal gestures) symptoms or changes during the premenstrual (luteal) part of the menstrual cycle. Common medical theories regarding the etiology of PMS include deficiencies or excesses of estrogen and progesterone, excess in the production of various other hormones including prolactin or prostaglandins, and deficiencies in such hormones as endorphin and thyroxin. Psychosocial explanations for PMS include rejecting the female role or a variety of common affective disorders. Social explanations for the existence of PMS include the mimicking of the behavior of other significant females in the woman's life, social expectations, or pressure from others in the social environment. The biopsychosocial model demonstrates the dynamic complexity of the etiology and pathophysiology of PMS [3, 5, 6, 9, 11, 13, 14].

AP originating from traditional Chinese medicine has long been applied to pain control and treating psychosomatic illness. AP is a specialized sensory stimulation that is analyzed through sensory neural pathways. Therefore, to understand its action we have to analyze the neuroanatomy, neurophysiology and neuropharmacology, aided by a knowledge of neuroendocrinology and the chemoarchitecture of the brain. Inserting one or more needles at particular points of the body activates neural pathways on three different levels, provoking local, regional and general reactions [2, 4, 8, 16, 17].

Chronic pain influences endorphinergic function, perhaps, depleting the endorphinergic neurons of their neurotransmitters. Endorphin function and pain sensibility are prominently affected in affective illness and schizophrenia [2, 16].  $\beta$ -Endorphins and ACTH are liberated from the pituitary gland by the stimulation brought about by AP. Analgesia (and sedation) produced by natural or electrical stimulation of other cutaneous afferents and by AP are believed to be mediated by these enkephalin-containing interneurons within substantial gelatinosa of the dorsal horn [8, 16]. Because pain is, in part, a negative emotional state, interventions that diminish the neurophysiology and neuroendocrinology of emotional arousal by restoring balance are likely to have a pain-relieving benefit.

The effect of AP stimulation of points UB 23 (Shenshu) can strengthen the excitability of noradrenergic neurons, activate the ascending pathway of the brain-

stem-hypothalamus and raise the catecholamine (5-HT, serotonin) ratio in the hypothalamus, so as to delay the aging process of the genital system [17]. The results of Takagi and Yonehara suggested that 5-HT 1 (serotonin receptor subtypes), with the exception of 5-HT1A; 5-HT2, with the exception of 5-HT2A; and 5-HT3 receptors are positively involved in electroacupuncture (EAP)-induced analgesia, whereas activating 5-HT1A and 5-HT2A receptors suppresses EAP-induced analgesia [15]. Estrogen and progestins have potent effects on central serotonergic and opioid neurons, modulating both neuronal activity and receptor density [9], and AP activated the serotonergic descending system within the dorsolateral funiculus and noradrenergic system from locus coeruleus [15, 17], and the positive influence of AP in treating PMS symptoms can be ascribed to its effects on the serotonergic and opioidergic neurotransmission that modulates various psychosomatic functions.

Invariably all PMS studies show a placebo effect between 20 and 30% [12], and in our experience is 5.9%. AP was found to be successful if the symptoms of PMS disappeared, and was performed for three or four more times if the symptoms still persisted, after which AP was considered to be unsuccessful, and medicamentous therapy was performed and AP and medication treatment of PMS became unnecessary or PMS symptoms didn't occur for a year after the AP treatment.

So far, no results on treating PMS symptoms with AP have been published. We believe that AP has its place in treating PMS, especially if symptoms such as anxiety, premenstrual migraines and headaches are present. The initial positive results of PMS symptoms with a holistic approach are encouraging and AP should be suggested to the patients as a method of treatment.

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