

Importance of acupuncture on premenstrual syndrome

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Summary

Aim: Premenstrual syndrome (PMS) is a complex group of symptoms. The clear reasons for PMS have not been understood completely. PMS includes emotional symptoms but mostly physical symptoms. **Methods:** The study was carried out on 11 patients (23-40 age range) diagnosed as having PMS. DSM IV was taken into account as the criteria for diagnosis. Ren2, Ren6, Ren12, LI4, LI11, P6, Liv3, Sp6, St36 and Du20 points were used on patients for the effects of acupuncture. The treatment of acupuncture was applied for three menses. Furthermore, NOx, MDA and GSH values in blood were studied. **Results:** The complaints of patients were observed to decrease or disappear completely. The most obvious changes were observed in myalgia, mastalgia and dysmenorrheal complaints ($p < 0.000$). Moreover, before starting the treatment of acupuncture, former blood values of NOx, MDA and GSH were compared with blood values of NOx, MDA and GSH after three cycles. An increase was observed for NOx levels after acupuncture treatment ($p < 0.05$). While there was no change in the oxidant stress indicator, MDA, an increase in antioxidant indicator GSH levels was observed ($p \leq 0.05$). **Conclusion:** Acupuncture to treat premenstrual syndrome can be considered as an effective treatment modality.

Key words: Acupuncture; Premenstrual syndrome (PMS); NOx; MDA; GSH.

Introduction

The etiology of premenstrual syndrome (PMS) is not completely known today. Moreover, in epidemiological studies, in over 60% of women in the reproductive period, many symptoms in the premenstrual phase of the cycle are observed [1]. The symptoms, which are affective and somatic, are over a hundred [2]. While a group of women with some changes in lifestyle and conventional treatments reduce these symptoms, a large number have these problems in every menstruation cycle.

Acupuncture and acupressure have widely been used for the treatment of symptoms all over the world in recent years [3]. According to traditional Chinese Medicine theory, PMS is mainly due to functional disorders of the liver, spleen and kidneys leading to disturbances in blood and qi flow inside the body. Acupuncture has the effect of opening up the meridians and maintaining balance in the body, which generally eases the emotions and pain associated with menstruation [4].

Nitric oxide (NO) is a key regulator of local vascular tone and blood flow [5-7]. Local levels of NO vary according to various pathophysiological events and metabolic alterations. In the case of acupuncture, Ma et al demonstrated that NO synthase (NOS) expression is higher in meridian skin regions, including acupoints [8]. Li *et al.* reported an increase in NO content after warm needling [9]. These findings show that acupuncture stimulation could be a modulator of in vivo NO levels [7, 9].

In this study, we aimed to test the effect of acupuncture on the symptoms and blood NOx, reduced gestation (GSH), malondialdehyde (MDA) levels of PMS diseased women.

Material and Methods

In this study, the effects of acupuncture on PMS were studied on women who had a university degree, aged 23-40, and working in Zekai Tahir Burak Women's Health Education and Research Hospital. Ethic committee approval and patient consents were taken. For the diagnosis of PMS, Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criterion was applied [10-13].

Eleven women who were diagnosed with PMS were treated with acupuncture. For the treatment of PMS, Ren2 (Qugu), Ren6 (Qihai), Ren12 (Zhonwan), LI4 (Hegu), LI11 (Quchi), P6 (Neiguan), Liv3 (Taichong), Sp6 (Sanyinjiao), St36 (Zusanli) and Du20 (Baihui) acu-points were used (Figure 1) [1, 3, 14, 15]. After determining the acupuncture points to be used for the treatment of PMS, the therapy was started. Treatments were applied every other day by starting one week before menstruation and ending at the onset of menses. Every session lasted for 20 min. The success of needling to the points was verified through the radiating deqi sensation starting from the needling point. Each treatment started with the DU20 point.

Any improvement from the treatment was registered on the complaint forms. In addition, by filling in three different scales – Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and physical indications, the patients' physical and psychological complaints from PMS were diagnosed. In the Beck depression test, including psychological changes, the participants were asked 21 questions in total. While grading, points were evaluated as: between 0-9 minimal, points between 10-16 slight, points between 17-29 middle and points between 30-63 severe depressive indicators. In the Beck anxiety test that consists of behavioral signs (0 = none, 1 = slight, 2 = middle, 3 = severe), 0-7 points were considered minimal, 8-15 points were slight, 16-25 were middle and 26-33 points were considered severe signs of anxiety. In the test involving physical symptoms, the degree of physical problems were graded with the same scores: (0 = none, 1 = slight, 2 = middle, 3 = severe).

In addition to these, blood samples were evaluated before the acupuncture treatment and one day after the last acupuncture session. Changes of the serum NOx, MDA and GSH were tested.

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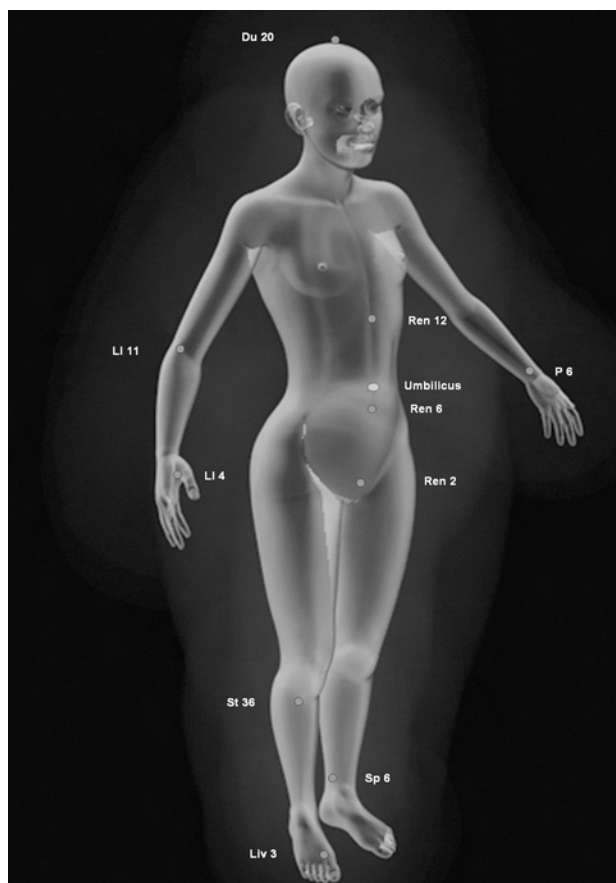


Figure 1. — Acupuncture points for the treatment of premenstrual syndrome.

Ren 2 (Qugu), Ren 6 (Qihai), Ren 12 (Zhonwan) points on ren meridian;
 LI 4 (Hegu), LI 11 (Quchi) points on large intestine meridian;
 P 6 (Neiguan) point on pericard meridian;
 Liv 3 (Taichong) point on liver meridian;
 Sp 6 (Sanyinjiao) point on spleen meridian;
 St 36 (Zusanli) point on stomach meridian;
 Du 20 (Baihui) point on du meridian.

The paired Student's-t test was used to compare the psychological, behavioral signs (BAI) and physical changes of PMS women before and after acupuncture (BDI).

Results

The BDI, BAI and the test for physical signs were conducted before and after the acupuncture sessions, and $p < 0.001$ was considered as a statistically significant difference (Table 1).

The BDI has 21 items; 18 out of 21 have a significant decrease of problems. As a result of the BDI, a feeling of fatigue, anger, sadness and depression were significantly changed (respectively $p < 0.004$, $p < 0.006$, $p < 0.011$ and $p < 0.016$). Moreover, in the BAI, consisting of ten items, significant improvements were observed in seven of them.

Table 1. — Psychological, behavioral and physical symptomatic changes in the pre- and post-acupuncture period.

Test	Test scores before acupuncture	Test scores after acupuncture	p value
Psychological changes (Beck depression test)	16.82 ± 9.41	7.36 ± 4.86	$p < 0.05$
Behavioral symptoms	9.9 ± 6.93	5 ± 3.52	$p < 0.05$
Physical symptoms	14.45 ± 4.69	7.82 ± 4.38	$p < 0.05$

Especially for the feelings: hot sensation, fatigue and vibration in the legs, and in the feeling of “bad things will happen”, significant improvements were observed (respectively $p < 0.004$, $p < 0.011$). In accordance with this, the problems of patients who had slight depressive symptoms and slight anxiety problems gradually decreased towards the end of the third cycle and came to a minimal level after the last session of acupuncture. The most apparent changes among the physical differences of PMS patients before and after acupuncture were seen for myalgia, mastalgia and dysmenorrhea ($p < 0.000$) (Table 2). However, almost no difference was observed in nausea problems before or after acupuncture.

Moreover, NOx, MDA and GSH blood levels before the acupuncture treatment and in the end of the third cycle were compared. For the NOx in relation to treatment with acupuncture, increased levels were observed ($p < 0.05$). For MDA, which is an oxidant indicator, the blood levels did not change; on the other hand, for GSH levels, an antioxidant indicator, increased levels were observed (Table 3).

Discussion

In the pathophysiology of PMS, many factors could be involved and play an important role: low progesterone level, high estrogen level, decrease in β endorphins, lack of serotonin, increased activity of aldosterone, hypoglycemia, inhibition of the steroid hormone, thyroid malfunction, lack of magnesium, and lack of pyridoxine [16, 17].

According to NIMH criteria for the diagnosis of PMS, at least a 30% increase in symptoms must be observed, complaints must be noted for at least two to three months and the acuteness must be scored [18]. In our study, test results – applied to each person individually – were recorded separately. The mid-level complaints were reported to decrease to around a 50% lower degree.

As the cause of PMS is not exactly known, treatment modalities are changeable [19]. There are many types of treatment and the basic principle is to stimulate ovulation and regulate the hormonal changes in blood. Oral contraceptives are the most commonly used drugs for this purpose [20]. In addition to these, for the dominant symptoms, symptomatic treatments are conducted. For instance, to resolve edema from the body, diuretics like spironolactone are given and salt-fluid consumption is limited. For head, waist, legs and groin ache, painkillers such as naproxen, ibuprofen, and mefenamic acid are

Table 2. — Substantial differences related to the psychological, behavioral and physical tests in the period of pre- and post-acupuncture.

		Before acupuncture	After acupuncture	p value
B	Feeling sad and depressed	1.00 ± 0.89	0.55 ± 0.69	$p < 0.016$
E	Hopeless and pessimistic view for the future	1.00 ± 1.09	0.36 ± 0.50	$p < 0.026$
C	Feeling unsuccessful	0.45 ± 0.69	0.09 ± 0.30	$p < 0.038$
K	Not enjoying too many things	1.00 ± 0.63	0.55 ± 0.52	$p < 0.053$
	Feeling guilty	0.90 ± 0.83	0.54 ± 0.52	$p < 0.038$
D	Not to be happy	0.90 ± 0.53	0.36 ± 0.50	$p < 0.006$
E	Criticizing herself due to own mistakes	0.81 ± 0.60	0.45 ± 0.52	$p < 0.038$
P	The feeling of crying	1.09 ± 0.83	0.36 ± 0.50	$p < 0.024$
R	Aggression	0.81 ± 0.75	0.18 ± 0.40	$p < 0.011$
S	Not talking and meeting others	1.00 ± 0.89	0.54 ± 0.52	$p < 0.053$
S	Seeing old and ugly when looking at a mirror	1.00 ± 0.77	0.27 ± 0.14	$p < 0.024$
I	Not being able to work as effectively as before	1.27 ± 0.90	0.72 ± 0.64	$p < 0.025$
O	Feeling tired quickly	1.18 ± 0.87	0.45 ± 0.52	$p < 0.004$
N	Anxiety of being punished	0.90 ± 1.22	0.27 ± 0.46	$p < 0.026$
B	Numbness and tingling	0.72 ± 0.64	0.27 ± 0.46	$p < 0.016$
E	Hot abscess/ Temperature	1.18 ± 1.16	0.45 ± 0.68	$p < 0.004$
H	Weakness and tremor in the legs	1.00 ± 1.18	0.36 ± 0.67	$p < 0.011$
A	Fear of very bad events in the future	1.18 ± 1.25	0.54 ± 0.68	$p < 0.011$
V	Palpitation of heart	0.72 ± 0.90	0.18 ± 0.40	$p < 0.025$
I	Fear of losing balance	0.72 ± 0.78	0.36 ± 0.50	$p < 0.038$
O	Flushing	1.18 ± 1.40	0.54 ± 0.68	$p < 0.046$
U				
R				
p	Headache in the pre-menstruation	1.18 ± 0.98	1.09 ± 0.70	$p < 0.004$
H	Migraine in the pre-menstruation	0.72 ± 1.10	0.36 ± 0.67	$p < 0.038$
Y	Pain, repletion and swelling in the breasts	2.45 ± 0.68	1.27 ± 0.78	$p < 0.000$
S	Myalgia	2.27 ± 0.78	1.27 ± 0.64	$p < 0.000$
I	Osteoarthritis	1.36 ± 1.20	0.72 ± 0.78	$p < 0.011$
C	Dysmenorrhea	2.45 ± 0.68	1.09 ± 0.83	$p < 0.000$
A	Chin and face ache (TME ache)	0.81 ± 0.87	0.45 ± 0.68	$p < 0.038$
L	Forgetfulness	1.90 ± 0.94	1.18 ± 0.60	$p < 0.012$

Table 3. — Changes of the rates of NOx, MDA and GSH in the pre- and post-acupuncture.

Test	Before acupuncture	After acupuncture	p value
NOx (nmol/ml)			
(n = 11)	38.42 ± 5.15	33.41 ± 6.22	$p < 0.05$
MDA (μmol/g tissue)			
(n = 11)	2.31 ± 0.30	2.40 ± 0.36	ns
GSH (μmol/g tissue)			
(n = 11)	2.03 ± 0.56	1.65 ± 0.23	$p \leq 0.05$

ns: non significant.

used [20, 21]. As an estrogen antagonist, danazol is also preferred as a treatment modality [22]. Moreover, while foods consisting of refined sugar, red meat, alcohol and caffeine products (coffee, coke, chocolate) and unsaturated fat consumption are limited, green vegetables, fruit and pulse consumption are recommended [21, 23].

Acupuncture, as a treatment method, is being used increasingly for gynecological problems [3]. Habek *et al.*, with the aim of determining the activity of acupuncture in PMS patients, practiced real acupuncture and placebo acupuncture for two groups of PMS patients. While the symptoms related to PMS were improved in 77.8% of the real acupuncture group, the symptoms were improved in only 5.8% of the placebo acupuncture group [1]. In the present study, differently from Habek *et al.*,

behavioral differences, and behavioral and physical signs of PMS women were compared before and after acupuncture. For each of the three parameters, a significant decrease was observed after acupuncture.

Acupuncture treatment, which has an important place in traditional Chinese medicine, has been used to control pain and treat psychosomatic diseases for many years. Chronic pain affects endorphinergic functions and probably consumes the neurotransmitters in endorphinergic neurons. Affective disorders and endorphine function in schizophrenia and pain sensitiveness are significantly affected [24, 25]. Stimulation of acupuncture points leads to the release of β -endorphins and ACTH from the hypophysis. It is believed that cutaneous afferents which rise from the analgesic or from the sedation of acupuncture spots occur by means of natural or electrical stimulation, and they are released from the interneurons that contain enkephalin in substantia gelatinosa which is placed in the posterior horn of the spinal cord [25, 26]. As pain is a partially negative emotional state which attempts to neurophysiologically and neuroendocrinologically increase emotional awakening by arranging the balance have pain killing profits [1]. The effect of acupuncture on the endorphinergic and enkephalinergic system has been known for a long time.

In our study, it was observed that patient complaints about mastalgia, myalgia and dysmenorrhea in the pre-acupuncture period, were diminished remarkably in the post-acupuncture period, a most notable decrease for physical complaints.

According to traditional Chinese medicine, as the etiologic factor, insufficiency in the kidney meridian, liver qi stagnation and liver-blood insufficiency are responsible for the development of unwanted gynecological conditions [27]. Sp6, which is the most important point in the treatment of PMS, is the intersection point of the spleen, liver, and kidney meridians [14]. Sp6 regulates dysmenorrhea and PMS [28-31]. Furthermore, Ren2, Ren6 and Liv3 regulate menstruation and cure dysmenorrhea [32]. It has been observed that by using the points mentioned above, mild or severe dysmenorrheal complaints of women with PMS have been mitigated to a great extent.

Ren 12 is the most important acupuncture point which eradicates mental and physical failure [33]. It has been observed that patients with PMS, who in their menstruation period claim to be using much more effort than they normally do, can work during the menstruation period as easily as normally. Moreover, the feeling of fatigue easily in the pre-acupuncture period has been observed to have decreased or disappeared in the post-acupuncture period.

LI4 and LI11 decrease pain and fever [34]. In our study it was observed that by using these points, mild or severe myalgia and headache decreased after acupuncture treatment. When examined in terms of osteoarthritis, mild or severe complaints of women with PMS in the pre-acupuncture period were lessened after acupuncture treatment. When premenstrual migraine complaints were examined in the pre- and post-acupuncture periods, statistically some improvements have been observed.

P6 is one of the main points when curing nausea and vomiting. Moreover, it also opens the channels. St36 is the point which strengthens the whole body and tonifies blood and qi [34]. These points are also very effective when curing mastalgia. Therefore, it has been observed that mastalgia complaints of women with PMS have lessened or disappeared.

The LI11 point is for edema and LI4 is for edema and spasm. LI4 also regulates the stomach. Du20 is the sedative regulator point. It is also the general physiologic and coordinator point.

Acupuncture enhances the level of NO concentrations substantially. NO is the key biological signal molecule for neurotransmission and causes vasodilatation in the blood vessels. Acupuncture increases NO levels in treated regions, thereby increasing local circulation. The importance of local circulation, and NO itself, in pain suggests that these effects might contribute to the pain relief obtained with acupuncture [7]. When the effects of acupuncture to the NO levels are studied, high NOS activity has been observed in the meridian acupuncture points of the rats [8]. It is concluded that the NOS system regulates the level of NO in the acupuncture points. Another explanation for the occurrence of NO is that it provides sympathetic tonus. Acupuncture is known to

enable sympathetic activity changes [35]. Recent studies indicate that acupuncture provides anesthesia in the parts far from the point where acupuncture is applied, and it also has some cardiac and antiemetic effects [36]. The central neurological system and opioid peptides are believed to contribute to such characteristic effects [37].

Siu *et al.* did not observe any change in the antioxidant enzyme activity in rats on whose brains – without ischemic occurrence – electroacupuncture was applied. However, they observed electroacupuncture effects in ischemic reperfused brain tissues and increased antioxidant enzyme activity, while lipid preoxidation decreased [38]. We also noted that acupuncture increased GSH levels.

It has been observed that physical and emotional complaints of PMS patients decreased and the quality of life of these patients increased after acupuncture treatment. Biochemically this condition displays a parallelism with increased GSH and NOx levels. Acupuncture diminished PMS symptoms (lessening depression and fewer physical complaints), and improved biochemical parameters.

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