

Neuro-vegetative disorders in premenstrual syndrome

I. Moldovanu¹, *I. Mazur²

¹Department of Neurology, ²Department of Obstetrics and Gynaecology
Nicolae Testemitsanu State University of Medicine and Pharmacy Chisinau, the Republic of Moldova

*Corresponding author: mazur_ina@mail.ru. Manuscript received October 26, 2014; accepted May 15, 2015

Abstract

Background: The premenstrual syndrome (PMS) is the complex of psychological, emotional and neuro-vegetative symptoms dependent on cyclical fluctuations of reproductive hormones; due to the present study we investigated the peculiarities of neuro-vegetative signs in patients with premenstrual syndrome.

Material and methods: 272 women (136 with moderate/severe premenstrual syndrome and 136 with mild premenstrual symptoms) at the age 18-43 years have been examined. We have used Menstrual Distress Questionnaire (MDQ) to determine clinical profile and intensity of premenstrual symptoms. The pattern of neuro-vegetative signs was assessed by using questionnaire the Motor-Autonomic Profile.

Results: The obtained outcomes indicated that the score of MDQ is markedly increased in patients with moderate/severe premenstrual syndrome. Neuro-vegetative symptoms, assessed by the Motor-Autonomic Profile showed that score in most scales was considerably higher in patients with PMS.

Conclusions: Parameters of the Motor-Autonomic Profile were higher in most scales and subscales in patients with PMS compared with women without PMS, indicating the presence of the broad range of psycho-vegetative disorders.

Key words: premenstrual symptom, premenstrual syndrome, the Motor-Autonomic Profile, neuro-vegetative symptoms, painful symptoms.

Introduction

Premenstrual syndrome is a neuroendocrine syndrome; multifactorial disorder that occurs due to functional insufficiency of hypothalamus-pituitary-ovary system influenced by unfavourable factors or increased sensitivity [2, 13, 15]. There are centres sensitive to steroids located in the hypothalamus, these participate in the mechanism of feeble-back. Due to disturbed neuroendocrine balance, autonomic reactivity increases in the second phase of the menstrual cycle [9, 16]. Vegetative disorders are manifested through emotional symptoms (irritability, depression, anxiety, unstable mood, aggression etc.) and vegeto-vascular signs (headache/ migraine, nausea, vomiting, pain in the heart, etc.) [6].

The autonomic nervous system maintains normal physiological limits of biological parameters and provides adaptation mechanisms of the body. The boundary between adaptation reaction and disease is conventional and depends on intensity and duration of influence of unfavourable factor and the mental and physical condition of the human body. If the woman adjusts to cyclical fluctuations of reproductive hormones her general condition is not affected. Functional disorders of the hypothalamus-pituitary-ovarian axis influence adaptation reaction, therefore, clinical symptoms appear in premenstrual period [6, 8, 13].

One of the objectives of the current study was to determine and assess clinical symptoms occurring in the premenstrual period under vegetative samples (questionnaire the Motor-Autonomic Profile). Comparing autonomic profile in patients with premenstrual syndrome (PMS) and women in the control group allows emphasizing clinical vegetative aspects characteristic for PMS.

Material and methods

Present study was conducted during 2010-2012 at the gynaecological outpatient unit, attended by 272 women:

research group included 136 women with moderate/severe PMS, which meet the Diagnosis Criteria and control group – 136 women with mild unique premenstrual symptoms which do not meet the Diagnosis Criteria for PMS. The study included women aged 18-43 years with regular menstrual cycle (23-35 days), no genital or brain injuries, who do not use COCs, are not pregnant or after giving birth (< 6 months).

Medical and social characteristics of participants were obtained from outpatient medical sheets and complex questionnaire that included: age, social status and menstrual function (menstrual cycle and rhythm). Premenstrual clinical profile was assessed by using the Menstrual Distress Questionnaire (MDQ) – questionnaire includes 47 symptoms characteristic for PMS united into 8 groups and valued at 0-3 points (0 points – no symptoms, 3 points – severe symptoms), questionnaire was completed in the premenstrual period at the maximum level of symptoms expression (day 24-26 of menstrual cycle) [5].

Assessment of neuro-vegetative pattern was based on the implementation and completion questionnaire the Motor-Autonomic Profile in the luteal phase of the menstrual cycle (24-26 days). This questionnaire is a clinical tool for quantitative and qualitative assessment of the neuro-vegetative disorders and consists of detailed analysis of bodily sensations (ache, breathless, cold, hot, cool etc) and behaviour (emotional, painful, motor behaviour etc.). The questionnaire consists of 169 statements and questions united into 16 groups, score obtained after calculation is marked by a sign in the Chart [3].

Statistical processing of the survey results was performed using Statistics 7.0 software (StatSoft Inc.). Statistical processing allowed us to calculate rates, averages, indicators of proportion. In order to determine the difference between mean values was used t test and nonparametric tests. Statistically significant differences were considered $p < 0.05$.

Results and discussion

The women involved in the study were comparable by age, social-demographic parameters, physical status and characteristics of menstrual function (tab. 1).

Table 1

General Characteristics of participants in the study

	Study Group n – 136	Control group n – 136
Age, years	30,33 ± 5,68	28,98 ± 5,75
Weight, kg	60,2 ± 4,0	61,24 ± 5,63
Height, cm	165 ± 2,33	162 ± 2,33
Body mass index,kg/m ²	22,31 ± 2,87	22,79 ± 3,11
Menstrual cycle, days	28,66 ± 1,32 (26-35)	28,79 ± 1,44 (25-34)
Living place		
Urban	76,47%	84,56%
Rural	23,53%	15,44%
Social status		
Married	67,65%	64,71%
Single	22,79%	29,41%
Divorced	9,56%	5,88%
Educational level		
School certificate	44,12%	56,62%
College	16,91%	23,53%
University	37,5%	20,59%**

Diagnosis of PMS is determined in the interview about clinical premenstrual symptoms, Menstrual Distress Questionnaire and meets the Diagnosis Criteria (American College of Obstetricians & Gynaecologists, USA, 2000; Royal College of Obstet&Gynec, The National Association for Premenstrual Syndrome, UK, 2007) [1, 10].

Menstrual Distress Questionnaire (R. Moos) [5] consists of 8 groups of symptoms (47 symptoms), characteristic for PMS. Results showed that parameters in study group were significantly higher compared with parameters in control group (tab. 2).

Table 2

Parametres of Menstrual Distress Questionnaire

Scale	Parameters	Study group n – 136	Control group n – 136	p
1	Pain	8,66 ± 1,43	2,12 ± 1,08	< 0,001
2	Concentration	6,25 ± 1,17	1,03 ± 0,65	< 0,001
3	Behavioural change	5,6 ± 1,32	0,78 ± 0,47	< 0,001
4	Autonomic reactions	4,39 ± 1,47	0,83 ± 0,48	< 0,05
5	Water retention	4,14 ± 1,11	0,96 ± 0,48	< 0,01
6	Negative affect	9,11 ± 1,71	1,59 ± 1,03	< 0,001
7	Arousal	3,87 ± 1,13	2,22 ± 0,98	> 0,05
8	Control	6,08 ± 1,64	1,0 ± 0,64	< 0,01
Total score		47,14 ± 3,67	10,28 ± 1,94	< 0,001

Symptoms included in the Menstrual Distress Questionnaire especially scales 1, 4, 5 and 8 are conducted by auto-

nomie and neuroendocrine mechanisms. Autonomic (vegetative) disorders are often encountered in actually healthy people, disturbing quality of synesthesia (a neurological phenomenon in which stimulation of one sensory or cognitive pathway leads to automatic, involuntary experiences in a second sensory or cognitive pathway). In these cases questionnaire the Motor-Autonomic Profile is the most appropriate structural analysis of the general condition of the subject [3, 4].

Comparing autonomic profile in patients with PMS and women in control group allows emphasizing vegetative clinical aspects characteristic for PMS. It was found that parameters of Motor-Autonomic Profile in patients with PMS were significantly higher than similar parameters in the control group.

Emotional disorders (Scales 1, 2) constitute essential characteristics of the subject and are considered the most common sources producing vegetative symptoms [3]. Clinical symptoms expressed through emotional disorders included: restlessness, anxiety, susceptibility, dissatisfaction, aggression (tab. 3).

General brain disorders (Scale 8) – the most frequent symptoms were mentioned: excessive tiredness, difficulty in concentrating and drowsiness (tab. 3).

Sexual and menstrual disorders (scale 12) were manifested by decrease/lack of sexual desire, discomfort and pain in patients with PMS (tab. 3).

Table 3

Parameters of Motor-Autonomic Profile, Scales 1, 2, 8, 12

Scale	Parameters	Study group n – 136	Control group n – 136	P
1	Anxiety and panic attacks	13,8 ± 1,84	4,0 ± 0,94	< 0,001
2	Depression	10,73 ± 1,44	3,06 ± 1,03	< 0,001
8	Asthenia – hyper-excitability	18,61 ± 1,74	6,26 ± 0,58	< 0,001
	Asthenia	10,59 ± 1,33	4,0 ± 0,79	< 0,001
	Hyper-excitability	7,84 ± 0,82	2,26 ± 0,43	< 0,001
12	Sexual and Menstrual Disorders	7,9 ± 0,71	2,17 ± 0,66	< 0,001
	Sexual	2,75 ± 0,52	0,77 ± 0,31	< 0,001
	Menstrual	5,15 ± 0,69	1,4 ± 0,31	< 0,001

Assessment of vegetative parameters revealed marked clinical symptoms in premenstrual period at scales: respiratory behaviour, hyper-excitability, cerebral vascular disorders, cardiovascular disorders, gastrointestinal disorders, difference between parameters in study group was statistically higher than in control group (tab. 4).

The phenomenon of dyspnoea (respiratory behaviour) occurs in the majority of patients with autonomic disorders (evident when cardiac or respiratory somatic excluded) [3, 4]. The rating scales manifestations of respiratory behaviour (Scales 3, 4) were referred to dyspnoea in emotions, sensations of air failure and intolerance of unventilated spaces.

Table 4

Parameters of Motor-Autonomic Profile,
Scales 3, 4, 5, 7, 9, 10

Scale	Parameters	Study group n – 136	Control group n – 136	P
3	Dyspnoea	15,11 ± 1,9	4,04 ± 0,85	< 0,001
4	Respiratory behavior	10,2 ± 1,23	6,02 ± 1,07	< 0,01
5	Tetany – neuromuscular hyper-excitability	18,56 ± 1,82	4,35 ± 0,91	< 0,001
7	Dizziness	11,92 ± 1,34	2,26 ± 0,36	< 0,001
9	Cardiovascular dysfunction	23,67 ± 1,73	7,27 ± 1,37	< 0,001
	Discomfort/palpitations	5,15 ± 0,88	1,1 ± 0,3	< 0,001
	Pulsations	5,63 ± 1,03	1,02 ± 0,27	< 0,001
	Orthostatic phenomena	8,04 ± 1,07	3,08 ± 0,68	< 0,001
10	Gastrointestinal dysfunctions	23,66 ± 1,83	8,4 ± 1,01	< 0,001

Significant differences were found in scale 5 – the phenomenon of neuro-muscular hyper-excitability (tetany) is largely influenced and sometimes caused by the phenomenon of hyperventilation (dyspnoea), therefore this phenomenon (tetany) is analysed in the context of these disorders [3, 8].

Tetany-neuromuscular hyper-excitability – frequently hyper-excitability is manifested by twitching to an unexpected event, twitch of the eyelid and throat feeling in stronger emotions.

Cerebral vascular disorders were manifested by weakness, dizziness, dysfunction of optical analysers («mesh, haze before eyes»), fainting, unreality of the surrounding world, feeling confused, which were included in the composition of scale 7.

Scale 9 – cardiovascular dysfunction is actually a disorder of autonomic cardiovascular function [3]. Significant differences were detected in subscale discomfort/pain at heart and subscale pulsations (in the head, in the whole body).

Gastrointestinal disorders (scale 10) – most commonly were manifested by changes of appetite, gastric and abdominal bloating and discomfort. Scale 10 highlights the most relevant functional gastrointestinal symptoms caused by autonomic disorders.

Disorders in thermoregulatory system – complex scale 11 consists of four subscales: cold, hot, sweating and swelling, the clinical symptoms of this scale refer to dysfunction of the cerebral structures in the hypothalamus and its connections [3] (tab. 5). Thermoregulatory system disorders are characterized by statistical indices significantly higher in patients with PMS compared to women in control group, symptoms were more frequently expressed by feelings of heat and sweating and swelling in emotions.

These results showed significant motor disorders in patients with PMS (sensation of pain and tension in the back muscles, in the lumbar region, excitement in emotions, tran-

sient weakness in legs). The set of phenomena included in the scale 14 is meant to highlight the sensorial and motor disorders, which constitute an important part of behaviour and are closely related to the autonomic nervous system [3, 4] (tab. 5).

Table 5

Parameters of Motor-Autonomic Profile, Scales 11, 14

Scale	Parameters	Study group n – 136	Control group n – 136	P
11	Thermoregulation and sweating	25,67 ± 1,75	8,34 ± 1,01	< 0,001
	Cold	6,81 ± 1,21	3,04 ± 0,67	< 0,01
	Hot	5,74 ± 1,15	1,15 ± 0,5	< 0,001
	Sweating	6,16 ± 0,86	2,21 ± 0,57	< 0,001
	Edema	4,08 ± 0,74	0,92 ± 0,36	< 0,001
14	Motor and sensorial disorders	23,6 ± 2,32	5,42 ± 1,3	< 0,001
	Motor disorders	11,18 ± 1,67	2,36 ± 0,39	< 0,001
	Sensorial disorders	4,67 ± 0,94	1,0 ± 0,27	< 0,001
	Disorders of consciousness	1,42 ± 0,53	0,35 ± 0,23	> 0,05
	Confusion disorders	1,2 ± 0,29	0,62 ± 0,23	> 0,05

Painful pattern in PMS includes both muscular-skeletal painful syndrome (muscles and joint pain with various localization) and visceral syndromes (abdominal pain, pain in the region of heart, pain in sexual intercourse, etc.) of different intensity also being worse in patients of study group (tab. 6).

Table 6

Parameters of Motor-Autonomic Profile, Scale 15

Scale	Parameters	Study group n – 136	Control group n – 136	P
15	Painful syndromes	24,59 ± 2,69	7,36 ± 1,19	< 0,001
	Muscular-skeletal syndrome	8,84 ± 1,42	2,23 ± 0,39	< 0,001
	Visceral syndromes	13,21 ± 1,65	4,0 ± 0,87	< 0,001

Pain is concrete body distress, with a broad range of undesirable vegeto-visceral symptoms in patients with premenstrual symptoms and determines the severity of PMS.

It is important to note that PMS is characterized by pronounced premenstrual symptoms that have negative impact for the overall condition and affects the quality of life of women. This is reflected in the scale 16 – Disability. In the study group parameter of this scale was 12.69 ± 1.64, while in the control group – 1.0 ± 0.61 (< 0.001). This data indicates that the scale value in study group is high and affects the quality of life and general condition, so this condition requires treatment.

Low quality of life in patients with PMS is manifested mainly by limiting in daily activities (work, study, house-

work) because of symptoms, difficulties in stealing attention from existing symptoms and focus on something else, and the presence of depression due to feeling disturbing bodily sensations. Not only painful phenomenon causes low quality of life and affective disorders, on the other hand, psycho-vegetative syndrome plays an important role in altering them [2, 9, 12].

All above-mentioned parameters of the Motor-Autonomic Profile in study group demonstrated statistically significant difference, being higher in patients with PMS, this shows a significant autonomic dysfunction in the luteal phase of the menstrual cycle. The study results do not contradict the data reported in the literature.

Disorders in the regulation of neuroendocrine system, established in patients with PMS present a research interest. It is known that autonomic nervous system is involved in the development of moderate premenstrual symptoms [7, 8, 11]. Premenstrual symptoms appear in the presence of parasympathetic autonomic reactivity in the second phase of the menstrual cycle. The basic function of the autonomic nervous system is to maintain normal biological constants and ensuring adaptability of the organism to the environment. In patients with PMS there are vegetative disorders which induce tension in adaptive-compensatory mechanisms [14].

Conclusions

1. The results of this study demonstrated that moderate/severe premenstrual symptoms occur in women with regular menstrual cycle.

2. Parameters of Motor-Autonomic Profile are higher in most scales and subscales in patients with PMS compared with women without PMS, indicating presence of the broad range of psycho-vegetative disorders.

3. Multiple mechanisms taking part in the genesis of autonomic symptoms present in patients with PMS involve painful and affective disorders.

4. Pronounced painful symptoms associated with emotional and neuro-vegetative symptoms in patients with PMS confirm the close connection and presence of common pathogenic links.

References

1. American College of Obstetricians & Gynecologists (ACOG) ACOG Practice Bulletin 15. Premenstrual Syndrome: Clinical management guidelines for obstetricians-gynecologists. Washington: DC, 2000.
2. Halbreich Uriel. Premenstrual syndromes: closing the 20th century chapters. *Curr Opin in Obs Gyn.* 1999;11(3):265-270.
3. Moldovanu I, Odobescu S, Vovc V, et al. Profilul Vegetativ Motor. Chişinău, 2010.
4. Moldovanu I, Dodick D, Odobescu S. Cefaleele, durerile faciale și cervicale. Chişinău, 2007.
5. Moos RH. The development of the menstrual distress questionnaire. *Psychosom Med.* 1968;30:853-867.
6. Odobescu Stela. Migrena cronică și sistemul nervos vegetativ. Chişinău, 2012;264.
7. Potter J, et al. Premenstrual Syndrome Prevalence and Fluctuation over Time: Results from a French Population-Based Survey. *J of Wom Health.* 2009;18(1).
8. Profire L. Corelațiile declinului hormonal și dereglărilor psihovegetative în menopauză. Teza de doc. în șt. med. Chişinău, 2005.
9. Rapkin A, Akopians A. Pathophysiology of premenstrual syndrome and premenstrual dysphoric disorder. *Menop Intern.* 2012;18:52-59.
10. Royal College of Obstetricians and Gynecologists, London. Green-top Guideline Management of Premenstrual Syndrome. 2007;48.
11. Warren JW, Morozov V, Howard FM. Could cronic pelvic pain be a somatic syndrome? *AJOG.* 2011.
12. Волкова Н, Антоненко М. Предменструальный синдром – взгляд эндокринолога. *Гинекологическая Эндокринология.* 2011;13(2).
13. Исмаилов С, Хайдарова Ф, Ходжаева Н, и др. Гипоталамо-гипофизарно-надпочечниковая ось в патогенезе предменструального синдрома. *Эндокр. Гинекология.* 2010;5(29).
14. Курушина ОВ, Ткаченко ЛВ. Цефалгии при предменструальном синдроме. *Лекарственный вестник.* 2006;6.
15. Линева О, Муравец Е. Коррекция психовегетативной составляющей синдрома хронических тазовых болей с использованием грандаксина. *Проблемы репродуктологии.* 2007;2:77-81.
16. Савельева ГМ, Бреусенко ВГ. Гинекология. Москва, 2004.

