

RELATIONSHIP OF CONNECTIVE TISSUE DYSPLASIA AND HYPOMAGNESEMIA IN GENESIS OF JUVENILE DYSMENORRHEA

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ABSTRACT

We studied the relationship of connective tissue state with magnesium and hydroxyproline levels in blood and urine of young women with primary dysmenorrhea. Study showed that in girls with dysmenorrhea and phenomena of connective tissue dysplasia hydroxyproline level in urine was increased which was associated with increased degradation of collagen and decreased level of magnesium in blood serum. This should be noted in differentiated approach to the treatment of dysmenorrhea.

UDC CODE & KEYWORDS

■ UDC: 616 ■ Gynecology ■ Connective tissue dysplasia ■ Juvenile dysmenorrhea ■

INTRODUCTION

Pain as a sensation of affection is a common cause of referring of young patients to a gynecologist, although painful menstruation is often regarded by girls as natural condition. According to Uvarova et al. (2003), dysmenorrhea is observed in 31-52% of girls and in some of them leads not only to disability, but also to changes in psychosomatic status.

Dysmenorrhea is a cyclically recurring polyetiological neuroendocrine syndrome which significantly reduces activity of girls during menstruation until its complete loss, determining the relevance of studying the issue.

Several researchers defined dysmenorrhea as one of many manifestations of connective tissue dysmorphism which is most often based on congenital or acquired long-term deficiency of intracellular magnesium (Kadurina, 2000; Stepura, 1999). Usually patients complain of stitching and drawing pains in the heart, without irradiation, arrhythmias, irritability, disturbed nocturnal sleep, autonomic crises, many fear, fatigue, impaired sweating, unreasonable fallings, frequent dizziness with a sharp rising in the morning, and vascular disorders in legs. These complaints previously were considered as only dysfunction of the autonomic nervous system. However, the experience of physicians, cardiologists and rheumatologists shows the close relationship of such manifestations with congenital or acquired long-term deficiency of intracellular magnesium. Thus, in patients with dysmenorrhea biochemical study of blood performed by Uvarova et al. (2003) for electrolyte levels confirmed the lack of magnesium in blood serum of 70% of patients.

Connective tissue dysplasia (CTD) is a congenital anomaly caused by the disruption of the structure of fibrous component (collagen) or basic substance, and is manifested in the reduction of its strength. This is a constitutional weakness of connective tissue. Collagen defects may be associated with the interaction between genetic and environmental factors. Intrapelvic fascia is continually responding to mechanical stress, metabolism, hormonal and neurological activities (Radzinsky, 2006). In addition to the abovementioned factors, changes in mineral homeostasis, mainly calcium and magnesium, have particular importance in the genesis of dysmenorrhea. Recent studies by Gromova (2006) and Kadurina (2000) indicate the presence of estrogen and progesterone receptors in the cells of the vaginal epithelium, connective tissue, striated muscles of the pelvic floor and round ligament of the uterus.

The purpose of our study was to establish the relationship of connective tissue state with magnesium and hydroxyproline levels in blood and urine of young women with primary dysmenorrhea.

Material and methods

The study included 64 patients complaining of painful menstruations. All the girls were aged between 13-17 years old with manifestations of connective tissue dysplasia and without it. Control group consisted of 25 girls with normal menstruations. Group I included 30 girls with moderately significant dysplasia of connective tissue (10 to 16 points). Group II consisted of 34 women with no clinical signs of connective tissue dysplasia.

Symptoms of connective tissue dysplasia were identified using the Yakovlev point scale (1992). It included the following criteria of connective tissue dysplasia:

- minor signs (1 point): asthenic body type or insufficient body weight, muscle hypotonia and low manometry, flattening of the arch, tendency to easy bruising, increased tissue bleeding, vegetovascular dysfunction, arrhythmias and conduction of the heart (ECG);
- major signs (2 points): scoliosis, kyphosis, kyphoscoliosis, II-III degree platypodia, elastosis of the skin, joint hypermotility, tendency to dislocation, sprain ligaments of the joints, susceptibility to allergic reactions and colds, previous tonsillectomy, varicose veins, hemorrhoids, biliary dyskinesia, impaired evacuation of the gastrointestinal tract (GIT), genital prolapse, and hernia in first line relatives;



- severe manifestations and conditions that led to surgery or have indications for them, and changes in anatomic relationships leading to organ dysfunction (3 points): hernia; splanchnoptosis, varicose veins and hemorrhoids (surgery), chronic venous insufficiency with trophic disorders ; habitual dislocation of joints and sprains more than 2 joints, gastrointestinal disturbances in motor function confirmed by laboratory methods of research; diverticulitis, dolichosigmoid, polyvalent allergy, and severe anaphylactic reactions.

The total score in mild severity (less significant) was up 9 points, average severity (moderately significant) - from 10 to 16, and severe (significant) - 17 points and more, accordingly. The severity of dysmenorrhea was revealed by the subjective assessment of pain on the pain visual-analogue scale. The state of connective tissue was studied by determining the daily excretion of metabolites of connective tissue hydroxyproline in the daily urine by the Stepura method (1999).

Determination of magnesium in blood serum was carried out on the device spectrofluorimeter type AF-610 (ARAYLEIGH TD Shanghai ANTAL Diagnostics Co, LTD) with sets of test systems BioLab (Russia).

Statistical data processing and verification of the results was based on the definition of equality of the expectations of random variables by t-test evaluation.

Results and discussion

Table shows results of the study of magnesium and hydroxyproline levels in blood and urine of girls with dysmenorrhea, depending on the severity of connective tissue dysplasia.

Table 1: Magnesium and hydroxyproline levels in blood and urine of girls with dysmenorrhea, depending on the severity of connective tissue dysplasia, M±m

Index	Normal values	With connective tissue dysplasia			Without connective tissue dysplasia		
		Mild degree	Moderate severe degree	Severe degree	Mild degree	Moderate severe degree	Severe degree
Hydroxyproline in urine, mmol/L	18,896± 1,104	45,4± 19,8	41,48± 9,52*	57,0± 16,8*	10,2± 2,3	12,75± 3,35*	13,43± 3,27*
Magnesium in blood plasma, mcg/mL	1,05± 0,25	0,7±0,2	0,6±0,1*	0,5±0, 2*	0,9±0, 2	0,8±0,1*	0,7± 0,1*

Source: Author, Note: * - P<0.05

In girls with dysmenorrhea magnesium level in blood plasma is varied depending on the presence or absence of signs of connective tissue dysplasia. In group of girls with dysmenorrhea and phenomena of connective tissue dysplasia magnesium level in plasma decreased from 0.7 ± 0.2 to 0.5 ± 0.2 mg/ml ($p<0.05$), whereas in the second group magnesium level remained within the normal range from 0.7 ± 0.1 up to 0.9 ± 0.2 mg/ml ($p<0.05$).

Magnesium deficiency leads to a change in the pelvic hemodynamics as hypertension and vasospasm. The synthesis of all currently known neuropeptides in the brain, including the enkephalins and endorphins that mitigate the perception of pain by receptors of nerve cells occurs at the obligatory participation of magnesium (Walker et al., 1998). This may explain the presence of symptoms of pain in dysmenorrhea, when the synthesis of opioid neuropeptides is not sufficient to ensure the reduction of pain threshold with desquamation of the functional layer of the endometrium.

As for the level of hydroxyproline in urine, it significantly increased in the first group of girls, depending on the severity of dysmenorrhea, and in the second group it level remained within the permissible concentration. Consequently, women with dysmenorrhea and signs of connective tissue dysplasia found increased hydroxyproline level in urine which is associated with increased degradation of collagen and decreased content of magnesium in blood serum. This is also shows the connective tissue dysplasia.

Conclusion

Connective tissue dysplasia plays the major role in the pathogenesis of primary dysmenorrhea. Underestimation of the state of connective tissue leads to increase in the frequency of relapses in violation of the reproductive function. The main objective of drug therapy for strengthen connective tissue is filling of deficiency of various components involved in the synthesis of collagen, correction of metabolic disorders, stimulation of collagen formation and stabilization of glycosaminoglycans. In the presence of connective tissue dysplasia we recommend to use a differentiated approach to the treatment of dysmenorrhea in girls which should include the use of magnesium and vitamin B6 in the second phase of the menstrual cycle.

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