THE NEW ARMENIAN MEDICAL JOURNAL
Vol.7 (2013), No 3, p.74-77

FEATURES OF ULTRASOUND PICTURE OF ADENOMYOSIS IN COMBINATION WITH VARICOSE EXPANSION OF PELVIC VEINS

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Received 12/15/2012; accepted in final form 7/10/2013

ABSTRACT

A study on the pelvic venous network in 50 females of reproductive age between 29 and 40 years with post-surgery histologically verified hysterectomy adenomyosis was performed. In patients with adenomyosis the expressed phlebostasis was revealed to be manifested as increasing diameter of main venous collectors: uterine, ovarian, curved and internal iliac veins. The significant number of patients with intramyometrial adenomyosis (n=42, 84%) showed expanding intraorganic (arcuate) veins, while in 12 (24%) of cases phlebectasis of extraorganic uterine veins was also observed. According to pathology of the main venous collectors, the following distribution was observed: in 4 (8%) females of the study group there was expansion of ovarian veins only, in 14 (28%) there was combined expansion of ovarian, uterine, and arcuate veins, while 32 (64%) women exhibited total varicosities of the pelvic veins. There was also a significant decrease in the blood flow velocity (almost twice) in the vessels studied.

As a conclusion, data of ultrasonic study should be considered when designing treatment strategy in patients with adenomyosis: it is recommended to apply phlebotonic drugs in conservative therapy, whereas surgery is a choice of medical management in expressed total varicosity of pelvic veins.

Keywords: *adenomyosis, varicose pelvic veins, three-dimensional reconstruction of the vascular bed.*

INTRODUCTION

Varicosities of small pelvis veins (VSPV) occur predominantly in women of reproductive age and are often associated with the presence of gynecological pathology (endometriosis, pelvic tumors, etc.) [*Kurjac A., Kupesic S., 2000; Rymashevsky N. et al., 2000; Volkov A. et al., 2000; Volkov A., 2008*]. The VSPV is widespread enough; sonographically it is revealed in 5.4% of conditionally healthy females and in 15.7% of females diagnosed with gynecological diseases [*Ozerskaya I., 2005; 2010; Medvedev M., Rudko G., 2010*].

Referring to the studies of other authors [*Sonography, 2005; Mozes V., Ushakova G., 2006*], ovarian varicose veins are observed in 80% of females, and total defeat of the pelvic venous system is detected in 50% of cases. In 1949, H. Taylor was the first to describe varicose pelvic veins. Varicosity of the small pelvis veins is also known as "pelvic varicose veins", "pelvic venous plethora syndrome", "ovarian varicose veins", "the right ovarian vein syndrome", "pelvic congestion syndrome", "pelvic varicies", "pelvic venous incompetence", "pelvic venous disorders", "iliac vein insufficiency syndrome", "pelvic varicocele", "pelvic venous stasis" [*Sokolov A., 2008*].

Clinical symptoms of varicose pelvic veins are variable. The main symptom in 76% of cases are chronic pains in the lower abdomen occurring after prolonged overloads increased in the second phase of the menstrual cycle, as well as periodic exacerbations triggered by exogenous (cooling, strain, stress) and endogenous (acute internal diseases) factors [*Mozes V., 2001; Sokolov A., 2008*].

Common symptoms are varicose dyspareunia (in 75% of patients with pelvic venous plethora) and dysmenorrhea. The length of menstruation up to 6-10 days is observed in 12% of patients, prolonged spotting is mentioned in 37%, menstrual cycle up to 50-80 days – in 22% and heavy periods – in 35% of

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females [*Volkov A. et al., 2000; Volkov A., 2008*]. There is a direct association between venous congestion and infertility, miscarriage (6% cases). Variability of clinical symptoms in VSPV leads to the fact that it often proceeds masked by other gynecological disorders [*Rymashevsky N. et al., 2000*].

Primary diagnosis of varicose pelvic veins is difficult, because specific symptoms and manual criteria of the disease are lacking [*Volkov A. et al., 2000; Mozes V., Ushakova G., 2006*]. Diagnosis setting is based on ultrasound results, since clinical symptoms of the disease can be suspected in only 10.2% females. The ultrasound study provides significant opportunities for making diagnosis of venous hemodynamic disturbances in the pelvic organs of women, it allows to noninvasively investigate the vascular system in the area of interest and implement a visual and quantitative analysis [*Sonography, 2005; Medvedev M., Rudko G., 2010; Ozerskaya I., 2010*].

Extensive diagnostic capabilities of ultrasound color Doppler mapping allow identification of all the venous alterations in the pelvic organs: ovarian varicose veins, venous thrombosis, post-thrombophlebitic occlusion. The increase of circulating blood volume in the pelvic venous pool at VSPV is accompanied with phlebohypertension extending to the entire venous sector of internal genitalia; this latter, in its turn, is accompanied by phlebectasia development [*Zarochentseva N. et al., 2011*]. Uterine extraorganic veins develop varicose dilation and acquire excessive tortuosity. Echograms show overconvoluted anechogenic structures extending along the edge of the uterus [*Mozes V., Ushakova G., 2006*].

On echograms varicosity of main (internal iliac) veins brings forth the anechogenic formations passing through the internal pelvic walls, with indistinct contours: the main type of VSPV.

The appearance of varicose intraorganic veins (arcuate or curved) within the myometrium of the posterior wall of the uterus traced to the internal orifice of the uterus as linear anechogenic inclusions is considered as an indirect sign of expressed phlebostasia in internal genitalia [*Medvedev M., Rudko G., 2010*].

The main criterion of expressed phlebostasia in the pelvic organs, which plays a crucial role in setting diagnosis of VSPV, is the increasing diameter of the main pelvic venous collectors: uterine, ovarian, internal iliac, and arcuate veins [*Kurjac A., Kupesic S., 2000; Wendorff H. et al., 2007*].

Although, as noted above, the combination of adenomyosis with varicose pelvic veins is not uncommon, there are very few records in the protocols of ultrasound studies indicating the status of the pelvic venous network. However, the conservative treatment of adenomyosis includes thrombotic complications inducing hormones; pelvic varicose veins being diagnosed, there is a challenge for corrective therapy. This shows an importance to develop ultrasonic diagnostic criteria for establishing the pelvic varicose veins in adenomyosis.

MATERIAL AND METHODS

The aim of present study was to examine the pelvic venous system in adenomyosis. Two groups were arranged: control and study.

The study group included 50 females of reproductive age from 29 to 40 years (mean age 35.1±3.2 years) who underwent operative hysterectomy followed by postoperative histological verification of adenomyosis. In the preoperative period these patients were studied by extended transvaginal ultrasound on "VOLUSON - 730 EXPERT" ("GE Healthcare", Austria) ultrasonic device using 3D transvaginal transducer 5-9 *MHz* mode in 2D, 3D with a spatial reconstruction of the vascular system, the color flow mapping, and pulsed Doppler. The criteria for exclusion were as follows: pelvic inflammatory diseases, sexually transmitted infectious diseases, oncology state, ovarian cancer, uterine myoma, hormonal therapy during the preoperative period.

The control group included 20 healthy females of reproductive age from 25 to 38 years (mean age 30.9±4.4 years) who applied for contraception. Venous blood flow was determined under the stable emotional state of the patient and normal blood pressure (120/70±10 *mm Hg*).

In addition to the conventional protocol, complex ultrasound study included detection of diameter of ovarian, uterine, arcuate, and internal iliac veins, detection of blood flow velocity in the uterine and internal iliac veins.

In order to standardize the diagnosis and apply differential approach to treatment A.E. Volkov and associates (2000) classified the varicose pelvic veins depending on the diameter of dilated vessels and lo-

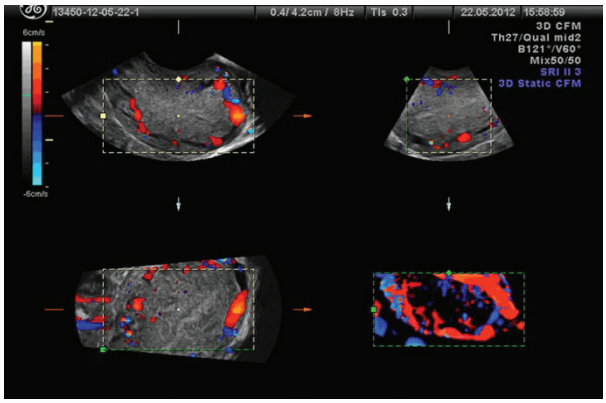

FIGURE 1. *Expanded arcuate veins (three-dimensional reconstruction).*

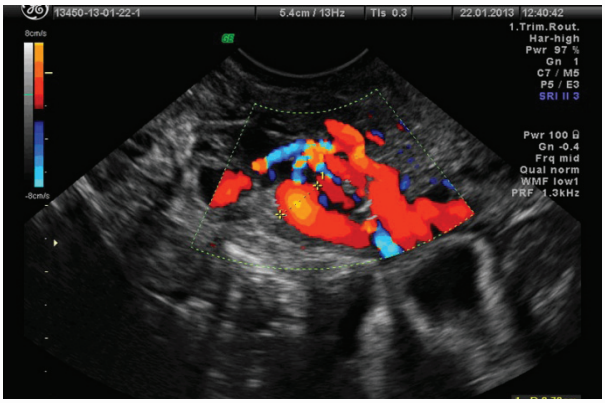

FIGURE 2. *Expansion and tortuosity of extraorganic veins of the uterus.*

calization of venous ectasia according to grades:

Grade 1: vein diameter is below 5 *mm* (any pelvic venous plexus), "corkscrew" motion of the vessel;

Grade 2: the diameter of veins is 6-10 *mm* in total pattern of varicose veins, loose ectasia of ovarian plexus, varicose parametrial veins, varicose arcuate venous plexus of the uterus;

Grade 3: vein diameter >10 *mm* in total pattern varicose or trunk type parametrial localization.

Statistical analysis of survey data was performed using MS Excel 2010. The mean (M) values and standard deviation (SD) were determined. The significance of differences was determined using Student's t-test. The difference between mean values was considered significant at $p<0.05$.

RESULTS AND DISCUSSION

The results obtained showed that a significant number of patients with adenomyosis (n=42, 84%) presented with varicose intraorganic (arcuate) veins in the thickness of the myometrium (Figure 1). In 12 (24%) of cases phlebectasies of extraorganic

TABLE 1.

Ultrasound parameters of pelvic veins in healthy females and females with adenomyosis (M±m)

Pelvic Veins	diameter in mm		blood flow velocity, cm/sec	
	control group, n=20	main group, n=50	control group, n=20	main group, n=50
Internal iliac:				
right	8.1±1.0	12.6±3.8	10.8±2.3	4.0±0.9*
left		12.7±3.9		3.6±0.8*
ovarian:				
right	2.3±0.7	5.6±1.4	6.5±1.5	2.9±0.6*
left		6.0±1.4	5.6±1.3	2.8±0.6*
uterine:				
right	5.3±1.0	10.3±3.4	6.76±2.3	1.8±0.4*
left		11.0±3.5	6.3±2.0	1.7±0.3*
arcuate**	1.5±0.3	3.7±1.2	6.2±1.2	1.5±0.3*

*Notes: * - differences significant at $p<0.05$; ** - for the control group n=19.*

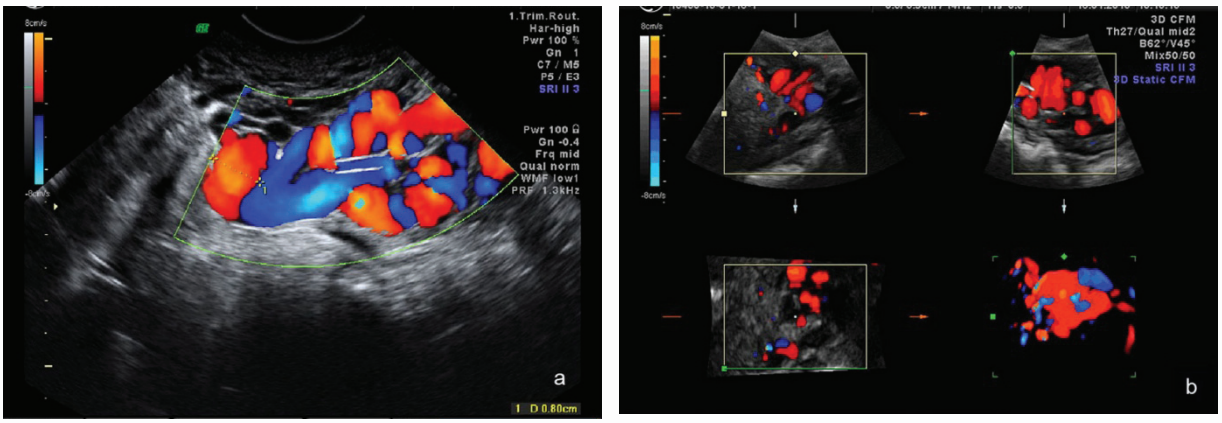

FIGURE 3. *Total dilation of pelvic veins a) in adenomyosis; b) three-dimensional reconstruction of the vascular bed.*

veins of the uterus, which performed excessive tortuosity (Figure 2), were also observed. Among the control group, the expansion of intraorganic arcuate veins was discovered only in one patient, who had no complaints.

Data on disorders of venous hemodynamics in surveyed patients with adenomyosis are presented in Table.

As revealed in the study group, 4 (8%) females had isolated extension of ovarian veins, 14 (28%) had the combined expansion of ovarian, uterine, and arcuate veins, and 32 (64%) women – total dilation of the pelvic veins (Figure 3).

Thus, the results obtained allow concluding that patients with adenomyosis showed expressed phlebostasia, which was expressed in increasing diameter of main venous collectors: uterine, ovarian, curved, and internal iliac veins. Furthermore, significant reduction in blood flow velocity ($p<0.05$) was observed in the vessels studied. Data of ultrasonic study should be considered when designing treatment strategy in patients with adenomyosis: it is recommended to apply phlebotonic drugs in conservative therapy, while surgery is choice of medical management in expressed total varicosities of pelvic veins.

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