

Transvaginal Echography in Assessing Cyclic Changes in Endocervix in Women of Reproductive Age

Abdullayev R Ya*, Sibihankulov AH and Abdullayev RR

Kharkiv Medical Academy of Postgraduate Education, Kharkiv, Ukraine.

*Corresponding author

Abdullayev R Ya, Kharkiv Medical Academy of Postgraduate Education, Kharkiv, Ukraine, E-mail: r.abdullaev@bk.ru, rizvanabdullaiev@gmail.com.

Submitted: 22 Aug 2017; Accepted: 28 Aug 2017; Published: 02 Sep 2017

Abstract

Objective: To study the echographic semiotics of endocervix in women of reproductive age in different periods of the menstrual cycle in a transvaginal way.

Materials and methods: The study included 124 gynecologically healthy women aged 19-45 years. Among the surveyed 14 ($11.3 \pm 2.8\%$) had in the history only abortions (group I), 54 ($43.6 \pm 4.5\%$) parturition (group II) and in 56 ($45.1 \pm 4.5\%$) of women was not pregnant (group III). 8 ($6.4 \pm 2.2\%$) women of I group were aged under of 25 years, 6 ($4.8 \pm 1.9\%$)-at the age of 26-35 years. 10 ($8.1 \pm 2.4\%$) women of II group were aged under of 25 years, 26 ($21.0 \pm 3.7\%$)-at 26-35 years, 18 ($14.5 \pm 3.2\%$)-at 36-45 years respectively. 34 ($27.4 \pm 4.0\%$) women of III group were aged under of 25 years, 16 ($12.9 \pm 3.0\%$)-at 26-35 years and 6 ($4.8 \pm 1.9\%$)-at 36-45 years respectively.

Results: The thickness of endocervix in women with a lack of pregnancy was 8.9 ± 1.0 mm, which is significantly ($p < 0.05$) more than in other women. Reduced echogenicity of endocervix on the 8-10th days of the menstrual cycle was noted in $73.2 \pm 5.9\%$ of women who did not have a pregnancy, in $66.2 \pm 5.7\%$ of those who had a history of delivery. The average echogenicity was much more often observed on days 12-14 - in $69.6 \pm 6.1\%$ and $72.1 \pm 5.4\%$ of women, isoechoic on 21-23 days - $76.8 \pm 5.6\%$ and $67.3 \pm 5.7\%$, respectively.

Conclusions: The greatest thickness of endocervix is observed on 12-14 days of the cycle in women with the impossibility of pregnancy. On the 8th-10th days of the cycle, the echogenicity of the endocervix is often reduced, on the 12-14 days of the middle, on the 21-23th days - isoechoic.

Keywords: Transvaginal Echography, Women of Reproductive Age, Endocervix.

Introduction

One of the main methods for examining the cervix is colposcopy and cytological examination. Colposcopy allows to reveal suspicious for neoplasia changes, to conduct a targeted biopsy with the subsequent morphological study. This helps to increase the accuracy of diagnosis of inflammatory and neoplastic diseases [1-2]. Diagnosis of the pathological conditions of endocervix is much more difficult. Cervicospopy does not yet find wide application in the outpatient practice of doctors in the cabinet of the pathology of the cervix. Cytological examination of the cervical canal does not always give a clear idea of the state of the endocervix [3].

Unlike the body of the uterus and ovaries, the cervical echography is used in a limited way, in particular to accurately determine the length of the cervix, the condition of the internal throat, prevent premature birth [4]. If the echography is widely used to assess

cyclic changes in the endometrium, then the state of endocervix is better studied using magnetic resonance imaging (MRI) [5,6].

Careful manipulation of a transvaginal probe during gynecological ultrasound imaging allows the operator to assess the mobility and elasticity of pelvic structures, and analysis of these 'dynamic images' in the context of a patient's symptoms can lead to a more reliable diagnosis than is possible using still ultrasound images or static ultrasonography alone [7]. Recent research in this field, carried out with the help of high-frequency digital transvaginal echography (TV), significantly helped to revise the possibilities of ultrasound diagnosis of the cervix [8].

Objective

To study the echographic semiotics of endocervix in women of reproductive age in different periods of the menstrual cycle in a transvaginal way.

Materials And Methods

The study included 124 gynecologically healthy women aged 19-45 years. Among the surveyed 14 (11.3 ± 2.8%) had in the history only abortions (group I), 54 (43.6 ± 4.5%) parturition (group II) and in 56 (45.1 ± 4.5 %) of women was not pregnant (group III). 8 (6.4 ± 2.2%) women of I group were aged under of 25 years, 6

(4.8 ± 1.9%)-at the age of 26-35 years. 10 (8.1 ± 2.4%) women of II group were aged under of 25 years, 26 (21.0 ± 3.7%)-at 26-35 years, 18 (14.5 ± 3.2%)-at 36-45 years respectively. 34 (27.4 ± 4.0%) women of III group were aged under of 25 years, 16 (12.9 ± 3.0%)-at 26-35 years and 6 (4.8 ± 1.9%)-at 36-45 years respectively (Table 1).

Table 1: Distribution of healthy women surveyed by age

Age of patients	Those who had only an abortion in the anamnesis Group I	Those who had birth Group II	Absence of possibility of pregnancy Group III
19-25	8 (6,4±2,2%)	10 (8,1±2,4%)	34 (27,4±4,0%)
26-35	6 (4,9±1,9%)	26 (21,0±3,7%)	16 (12,8±3,0%)
36-45	-	18 (14,5±3,2%)	6 (4,9±1,9%)
Total 124 (100%)	14 (11,3±2,8%)	54 (43,6±4,5%)	56 (45,1±4,5%)

Results

In transvaginal ultrasound, the cervix of the uterus was visualized in longitudinal and transverse projection. In the middle third of the cervix, the total thickness of the endocervical leaflets and its echostructure were determined on the 4th, 6th, 8th, 10th, 12th and 21st days of the cycle (Table 2).

Table 2: Ultrasonographic parameters of endocervix in different periods of the menstrual cycle

Ultrasonographic parameters of endocervix	Menstrual cycle days	Those who had only an abortion in the anamnesis Group I (n = 14)	Those who had birth Group II (n = 54)	Absence of possibility of pregnancy Group III (n = 56)
The total thickness of the endocervical leaflets, Te, mm	4-6- th	4,8±0,5mm	5,2±0,6mm	5,4±0,6mm
	8-10- th	5,6±0,6mm	5,7±0,6mm	8,1±0,9mm P<0,05
	12-14- th	5,8±0,6mm	6,1±0,7mm	8,9±1,0mm P<0,05
	21-23- th	4,9±0,5mm	4,6±0,5mm	5,6±0,7mm
Reduced echogenicity of endocervix	4-6- th	5 (35,7±12,6%)	17 (31,5±6,3%)	21 (37,5±6,5%)
	8-10- th	8 (57,1±13,2%)	35 (64,8±6,5%)	41 (73,2±5,9%)
	12-14- th		5 (9,3±4,0%)	2 (3,6±2,5%)
	21-23- th	3 (21,4±11,0%)	8 (14,8±4,8%)	6 (10,7±4,1%)
Moderate echogenicity of endocervix	4-6- th	3 (21,4±11,0%)	10 (18,5±5,3%)	3 (5,4±3,0%)
	8-10- th	2 (14,3±9,4%)	9 (16,7±5,1%)	12 (21,4±5,5%)
	12-14- th	11 (78,6±5,5%)	39 (72,2±6,1%)	39 (69,6±6,1%)
	21-23- th	3 (21,4±11,0%)	10 (18,5±5,3%)	7 (12,5±4,4%)
Increased echogenicity of endocervix	4-6- th			
	8-10- th	-	-	-
	12-14- th	1 (7,1±6,9%)	4 (7,4±3,6%)	7 (12,5±4,4%)
	21-23- th			
Isoechoic endocervix	4-6- th	6 (42,9±13,2%)	27 (50,0±6,8%)	32 (57,1±6,6%)
	8-10- th	4 (28,6±12,1%)	10 (18,5±5,3%)	3 (5,4±3,0%)
	12-14- th	2 (14,3±9,4%)	10 (18,5±5,3%)	8 (14,3±4,7%)
	21-23- th	8 (57,1±13,2%)	36 (66,7±6,4%)	43 (76,8±5,6%)
Clear contours of endocervix	4-6- th	5 (64,3±12,8%)	16 (29,6±6,2%)	21 (37,5±6,5%)
	8-10- th	11 (78,6±11,0%)	45 (83,3±5,1%)	49 (87,5±4,4%)
	12-14- th	13 (92,8±6,9%)	48 (88,9±4,3%)	52 (92,9±3,4%)
	21-23- th	6 (42,9±13,2%)	22 (40,7±6,7%)	17 (30,4±6,1%)

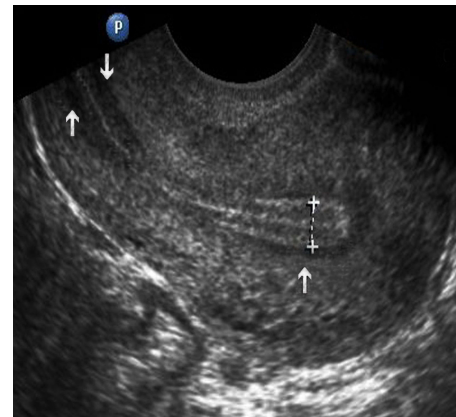
Fuzzy contours of endocervix	4-6- th	9 (64,3±12,8%)	38 (70,4±6,2%)	35 (62,5±6,5%)
	8-10- th	3 (21,4±11,0%)	9 (16,7±5,1%)	7 (12,5±4,4%)
	12-14- th	1 (7,1±6,9%)	6 (11,1±4,3%)	4 (7,1±3,4%)
	21-23- th	8 (57,1±13,2%)	32 (59,3±6,7%)	39 (69,6±6,1%)

As can be seen from the table, the largest total thickness of endocervix was found on days 12-14 and slightly higher than the 8-10th day of the cycle. In women who did not have a pregnancy, the thickness of the endocervix was significantly ($p < 0.05$) higher than in the other groups. Further analysis of the functional state of the ovaries and endometrium among women who did not have a pregnancy in 21 (37.5±6.5%) cases revealed various types of disorders - luteinization of the neovulatory follicle, luteal phase insufficiency, lack of a ripening follicle.

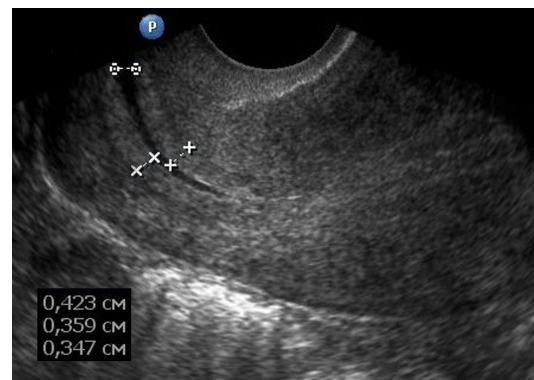
In all groups on the 8th-10th and 12th-14th days of the cycle, the cervical canal widened, the largest of which was among women who had a history of childbirth. In this regard, the total thickness of the mucosa in the transverse section was determined without taking into account the width of the cervical canal. Therefore, the true total thickness of the leaves was, on average, 3-5 mm less than the anteroposterior size of the endocervix along with the cervical canal, defined as the distance between the side walls on its transverse section.

In addition to quantitative parameters, we determined such qualitative parameters of endocervix as echogenicity, clarity of contours for the corresponding days of the cycle. Echogenicity of endocervix is assessed as reduced, medium, increased, isoechoic, and contours - clear and fuzzy. The frequency of occurrence of these ultrasound symptoms among all groups of women is calculated for the corresponding days of the cycle.

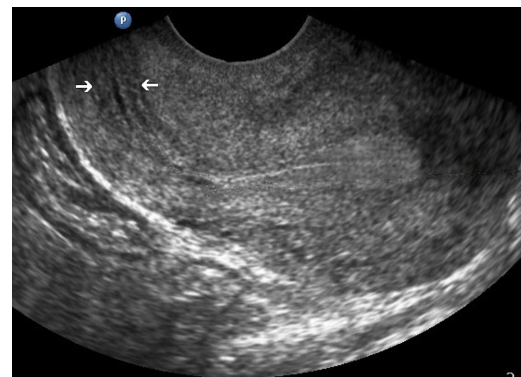
As can be seen from Table 2, the best visualization of endocervix was carried out on the 8th-10th and 12th-14th days of the menstrual cycle. At the same time on the 8th-10th day, the decreased echogenicity was reliably registered more often, and on the 12-14th day of the cycle the mean echogenicity was recorded. Among women who did not have a pregnancy, the frequency of reduced endocervical echogenicity on the 8th-10th days of the cycle was 73.2±5.9%, in those with a history of only abortions, 57.1±13.2%, and those with births had 64,8±6,5% of cases, at the same time, on the 4th-6th days of the cycle, a decreased echogenicity was observed in 37.5±6.5%, 35.7±12.6% and 31,5±6,3% of cases respectively. The frequency of reduced echogenicity of endocervix on days 8-10 was significantly greater than on days 4-6 of the cycle ($p < 0.01$). For the 21-23 days of the cycle, the most characteristic is the isoechoic structure of endocervix, it was recorded in 76.8±5.6%, 57.1±13.2% and 66,7±6,4% of cases among women of all groups respectively. The frequency of occurrence of a clear contour of endocervix on the 8th-10th and 12th-14th days of the cycle approximated 90%, which was higher than the results of other cycle days in all groups of women with high reliability ($p < 0.001$) (Figures 1-3).



Figures 1: Longitudinal view of the body and cervix on the 9th day of the menstrual cycle. A homogeneous hypoechoic endocervix is visualized (left arrows).



Figures 2: Longitudinal view of the body and cervix on the 14th day of the menstrual cycle. The average echogenicity of the endocervix is determined, the clarity of its contours, the maximum thickness of the leaves is 3.59 mm.



Figures 3: Longitudinal view of the body and cervix on the 23rd day of the menstrual cycle. Isoechoic endocervix is determined (arrows).

Conclusion

1. The greatest thickness and volume of the cervix occurs in women of reproductive age who had a history of childbirth. In menopause, these indicators are reliably reduced.
2. Among women of reproductive age who did not have a history of pregnancy, the largest thickness of endocervix is observed on the 12-14 days of the cycle.
3. On the 8-10th days of the cycle, the echogenicity of the endocervix is often reduced, on the 12-14 days of the middle, on the 21-23th days - isoechoic.

References

1. Moss SF, Blaser MJ (2005) Mechanisms of Disease: Inflammation and origins of cancer. *Nat Clin Pract Oncol* 2: 90-97.
2. Hammes LS, Tekamal RR, Naidu P, Edelweiss MI, Kirma N, et al. (2007) Macrophages, inflammation and risk of cervical intraepithelial neoplasia (CIN) progression - Clinicopathological correlation. *Gynecol Oncol* 105: 157-165.
3. Apgar BS, Brotzman G, Am Fan (2004) Management of cervical cytologic abnormalities. *Physician* 5: 1905- 1916.
4. Roh HJ, Jung CH, Chun S, Cho HJ (2013) Comparison of cervical lengths using transabdominal and transvaginal sonography in midpregnancy. *J Ultrasound Med* 32: 1721-1728.
5. Hauth EA, Jaeger HJ, Libera H, Lange S, Forsting M. MR (2007) imaging of the uterus and cervix in healthy women: Determination of normal values. *European radiology* 17: 734-742.
6. Yonglan H, Ding N, Xue H.D, Jin Z, Hao S, et al. (2014) Beijing/CN. Cyclic changes of the female reproductive system in young and middle-aged women during the menstrual cycle: an initial 3T MRI study based on T2 3D-space sequence. *ECR*.
7. Testa AC, Holsbeke CV, Mascilini F, Timmerman D (2009) Dynamic and interactive gynecological ultrasound examination. *Ultrasound Obstet Gynecol* 34: 225-229.
8. Abdullaev R Ya, Kaminsky VV, Grishchenko OV, Sibikhankulov AKh (2012) Transvaginal echography in pathology of the cervix. *Kharkiv*.
9. ACOG Committee on Practice Bulletins-Gynecology (2009) ACOG Practice Bulletin no. 109: Cervical cytology screening. *Obstet Gynecol* 114: 1409-1420.
10. Kido A, Kataoka M, Koyama T, Yamamoto A, Saga T, et al. (2010) Changes in apparent diffusion coefficients in the normal uterus during different phases of the menstrual cycle. *The British journal of radiology* 83: 524-528.

Copyright: ©2017 Abdullayev R Ya, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.