



Comparison of Transabdominal and Transvaginal Sonography in Measuring Cervical Lengths in Midpregnancy

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ÖZET

Midtrimesterde ultrasonografik olarak transabdominal ve transvajinal servikal uzunluk ölçümü karşılaştırılması

Amaç: Midtrimesterde servikal uzunluğun transabdominal ve transvaginal sonografik olarak ölçülmesinin karşılaştırılması.

Gereç ve Yöntem: Bu retrospektif çalışma, bir üniversitede hastanesinde gerçekleştirılmıştır. Çalışmaya 18-20. haftadaki gebe kadınlar dahil edildi. Bu hastalarda ultrasonografik olarak transabdominal ve transvaginal servikal uzunluk ölçüldü.

Bulgular: 1150 gebe kadından 1050 hasta, çalışmaya dahil edildi. Ortalama maternal yaş, servikal uzunlukları: transabdominal ve transvaginal sonografi gruplarında sırasıyla 33 ± 6.8 yıl, 33 ± 5.4 yıl ve 36.5 ± 7.2 mm, 37.2 ± 7.0 mm idi. İki grup arasında istatistiksel fark yoktu ($p > 0.05$).

Sonuç: Düşük riskli populasyonda transabdominal olarak servikal uzunluk ilk ölçüm olarak kullanılabilir.

Anahtar kelimeler: Servikal uzunluk, preterm eylem, transabdominal sonografi, transvaginal sonografi

ABSTRACT

Comparison of transabdominal and transvaginal sonography in measuring cervical lengths in midpregnancy

Objective: To compare the transabdominal and transvaginal ultrasonographic measuring of cervical length in midtrimester of pregnancy.

Material and Methods: This retrospective study was performed in a university hospital. The pregnant women between 18-20 weeks gestation were included to the study. Transabdominal and transvaginal ultrasonographic measurement of cervical length were measured in these patients.

Results: Among 1150 pregnant women 1050 patients were included to the study. The mean maternal age, cervical lengths were 33 ± 6.8 years and 33 ± 5.4 years and 36.5 ± 7.2 mm, 37.2 ± 7.0 mm in transabdominal and transvaginal sonography group respectively. There was no significant difference between these two groups ($p > 0.05$).

Discussion: Transabdominal measurement of cervical length may be used for the initial measurement of cervical length in low risk population.

Key words: Cervical length, preterm labour, transabdominal sonography, transvaginal sonography

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INTRODUCTION

Preterm birth is an important cause of perinatal morbidity and mortality (1). Although there are improvements in the management of preterm labour over the last decades, the rate of preterm birth has not

declined (2). There are some risk factors for predicting preterm labour, one of the most important risk factors is the history of preterm birth (3-5). The association of cervical shortening and spontaneous preterm delivery is known today and measuring of cervical length during the 18 to 23 weeks scan transvaginally is accepted the best method for predicting preterm labour (6). Today transvaginal (TV) sonography is used for cervical measurement but sometimes it takes up time and needs transvaginal equipment. In contrast, transabdominal (TA) sonography is a part of routine antenatal checkup without necessity of any cost and extra effort.

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The aim of this study is to compare the transabdominal sonography with transvaginal sonography for measuring cervical length in midtrimester in general obstetric population.

MATERIAL AND METHODS

This retrospective study was performed in the department of perinatology unit of a university hospital. The women who attended for a routine anomaly scan at 18-20 weeks gestation between January 2013 to January 2015 with singleton pregnancy were involved for the study. Women who had a diagnosis of preterm labour, premature rupture of membranes, previous preterm labour history or an incompetent internal os of cervix in the current pregnancy who used progesterone and who smoked were excluded.

After performing routine anomaly scan TA cervical length was measured, followed by TV sonography of cervical length. The cervical length was measured transabdominally while the maternal bladder was hemifull. If the internal or external os was not clear on TA sonography because of obesity or other factors, the case was excluded (Figure 1).



Figure 1: Transabdominal sonographic measurement of the cervical length



Figure 2: Transvaginal sonographic measurement of the cervical length

In women with a full or partially full bladder TV measurement of cervical length was made after voiding of urine. Cervical length measurements on TV sonography were obtained in the dorsal supine position with bended knees. A vaginal probe covered by a condom was inserted into the anterior fornix of the vagina without excessive pressure to the cervix (Figure 2).

The sagittal view of the cervix was obtained with the echogenic endocervical mucosa imaged along the length of the canal. The echogenic endocervical mucosa was used as a guide for internal os. Calipers were placed at the external os and at the internal os. Three measurements of the cervical length were made either TV or TA sonography and the most suitable measurement for each patient was recorded.

Cervical length measurements were obtained with TV probe and a TA probe, Voluson P8, GE Healthcare. All sonographic measurements were conducted by a single physician. Images were stored electronically on viewpoint archiving and communication system.

The correlation of TA and TV measurements were assessed for every patient. The position which the fetal part came and pressed the cervix was corrected by swinging the maternal abdomen.

A paired t test and Pearson correlation were used to compare the mean cervical lengths measured by transabdominal and transvaginal sonography. SPSS 11 was used for statistics and $p < 0.05$ was considered significant.

RESULTS

A total of 1150 pregnant women who had 18-20 weeks of gestation visited our clinic during the study period were accepted for the study. Of them 1050 patients (91%) were included in this study according to our inclusion criteria. Demographic parameters of the patients were given in Table 1. The cervix was visualized and its length was measured transvaginally in 930 patients (89%). One hundred and twenty patients (11%) refused to examine transvaginally. On the transabdominal sonography group it was impossible to measure the cervical length in 56 patients (5.3%) because the internal os was not seen on the abdominal scan. Because the cervix was retroflex (35%), women were obese (45%) and fetal presentation parts overlaid the internal os (20%).

The cervical length was measured transabdominally in 994 patients (94.7%).

The mean maternal age was 33 ± 6.8 years (21-48 years) in transabdominal and 33 ± 5.4 years in transvaginal group. Fifty-four percent of women in TA and 55% of women were nulliparous in TV group. The mean gestation of ultrasound assessment was 19 ± 1.4 weeks in transabdominal and 19 ± 1.2 weeks in transvaginal group (Table 1).

The mean cervical lengths were 36.5 ± 7.2 mm on transabdominal sonography and 37.2 ± 7.0 mm on transvaginal sonography. There was no significant difference between these means ($p > 0.05$) (Table 1).

There was no significant difference in cervical length between transabdominal and transvaginal assessment according to fetal presentation (Table 2).

The 5th percentile transabdominal cervical length was 26.2 mm and the transvaginal length was 24.6 mm. The discrepancy between TV and TA cervical length assessment was significantly greater among primiparous women than multiparous women ($p < 0.05$).

There was no correlation between maternal age and cervical length discrepancy ($p > 0.05$; $r = 0.75$). The discrepancy between TV and TA cervical measurements was not correlated with gestational age ($p > 0.05$).

DISCUSSION

Preterm labour is a leading cause of neonatal morbidity and mortality. If a preterm labour begins, today there is no drug to stop the labour (1). For this reason to predict preterm labour and to take precaution are the main goal of preterm labour management.

It is known that the risk of preterm birth is increased in women with a short cervix during pregnancy. The cervical length less than 25 mm is associated with preterm birth (7).

Hassan et al showed that women with cervix which is shorter than 15 mm has 50 % risk of preterm birth (8). Similar results were reported in Heath and Moroz's studies (7,9). Although the correlation of short cervix and preterm labour, routine screening of cervical length in pregnant women is not offered because of its insufficiency for detecting preterm labour completely (10-12). Because preterm labour is a complex process and multifactors may cause preterm labour (13,14).

Transvaginal sonography for the cervical length measurement is offered mostly (13). But transvaginal

Table 1: Demographic parameters of pregnant women

	Transabdominal Group N=994	Transvaginal Group N=930	p value
Mean Maternal Age (year)	33 ± 6.8	33 ± 5.4	NS
Mean Gestational Weeks (weeks)	19 ± 1.4	19 ± 1.2	NS
Multiparous Women (%)	46	45	NS
Nulliparous Women (%)	54	55	NS
Mean Cervical Length (mm)	36.5 ± 7.2	37.2 ± 7.0	NS

Table 2: Mean cervical lengths between transabdominal and transvaginal cervical assessment for each fetal condition

	Transabdominal Group	Transvaginal Group	p value
Mean Cervical Length (mm)	36.5 ± 7.2	37.2 ± 7.0	NS
Cervical Length in Vertex Presentation (mm)	35.5 ± 7.0 (N=548)	36.2 ± 7.1 (N=540)	NS
Cervical Length in Breech Presentation (mm)	39.7 ± 7.5 (N=446)	39.9 ± 7.0 (N=390)	NS

sonography can make the women uncomfortable. The women should change their clothes for transvaginal sonography and it takes time to change position for transvaginal sonography.

In our study 11% of patients refused to be examined by transvaginal sonography as in Heath and Braithwaite's reports (9,15). Of course transabdominal sonography was accepted by every patients but the cervical lenght could not be measured in 56 patients (5.3%) in our study. This rate is below the literature. In To's report the visualization of the cervix by transabdominal sonography was 49% (16).

Transabdominal approach is possible when the bladder is full. The full bladder can make the cervix longer than the original lenght. This is the weakness of transabdominal measurement of the cervix. If the woman is obese, the cervix is retropose and fetal presentation parts overlay the internal os, the visualization of cervix will not be reliable.

Anderson et al. reported the same point that when the bladder is empty, it will be difficult to examine the cervix as in our study (17).

In our study the cervical lenght difference between TA and TV sonography was greater in primiparous women than in multiparous women. The delivery may cause deformation of the cervix and the edges of internal

and external cervical osseous may be determined clearly in multiparous women by the help of delivery.

This study was planned to compare cervical lenghts measured with transvaginal and transabdominal sonography in women with low risks of preterm birth in midpregnancy. Although there was no significant difference between the two methods, the cervical lenghts measured with transabdominal sonography were shorter than cervical lenghts measured with transvaginally.

Our result is compatible with previous findings. Stone et al reported that transabdominal measurements were less than transvaginal. They also offered a cutoff value of cervical lenght for preterm labour as 27 mm (18). This cutoff value was 26 mm in our study.

The limitations of our study were not to include the delivery information about labour for prediction of preterm ones. Further prospective studies are ongoing about this subject.

This finding can direct us that transabdominal sonography may be used for the initial measurement of cervical lenght safety in low risk population. But if a woman has a history of preterm labour or if we measure cervix, shorter than 26 mm according to our data, transvaginal sonographic measurement of cervix should be done.

REFERENCES

- Committee on Understanding Premature Birth and Assuring Healthy Outcomes BoHSP. Preterm birth: causes, consequences and prevention. Washington, DC: The National Academies Press; 2006.
- Joseph KS, Kramer MS, Marcoux S, Ohlsson A, Wen SW, Allen A, Platt R. Determinants of preterm birth rates in Canada from 1981 through 1983 and from 1992 through 1994. *N Engl J Med* 1998; 339: 1434-1439.
- Creasy RK, Gummer BA, Liggins GC. System for predicting spontaneous preterm birth. *Obstet Gynecol* 1980; 55: 692-695.
- Mercer BM, Goldenberg RL, Das A, et al. The preterm prediction study: a clinical risk assessment system. *Am J Obstet Gynecol* 1996; 174: 1885-1893; 1893-1895.
- Bloom SL, Yost NP, McIntire DD, Leveno KJ. Recurrence of preterm birth in singleton and twin pregnancies. *Obstet Gynecol* 2001; 98: 379-385.
- Marren AJ, Mogra R, Pedersen LH, Walter M, Ogle RF, Hyett JA. Ultrasound assessment of cervical lenght at 18-21 weeks' gestation in an Australian obstetric population: Comparison of transabdominal and transvaginal approaches. *Aust N Zealand J Obstet Gynecol* 2014; 54: 250-255.
- Moroz LA, Simhan HN. Rate of sonographic cervical shortening and the risk of spontaneous preterm birth. *Am J Obstet Gynecol* 2012; 206: 234e1-234e5.
- Hassan SS, Romero R, Berry SM, et al. Patients with an ultrasonographic cervical lenght < or = 5 mm have nearly a 50% risk of early spontaneous preterm delivery. *Am J Obstet Gynecol* 2000; 182: 1458-1467.
- Heath VC, Southall TR, Souka AP, Elisseeou A, Nicolaides KH. Cervical lenght at 23 weeks of gestation: prediction of spontaneous preterm delivery. *Ultrasound Obstet Gynecol* 1998; 12: 312-317.
- Mateus J. Clinical management of the short cervix. *Obstet Gynecol Clin North Am* 2011; 38: 367-385.
- Berghella V, Baxter JK, Hendrix NW. Cervical assessment by ultrasound for preventing preterm delivery. *Cochrane Database Syst Rev* 2009; 3: CD007235.
- Lim AC, Goossens A, Ravelli AC, Boer K, Bruinse HW, Mol BW. Utilizing new evidence in the prevention of recurrent preterm birth. *J Matern Fetal Neonatal Med* 2011; 24: 1456-1460.
- Roh HJ, Ji YI, Jung CH, Jeon GH, Chun S, Cho HJ. Comparison of cervical lenghts using transabdominal and transvaginal sonography in midpregnancy. *J Ultrasound Med* 2013; 32: 1721-1728.

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14. Karis JP, Hertzberg BS, Bowie JD. Sonographic diagnosis of premature cervical dilatation: potential pitfall due to lower segment contractions. *J Ultrasound Med* 1991; 10: 83-87.
15. Braithwaite JM, Economaides DL. Acceptability by patients of transvaginal sonography in the elective assessment of the first trimester fetus. *Ultrasound Obstet Gynecol* 1999; 7: 91-93.
16. To MS, Skentou C, Cicero S, Nicolaides KH. Cervical assessment at the routine 23-weeks' scan: problems with transabdominal sonography. *Ultrasound Obstet Gynecol* 2000; 15: 292-296.
17. Anderson HF. Transvaginal and transabdominal ultrasonography of the uterine cervix during pregnancy. *J Clin Ultrasound* 1991; 19:77-83.
18. Stone PR, Chan EH, McCowan LM, Taylor RS, Mitchell JM. Transabdominal scanning of the cervix at the 20-week morphology scan: comparison with transvaginal cervical measurements in a healthy nulliparous population. *Aust NZ J Obstet Gynecol* 2010; 50: 523-527.