

Transabdominal Versus Transvaginal Sonographic Evaluation of Trachleodynamics during Pregnancy – A Prospective Study

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Summary

Fifty pregnant women were evaluated by serial clinical and ultrasonographic examination of cervix from 18 weeks to 34 weeks of pregnancy, in this study.

Cervical length, width, internal os dimensions and appearance were visualized by transabdominal and transvaginal sonography. These women were followed up till delivery.

Progressive increase in cervical length was observed from 18 weeks upto 26 weeks followed by a decrease from 30 weeks upto 34 weeks of gestation. A significant difference was found in values of cervical length obtained on transabdominal sonography, from those obtained by transvaginal ultrasonography. The cervical length value obtained by transabdominal sonography (TAS) was consistently higher than that obtained on transvaginal sonography (TVS).

Introduction

The function of cervix during pregnancy is competence. When this function is lost, pregnancy ends in either abortion or preterm labour.

Clinical assessment of the cervix is inaccurate as the early changes do occur in the upper cervix which is often left undiagnosed. Ultrasound assessment of cervical changes have recently entered the armamentarium of modern obstetrics and it may provide a key to early diagnosis of preterm labour.

However, racial differences in the length and width of the cervix calls for need to set nomograms of cervical characteristics during pregnancy. This study was undertaken mainly to evaluate two different routes of sonography in the study of cervix during pregnancy.

Subjects and Methods

A group of 50 pregnant women with normal singleton pregnancy and known last menstrual period were counselled and their willing participation was confirmed in the study.

The study period was from 18 weeks of gestation upto 34 weeks of gestation and the women were examined at an interval of 4 weeks. They were subjected to serial clinical and ultrasonographic study. All of them were followed up till term and pregnancy outcome was noted.

The sonologist was blinded to clinical examination findings. Statistical analysis was done using mean and unpaired 't' test. $P < 0.05$ was considered statistically significant.

Table I
Correlation of Gestational Weeks with Sonographic Measurement of Cervical Length

Group	Weeks of Gestation	n (100)	TAS Cervical Length (mm) (± 1 S.D.)	TVS Cervical Length (mm) (± 1 S.D.)	P Value
1.	18-21	22	32.63 (5.38)	31.68 (3.85)	<0.05
2.	22-25	29	32.89 (5.37)	31.96 (3.20)	<0.01
3.	26-29	20	35.70 (5.84)	32.70 (4.85)	<0.01
4.	30-33	20	32.10 (5.59)	32.45 (4.28)	<0.01
5.	34	09	32.66 (5.47)	32.55 (3.67)	<0.05
Mean			33.19 (1.42)	32.26 (0.43)	<0.05

Table-II
Gestational weeks and sonographic measurement of cervical width

Group	Weeks of Gestation	n(100)	TASCervical Width (mm) (± 1 S.D.)	TVS Cervical Width (mm) (± 1 S.D.)	P Value
1.	18-21	22	22.09 (4.5)	24.68 (2.76)	<0.001
2.	22-25	29	25.31 (3.35)	28.2 (4.16)	<0.001
3.	26-29	20	26.65 (2.55)	26.3 (2.34)	<0.001
4.	30-33	20	24.0 (3.36)	25.0 (2.24)	<0.01
5.	34	09	24.88 (3.35)	25.88 (3.17)	<0.05
Mean			24.58 (1.34)	25.81 (1.47)	<0.05

Table III
Sonographic Measurement of internal os diameter correlated with gestational weeks.

Group	Weeks of Gestation	n (100)	TAS internal OS diameter (mm) (± 1 S.D.)	TVS internal OS diameter (mm) (± 1 S.D.)	P Value
1.	18-21	22	3.36 (3.03)	3.63(1.95)	NS
2.	22.25	29	3.68 (2.49)	3.89 (2.05)	NS
3.	26-29	20	4.35 (1.81)	4.05 (1.84)	NS
4.	30-33	20	4.2 (3.13)	4.50 (2.58)	NS
5.	34	09	6.12 (2.5)	4.66 (2.82)	NS
Mean			4.34 mm	4.146mm	NS

N.S. = Not significant

Results

Cervical length measured by transabdominal scan ranged between 32.10 mm to 35.70 mm with a mean value of 33.19 mm (Table I). These values were found to be significantly higher than those obtained in the same group of women by transvaginal scan, ranging from 31.68 mm to 32.70 mm with a mean value on TVS of 32.26 mm.

These mean values of cervical length obtained in this study group correlate well with the mean value of 34 mm found in Japanese women (Murukawa et al, 1993). In contrast, cervixes of Caucasian women during pregnancy were shown to be approximately 10 mm longer (Brieger et al, 1997).

A progressive increase in cervical length was observed upto 26 weeks of gestation (Table I) and then decreasing upto 34 weeks of gestation. Other studies too mention similar observations (Kushnir et al, 1990; Brieger et al, 1997).

Cervical width as measured on TVS was significantly different from that measured on TAS with a progressive decrease observed over time (Table II).

Values of internal os diameter obtained on TAS were comparable to those obtained on TVS (Table III).

During the course of this study no significant difference was observed in cervical length or width

measurements between primigravid and multigravid women.

Using measurements of cervical length obtained on TVS as a "gold standard", comparison with measurements on TAS and digital examination both did reflect considerable difference.

Greater reproducibility and accuracy of sonographic estimation of cervical length has been demonstrated in previous studies when compared to digital examination (Lim et al, 1992; Gomez et al, 1994; Berghella et al, 1997).

Discussion

Since the onset of labour at any time in pregnancy may not be a sudden event, but rather the culmination of many silent uterine and cervical changes, ultrasonography may detect these changes early and provide adequate warning of preterm labour.

Additionally previous observations of racial differences in cervical characteristics of pregnant women strongly indicate the need to develop normograms in population with different racial background.

This study thus observed changes in cervical measurements throughout pregnancy which did not appear to correlate with gravidity of the women but did correlate with the weeks of gestation-showing an initial increase in length upto 26 weeks of gestation followed by a progressive decrease upto 34 weeks of gestation. However, no reference could be obtained from existing literature to explain this phenomenon.

In this group of women, two out of the 50 delivered preterm babies though serial scanning had not demonstrated any significant cervical changes. On the other hand, two women who showed dilatation of internal os >10 mm (13 mm and 14 mm respectively) and U shaped lower segment and upper cervix, on ultrasonography responded to initiation of bed rest and changes reverted to normal, the women subsequently delivering at term.

The inherent disadvantages of IAS such as amount of bladder filling, patient discomfort, lower resolution of abdominal probe and presence of intervening anatomical structures, can be overcome by endovaginal probe. Thus to say that the palpating finger is the "eye of the gynaecologist" holds true now as the finger receives its visual power from the endovaginal probe.

Further large scale studies would surely prove helpful to establish nomograms for cervical characteristics during pregnancy.

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