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Full Length Research Paper

Prediction of Preterm Labor by Transvaginal Sonography of Cervical Gland Area

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Abstract
Preterm birth is associated with neonatal morbidity and mortality. Transvaginal ultrasound is a non-invasive technique to evaluate the cervix before pregnancy termination. transvaginal ultrasonographic measurement could represent a more accurate assessment of the cervix than digital examination because the supravaginal portion of the cervix usually comprises about 50% of cervical length, but this is highly variable among individuals. This portion is difficult to assess digitally especially if the cervix is closed, in addition, effacement is subjective and can vary considerably among examiners. The main goal of this study is to evaluate the relationship between the cervical gland area by transvaginal ultrasonography and preterm delivery. This study was performed on 150 singleton pregnant women in the department of obstetrics and gynecology, Gammalia central hospital. All patients are subjected to full history taking, general examination, and abdominal examination. Transvaginal ultrasonography was performed from 16 to 31 weeks of gestation. During the study, there were high statistically significant difference between cervical gland area according body mass index. Cervical gland area more absent with increase body mass index. There was no statistically significant difference between cervical gland area as regard to parity. There was high statistically significant difference between cervical gland area as regard to previous abortion. CGA was detected in 95.6 % of term pregnancies comparing with 13 % in preterm group; which was significantly different (P value = 0.001). Prediction of preterm delivery is an important challenge because of the need for special perinatal care. It seems cervical gland area detection may be used as a helpful marker for this purpose

Keywords: *ultrasound-cervix-preterm delivery*

Introduction

Preterm birth is mainly caused by preterm labor and intact membranes (PTL) and preterm premature rupture of membranes (preterm-PROM), which show different clinical manifestations. However, ascending intra-uterine infection is related to both PTL and preterm-PROM, and is known to sequentially involve the chorio-decidua (chorio-deciduitis) and the amnion (amnionitis) in the extra-placental membranes, and the chorionic plate (chorionic plate inflammation) and the umbilical cord (funisitis) in the placenta *(Park et al., 2016).*Premature birth, commonly used as a synonym for preterm birth, refers to the birth of a baby before the developing organs are mature enough to allow normal postnatal survival *(Goldenberg et al., 2008).*Children who are born prematurely have higher rates of cerebral palsy, sensory deficits, learning disabilities and respiratory illnesses compared with children born at term. The morbidity associated with preterm birth often extends to later life, resulting in enormous physical, psychological economic costs *(Petrou et al., 2003).*The cervix is the lower, narrow portion of the uterus where it joins with the top end of the vagina. It is cylindrical or conical in shape and protrudes through the anterior vaginal wall. Approximately half of its length is visible with appropriate medical equipment, the remainder lies above the vagina beyond view *(Weschler, 2003).* Transvaginal ultrasound is a non-invasive technique to evaluate the cervix before pregnancy termination *(Hatfield et al., 2007).* Many of cervical anatomic features are seen on transvaginal ultrasonography in sagittal plane, the cervix is seen as a cylindrical moderately echogenic structure with a central canal. This area could be found in most women, whether they were pregnant or not, but it could not be detected in patients with amature cervix which includes those threatened by preterm labor or those with cervical incompetence. This zone is consistently seen until 31 weeks of gestation and disappears as pregnancy advances *(Wiqvist, 1993).* The main goal of this study is to evaluate the relationship between the cervical gland area by transvaginal ultrasonography and preterm delivery.

Materials and Methods

Patient and methods

This study was performed on 150 singleton pregnant women in the department of obstetrics and gynecology, Gammalia central hospital. Cases selected were there parity ranging from 16th to 31 weeks of gestation. All patients included in this study were subjected to: - History taking, General examination, Abdominal examination. Transvaginal ultrasonography was performed from 16 to 31 weeks of gestation. Ultrasound study was done by a transvaginal probe (7.5 MHz) of a gray scale real time ultrasound machine. Cervical length was measured from internal to external os. Statistical analysis was performed by version 18 SPSS

software; student's t test, Chi square and logistic regression analysis were used in the study. Confidence interval was 95% and P value <0.05 was significant. Data were analyzed using Statistical Program for Social Science (SPSS) version 20.0. Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage._The following tests were done:

- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (X^2) test of significance was used in order to compare proportions between two qualitative parameters.
- Pearson's correlation coefficient (r) test was used for correlating data.
- Probability (P-value)
  - P-value ≤0.05 was considered significant.
  - P-value ≤0.001 was considered as highly significant.

_ P-value >0.05 was considered insignificant.

Results

Table 1: Comparison between cervical gland area as regard body mass index.

Body mass index	Cervical Gland Area		t-test	
	Present	Absent	t	p-value
Mean±SD	22.3±1.42	31.55±1.42	12.583	**<0.001**
Range	19-25.6	22.4-38.7		

This table shows highly statistically significant difference between cervical gland area according body mass index. Cervical gland area more absent with increase body mass index. There was no statistically significant difference between cervical gland area as regard to parity.

Table 2: Comparison between cervical gland area and cases of abortion.

Abortion	Cervical Gland Area				Chi-square test	
	Present		Absent			
	No.	%	No.	%	x2	p-value
.00	81	89.0%	8	34.8%	46.629	<0.001
1.00	9	9.9%	4	17.4%		
2.00	1	1.1%	4	17.4%		
3.00	0	0.0%	4	17.4%		
4.00	0	0.0%	2	8.7%		
8.00	0	0.0%	1	4.3%		
Total	91	100.0%	23	100.0%		

This table shows highly statistically significant difference between cervical gland area as regard to previous abortion.

Table 3: Comparison between cervical gland area as regard to gestational age at delivery.

GA at delivery	Cervical Gland Area				Chi-square test	
	Present		Absent			
	No.	%	No.	%	x2	p-value
Term	87	95.6%	3	13.0%	75.381	**<0.001**
Preterm	4	4.4%	20	87.0%		
Total	91	100.0%	23	100.0%		

This table shows highly statistically significant difference between cervical grand area according term and preterm.

Table4): Mode of delivery of the study group.

Mode of delivery	No.	%
Normal	25	21.93
CS	89	78.07
Total	114	100.00

This table shows no statistically significant difference between cervical grand area as regaled to mode of delivery.
This table shows highly statistically significant difference between cervical gland area according cervical length.

Table 5: Relation between cervical length and other parameters of the study group.

	Cervical Length			t-test	
	N	Mean	±SD	t	p-value
CGA					
Present	91	32.19	4.25	12.649	**<0.001**
Absent	23	20.30	2.91		
GA at delivery					
Term	90	31.76	4.67	10.608	**<0.001**

Preterm	24	19.95	2.86		
Mode of delivery					
Normal	25	27.92	6.44	-1.708	0.090
CS	89	30.31	6.12		

This table shows significance between cervical length and cervical gland area, gestational age at delivery. Negative correlation and significant between cervical length and maternal age, abortion, while there is positive correlation between gestational age and cervical length.

Discussion

Many of cervical anatomic features are seen on transvaginal ultrasonography in sagittal plane. This area could be found in most women, whether they were pregnant or not, but it could not be detected in patients with amature cervix which includes those threatened by preterm labor or those with cervical incompetence *(Wiqvist, 1993).* Evaluation of the cervical length during pregnancy plays an important role in the management of preterm labor *(J. M. Crane 2010).* Cervical gland area refers to some mucosal glands in cervical canal which are normally seen as a hypoechoeic segment around the cervical mucosa in ultrasonography. Absence of these glands in second trimester can be a sign of preterm maturity of cervical canal, and can be used as a predictive marker for preterm labor *(Carcopino, 2011).*

This study was performed on 150 singleton pregnant women in the department of obstetrics and gynecology, Gammalia central hospital. Cases selected were there parity ranging from 16th to 31 weeks of gestation with no medical disorders. The study showed highly significance of CGA detection rate as it was significantly lowered in threatened preterm labor and early disappearance predict preterm delivery , this in agreement with *Carcopino (2011)* as they demonstrate for first time that the sonographic absence of cervical gland area reflects cervical maturation and could be considered as a predictor of threatened preterm labor and a sign of poor outcome of pregnancy in this condition.

The detection rate of cervical gland area is relatively constant at> 80% between 16 and 31 weeks gestation. With increased gestational age detection rate gradually decreased *(Asakura et. al, 2009)*

Hatfield et al. (2007) reported that absence of CGA had a higher sensitivity than shortening of cervical length at 16 _31 wks of gestation. Large screening studies have demonstrated that the shorter the cervical length, the higher the rate of spontaneous preterm delivery (SPTD). However, the sensitivity and positive predictive value of cervical length for detecting preterm birth were low *(Guzman et al., 2001).*Cervical mucosa which is lined by columnar epithelium contains many branched glands. Flumann and Dickmann 1958 demonstrated that these glands are actually inholdings of endocervical mucosa and will present new and more pronounced invaginations in the course of pregnancy.

In most of the pregnancies, even high risk for preterm labor, the CL is normal in first trimester and short CL is found in or after 16 weeks *(Owen, 2001).* Cervical gland area was present in (79%) of all mothers, 87 of them were in term group and 4 women were in preterm group. Absence of CGA was found in 13.0% of the term group comparing with 87.0% of the preterm cases which was significantly different (P value 0.001). The multiple logistic regression analysis revealed that absence of CGA was the only variable showing statistically significant association with SPTD. This is similar to the study of *(Pires et al., 2006).*

Conclusion

Prediction of preterm and very preterm delivery (gestational age before 32 weeks) is an important challenge because of the need for special perinatal care. It seems CGA detection is one of the good markers for this purpose.

References

Carcopino, X. 2011. Prévention de l'accouchement prématuré : doit-on prescrire de la progestérone vaginale aux patientes ayant une longueur cervicale diminuée en échographie ? *Revue de médecine périnatale,* 3: (4), 214-215.

Daskalakis, G., Thomakos, N., Hatziioannou, L., Mesogitis, S., Papantoniou, N. & Antsaklis, A. 2005. Sonographic Cervical Length Measurement before Labor Induction in Term Nulliparous Women. *Fetal Diagnosis and Therapy,* 21: (1), 34-38.

Goldenberg, R. L., Culhane, J. F., Iams, J. D. & Romero, R. 2008. Epidemiology and causes of preterm birth. *The Lancet,* 371: (9606), 75-84.

Hatfield, A. S., Sanchez-Ramos, L. & Kaunitz, A. M. 2007. Sonographic cervical assessment to predict the success of labor induction: a systematic review with metaanalysis. *American Journal of Obstetrics and Gynecology,* 197: (2), 186-192.

Owen, J. 2001. Mid-Trimester Endovaginal Sonography in Women at High Risk for Spontaneous Preterm Birth. *JAMA,* 286: (11), 1340.

Park, C.-W., Park, J. S., Moon, K. C., Jun, J. K. & Yoon, B. H. 2016. Preterm labor and preterm premature rupture of membranes have a different pattern in the involved compartments of acute histologoic chorioamnionitis and/or funisitis: Patho-physiologic implication related to different clinical manifestations. *Pathology International,* 66: (6), 325-332.

Petrou, S., Mehta, Z., Hockley, C., Cook-Mozaffari, P., Henderson, J. & Goldacre, M. 2003. The Impact of Preterm Birth on Hospital Inpatient Admissions and Costs During the First 5 Years of Life. *PEDIATRICS,* 112: (6), 1290-1297.

Pires, C. R., Moron, A. F., Mattar, R., Diniz, A. L. D., Andrade, S. G. A. & Bussamra, L. C. S. 2006. Cervical gland area as an ultrasonographic marker for preterm delivery. *International Journal of Gynecology & Obstetrics,* 93: (3), 214-219.

Weschler, T. 2003. *Taking charge of your fertility: the definitive guide to natural birth control, pregnancy achievement, and reproductive health*, Random House.
Wiqvist, N. 1993. Fetal fibronectin and preterm birth. *Acta Obstetricia et Gynecologica Scandinavica*, 72: (7), 507-508.