Cervical length as a predictor risk of preterm delivery

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ABSTRACT

Objectives: To study cervical length measurement by transvaginal ultrasound at 20-28 weeks as predictor for women at risk of preterm delivery.

Methods: This study was done over a period of one year between 2012 and 2013 at prince Rashid Bin Al-Hassan Military Hospital– Irbid –Jordan. Cervical assessment by transvaginal sonography was done in 100 women at 20-28 weeks of gestation. The gestation at delivery in woman with cervical length more or equal to 3 cm (group A, n=80) were compared with that in woman with cervical length < 3 cm (group B, n=20)

Results: thirty-eight percent of patients were primigravidas and 61.25% were multigravidas in group A, while 35% of them were primigravidas and 65% were multigravidas in group B. The most age group of the women was between 21-30 years in both groups. The incidence of preterm delivery was 13.75% in group A as compared to 90% in group B ($p<0.005$). In group A of the 80 women 11 delivered preterm (13.75%), 7 of them between 32 and 37 weeks of gestation and 4 women before 32 weeks. While in group B, 18 of the 20 women (90%) delivered preterm (10 before 32 weeks, 8 between 32 and 37 weeks and 2 after 37 weeks). The mean cervical length in group A women was 3.5±0.6 cm, while it was 2.1±0.5 cm in group B women.

Conclusion: Transvaginal ultrasound has been shown to be an objective sensitive and reliable method to assess the cervix and predict the risk of preterm delivery.

Key words: cervical length, transvaginal ultrasound, preterm delivery.

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Introduction

Preterm delivery defined as birth of a baby before 37 weeks of gestational age. The cause of preterm delivery is in many situations elusive and unknown. Preterm delivery has been and continues to be the most serious problems encountered in the care of pregnant women in both developed and developing countries, and is the most common cause of neonatal morbidity and mortality after congenital malformations accounting for 68% of infant mortality rate. [(1)] Preterm birth rates have been reported to range from 5% to 7% of live births in some developed countries, but are estimated to be substantially higher in developing countries. These figures appear to be on the rise. [(2)]

The management of threatened preterm labor with tocolytic therapy can prolong gestation. However, the time gained in-utero needs to be aptimized. The wide range of tocolytic agents in use is testament to the fact that we still do not have an ideal drug available. The use of tocolytic agents should be individualized and based on maternal condition, potential side-effect and gestational age.[(3)] While prevention of preterm delivery due to preterm labor is a primary goal of obstetricians, its incidence rates does not appear to have decreased over the last 20 years.[(4)] One of the most important risk factors for preterm birth is a previous history of spontaneous preterm birth. Researchers may find that identifying risk factors for

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recurrent preterm delivery suggests hypotheses about the aetiology of preterm delivery, the cause of which is largely unknown. In addition, policy makers responsible for directing prenatal care.[5] To identify women who are most likely to deliver premature requires to use some simple methods that can be applied to pregnant women either symptomatic or not. Unfortunately some methods used to identify those women like; manual examination of cervix (cervical dilatation, effacement and position) and biochemical tests may suffer from low sensitivity and positive predictive values making them unuseful in clinical practice.[6] In the last few years, transvaginal sonographic measurement of the cervix has emerged as an alternative method for the assessment of cervical length as it allows better quality and more accurate visualization of the uterine cervix and has fewer limitations than does the transabdominal approach. Several studies on pregnancy have reported that cervical assessment may provide a useful tool for the prediction of preterm delivery.[7] Cervical length measured by transvaginal ultrasonography has been shown to predict preterm birth in asymptomatic high-risk women as well as in those presenting with threatened preterm labor. [8,9] It has been demonstrated that the combination of short cervical length, and positive fetal fibronectin screening is the most highly associated risk factor for preterm delivery in the current gestation than traditional risk factors. [10] This study was undertaken to integrate data on the performance of cervical length measurement by transvaginal ultrasound at 20-28 weeks for predicting women at risk of preterm delivery.

Methods

This is a prospective study which was conducted over a period of one year, between the 1st of Aug 20012 and the end of July 20013 at Prince Rashid Bin-AI-Hassan Military hospital in the north of Jordan. Prince Rashid Bin-Al-Hassan Military hospital is one of the main referral hospital in the north of Jordan. It serves a population of about 800 thousand, and the maternity care unit receive about 500-600 deliveries monthly. The study was approved by ethical committee and informed written consent from all participants was obtained. During the study period, 100 women at 20-28 weeks generally underwent cervical assessment by transvaginal ultrasound. Scans were performed by obstetricians, either in outpatient clinics or inside the hospital. All ultrasound examinations were carried out using 7.5 MHz/ 5MHz convex transvaginal probe, which is introduced into the anterior vaginal fornix. The whole length of the sonolucent endocervical mucosa is identified in the sagittal section, and the image is magnified to occupy 75% of the screen. Calipers are placed from external os to internal os; and this distance is measured in a straight line. Exclusion criteria for this study were: multiple pregnancy, PROM (premature rupture of membrane), any obstetric situation requiring early delivery, and congenital abnormality of the cervix. The length of cervix was recorded, and the gestations at delivery in women with cervical length more or equal to 3 cm (Group A, n=80) were compared with that in women with cervical length < 3 cm (Group B, n=20). The sonographic reports were examined in all cases. Demographic details, and/or clinical follow-up reports were available for all cases, and all of them were regularly followed up in our antenatal clinic till delivery. Statistical analysis was done using Chi-square test.

Results

During the study period 100 women were studied, patients characteristics in both groups (A and B) were similar, 38.75% of them were primigravidas and 61.25% were multigravidas in group A, while 35% of them were primigravidas and 65% were multigravidas in group B. The most age group of the women was between 21-30 years in both groups (A and B). The demographic and obstetric characteristics of study population are summarized in Table I. The incidence of preterm delivery was 13.75% in group A as compared to 90% in group B ($p<0.005$). ln group A of the 80 women 11 delivered preterm (13.75%), 7 of them between 32 and 37 weeks of gestation and 4 women before 32 weeks. While in group B, 18 of the 20 women (90%) delivered preterm (10 before 32 weeks, 8 between 32 and 37 weeks and 2 after 37 weeks) as shown in Table II.

The mean cervical length in group A women was 3.5+0.6 cm, while it was 2.1+0.5 cm in group B women.

Table I: The demographic and obstetric characteristics of study population.

Patients characteristics	Group A(80)	Group B(20)
Parity		
-Primigravidae	31(38.75%)	7(35%)
-Multigravidae	49(61.25%)	13(65%)
Age		
- < 20 years	22(27.5%)	5(25%)
- 21-30 years	35(43.75%)	9(45%)
- > 31 years	23(28.75%)	6(30%)
Mode of delivery		
-NVD	58(72.5%)	14(70%)
-CS	22(27.5%)	6(30%)
Sex of infant		
- male	42(52.5%)	11(55%)
- Male	38(47.5%)	9(45%)

Table II: Relation of cervical length and period of gestation at delivery (n = 100).

Patients group	Cervical length	Period of gestation at delivery (weeks)		
		< 32	32 – 37	>37
Group A (n=80)	> 3 cm	4(5%)	7(8.75%)	69(86.25%)
Group B (n=20)	< 3 cm	10(50%)	8(40%)	2(10%)

Discussion

The rate of preterm deliveries (<37 weeks of gestation) has remained stable over the last decade, ranging between 6-8% in Europe and Australia and 9.6-11.6% in Canada and North America. [11] The pre-term delivery (PTD) of an infant has been and continues to be one of the most serious problems encountered in the care of pregnant women in both developed and developing countries. Prematurity accounts for more than 35% of infant mortality world-wide and remains the main cause of mortality and morbidity in infants and a problem in the care of pregnant women.[12] If women can be identified to be at high risk in early pregnancy, they can be targeted for more intensive antenatal surveillance and prophylactic interventions. When women present with symptoms of threatened preterm labour, if the likelihood of having a spontaneous preterm birth can be determined, interventions can be deployed to prevent or delay birth and to improve subsequent neonatal mortality/morbidity. [13] A helpful clinical test should predict a high risk for preterm birth during the early and middle part of the third trimester, when their impact is significant. Many women experience false labour (not leading to cervical shortening and effacement) and are falsely labeled to be in preterm labour. The study of preterm birth has been hampered by the difficulty in distinguishing between "true" preterm labour and false labour. These new tests are used to identify women at risk for preterm birth. [14] The importance of transvaginal ultrasound in measuring cervical length in pregnancy was applied and published in 1992. Transvaginal ultrasonography has been proposed as a reliable method of assessing dimensions of the cervix and this information may be helpful in predicting patients at risk for preterm birth. [15] Clinical studies have shown that sonographic examination can provide reliable and objective information on the uterine cervix and lower uterine segment. Several authors have reported that disproportionate shortening of the cervical length is a useful predictor of preterm labor. [16] Transvaginal ultrasonography is the preferred route for cervical assessment to identify women at increased risk of spontaneous preterm birth and may be offered to women at increased risk of preterm birth. Interestingly, we noted the best cut-off for cervical length to predict preterm delivery to be <3 cm rather than <2.5 cm, this may be owing to the later gestational age at which transvaginal ultrasound was carried out in our study as seen by study of Crane JM *et al*.[17] In our study, we found that the incidence of preterm delivery was 13.75% in group A who has normal cervical length as compared to 90% in group B who has short cervix, similar results have been reported in other studies. As Lee HJ *et al* [18] concluded that CL measurements are objective and reliable screening tests to identify women at risk of spontaneous PTB. Serial CL measurements on TVS from 16 weeks of gestation to 30 to 32 weeks of gestation with or without FFN testing from 22 through 35 weeks in women at high risk will help to individualize management, prevent unnecessary hospitalization and obstetric intervention, and improve perinatal outcome by optimizing the timing of antenatal steroid therapy and transfer to a tertiary care center. Recent study by Arisoy R et al [19] reports that the length of the cervix may be useful in predicting the risk of premature delivery, with a shorter cervix predicting a higher risk, and this article reviews the evidence in support of the clinical introduction of transvaginal sonography for both the prediction and management of spontaneous preterm labour. Also Norwitz ER et al [20] found that a strong inverse correlation exists between residual cervical length as measured by transvaginal ultrasound and preterm birth. If the cervical length is < 10th percentile for gestational age in the mid second trimester, the pregnancy is at a six fold increased risk of delivery prior to 35 weeks. On 2011, the US Food and Drug Administration (FDA) approved the use of progesterone supplementation (hydroxyprogesterone corporate) during pregnancy to reduce the risk of recurrent preterm birth in women with a history of at least one prior spontaneous preterm delivery. This is the first time that the FDA has approved a medication for the prevention of preterm birth, and represents the first approval of a drug specifically for use in pregnancy in almost 15 years.

Owen J *et al* [21] also reported similar findings as a shortened cervical length in the mid trimester preferentially predicts early, as opposed to later, spontaneous preterm birth in high-risk women. But in other study by Tsoi E *et al* [22] concluded that in women with threatened preterm labour assessment of fetal fibronectin in cervicovaginal secretions does not improve the prediction of delivery within 7 days provided by the sonographic measurement of cervical length. Numerous studies have examined the

relationship between short cervix and preterm birth, and although differences in sensitivity and predictive value exist, the overwhelming consensus indicates that the risk of preterm birth increases with decreasing cervical length. Also transvaginal ultrasound is the most reliable method to evaluate cervical length, but it is not available in all locations. Current clinical practice standards do not recommend universal screening for cervical length; however, results of randomized controlled clinical trials provide evidence to support expanded screening programs by individual practitioners. [23] Further studies are also needed with respect to the utility of measuring fetal fibronectin in conjunction with measurements of cervical length to predict risk of preterm delivery.

Conclusion

The frequency of the sonographic measurement of the cervix is a reproducible and safe method to assess cervical length. Also transvaginal ultrasound has been shown to be an objective sensitive and reliable method to assess the cervix and predict the risk of preterm delivery.

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