Original Research Article

Transvaginal sonographic cervical length during mid-trimester in predicting preterm labour in asymptomatic singleton pregnancies

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ABSTRACT

Background: Worldwide, preterm birth is the main contributor to perinatal mortality and morbidity. Preterm birth causes 50% of long-term morbidity, contributes 75% of neonatal deaths (after accounting for fatal abnormalities), and becomes 85% of newborn deaths. Cervical length measurement has been linked to predicting the preterm labour in mid-trimester by various studies.
Methods: This study was carried out to evaluate the strength of cervical length as a predictive factor for pre-term labour. This is a prospective observational study conducted at MIMS, Vizianagaram on 100 antenatal mothers. The cervical length is measured by transvaginal ultrasound. If the length was <25 mm, then the patients were advised a second scan during 28th week and follow-up was done till delivery.
Results: Out of the 100 patients, 21 were multigravida, whereas 79 were primigravida. 20 had pre-term delivery and 80 had term delivery. The mean age of the population was 25.2±4.5 years. 40% of cases with cervical length <25 mm had pre-term delivery, as compared to 33.33% in patients with cervical length 26-30 mm, 13.63% in 31-35 mm, 5.88% in 36-40 mm and 16.66% in patients with cervical length >40 mm. The p value<0.05. Area under ROC curve is 0.79. Sensitivity is 60%, specificity is 8.75%, positive predictive value is 57.14%, negative predictive value is 89.87%.
Conclusions: Transvaginal sonography is a reliable diagnostic test in mid-trimester in predicting pre-term delivery in singleton pregnancy.

Keywords: TVS, Cervical length, Preterm labour

INTRODUCTION

A preterm birth is one that occurs between the viability age and 37 full weeks of gestation. Preterm birth rates in India range from 5 to 21%. Worldwide, preterm birth is the main contributor to perinatal mortality and morbidity. Premature babies have higher morbidity than term babies because their organ systems are still developing.

Preterm birth causes 50% of long-term morbidity, contributes 75% of neonatal deaths (after accounting for fatal abnormalities), and becomes 85% of newborn deaths.[1] Preterm labour is started by a number of processes, many of which are the same as those that start term parturition. Additional causes include cervico-vaginal infections, asymptomatic bacteruria, cervical incompetence, decidual haemorrhage, and uterine overdistension.

The most accurate method for predicting spontaneous preterm birth is transvaginal sonographic measurement of cervical length.

Numerous research on this preterm delivery point to the value of effective screening by determining individuals at risk by midtrimester cervical length measurement.[2,3]

Aim and objectives

The aim and objective of the study was (a) to measure the length of the cervical canal using transvaginal sonography in singleton pregnancies between 18 and 26 weeks of gestation; (b) to determine the connection between the cervical length during midtrimester and the due date; and (c) to determine whether routine cervical length measurements during singleton pregnancies between 18 and 26 weeks can be useful in predicting the risk of preterm delivery.

METHODS

Study design

The study design was prospective observational study.

Study place

The study place was department of OBG, MIMS, Vizianagaram.

Duration of study

The study duration was January 2021 to December 2022.

Sample size

The sample size was 100.

Inclusion criteria

Asymptomatic antenatal women between 18-26 weeks gestation who have registered before 16 weeks of gestation with known LMP, and antenatal women between 18-26 weeks gestation with one of the following high risk factors viz. history of threatened abortion in present pregnancy or previous first trimester abortions or previous second trimester abortion or past history of preterm birth or second gravida with inter-pregnancy interval less than 1.5 years or more than 5 years were included in the study.

Exclusion criteria

Multipara women, pregnants with diagnosed congenital fetal anomaly, polyhydramnios, iatrogenic preterm birth due to severe preeclampsia and intrauterine fetal growth restriction were excluded from the study.

The cervical length is measured by transvaginal ultrasound after receiving informed, written consent, and the patient is asked to return for a follow-up appointment in 3-4 weeks. Patients are not subjected to additional follow-up scans if the cervical length is greater than 25 mm, and their gestational age at delivery and method of delivery are noted. If the length is under 25 mm, a follow-up scan is performed up to 28 weeks, and the patients are monitored all the way through birth. Data were entered into excel sheet and statistical analysis was done using Microsoft Excel 2013. This study abides to the guidelines laid by the declaration of Helsinki.

RESULTS

Out of the 100 patients, 21 were multigravida, whereas 79 were primigravida. 20 had pre-term delivery and 80 had term delivery. The mean age of the population was 25.2±4.5 years. Most of the patients belonged to the age group 25-30 years.

The difference in statistically significant with p value<0.05. This implies that patients with less cervical length during the mid-trimester have more chances of having pre-term delivery.

Area under POC curve

The area under fitted curve (Az)=0.7917, estimated standard error=0.0577, sensitivity: 60%, specificity: 8.75%, positive predictive value: 57.14%, and negative predictive value: 89.87%.

Table 1: Cervical length.

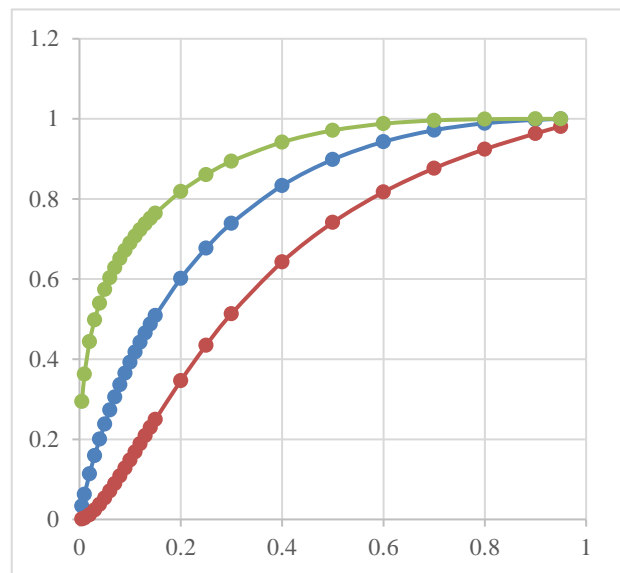| Cervical length (mm)	N	Pre-term delivery	%
<25	20	8	40
26-30	18	6	33.33
31-35	22	3	13.63
36-40	34	2	5.88
>40	6	1	16.66

Figure 1: ROC curve.

DISCUSSION

Pre-term labour is defined as the occurrence of uterine contractions that are frequent and strong enough to cause the cervix to gradually efface and dilate between 20 and 37

weeks of gestation. It is suggested that there are four direct reasons of preterm birth: (1) spontaneous preterm labour with intact membranes, (2) preterm premature membrane rupture, (3) iatrogenic, and (4) multiple pregnancies.[4,5]

Patients at risk of preterm labour are monitored by home ambulatory uterine activity monitoring, foetal fibronectin, salivary estriol, corticotropin-releasing hormone, relaxin, inflammatory cytokines IL-6 and 8, TNF beta, and phosphorylated insulin-like growth factor binding protein-1.[2,6,7]

Women at risk of premature labour may benefit from sonography to measure cervical length. Their negative predictive value is what gives them most of their worth. Over the past ten years, cervical length measurement techniques have gradually improved. According to ACOG, transvaginal sonography is the preferred method for identifying women who are more likely to have a spontaneous preterm birth and should be made available to those who are. Pre-term labour was more common in our study's participants with cervical lengths under 26 mm than those over 25 mm in the middle of the third trimester.[8,9] Short cervix less than 25 mm is a strong indicator of preterm birth, and the best method in measuring cervical length is by ultrasonogram. Transvaginal ultrasonography has highest sensitivity and negative predictive value than other methods of ultrasonography. Sandra O'Hara et al conducted study on cervical length for predicting preterm birth and a comparison of ultrasonic measurement techniques. It is debatable if cervical length screening is necessary in low-risk pregnancies.[10]

In order to predict preterm labour in asymptomatic women with a history of preterm labour, Crane et al performed meta analyses of numerous study reports.[11] According to the findings, there is a cut-off cervical length of 25 mm below which the likelihood of premature delivery increases. This length has a high sensitivity, 77% specificity, low positive predictive value, and high negative predictive value. Crane et al likewise came to the conclusion that progressive cervical shortening in asymptomatic high-risk women discovered by TVS added useful information to the previously identified short cervix.

Limitations

Smaller sample size was a limitation and any unprecedented confounding factors that might have affected the outcomes have not been ruled out.

CONCLUSION

Transvaginal sonography is a reliable diagnostic test in mid-trimester in predicting pre-term delivery in singleton pregnancy.

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