

A Prospective Study to Evaluate the Predictive Value of Transvaginal Cervical Length between in First Trimester and Second Trimester by using TVS

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Abstract

Aim: The aim of the present study was to evaluate the predictive value of transvaginal cervical length between in first trimester (11 to 13+6 weeks) and second trimester (20 to 24 weeks) by using TVS.

Material & Methods: This prospective observational study of 200 pregnant women attending ANC OPD . The pregnant women were scanned for cervical length between 11-14 weeks and 20-22 weeks of gestation, using USG machine with TVS probe (Mindray DC-7).

Results: 52% of women in the study group are in the age group of 21-25 years. Median age was 23 years. Minimum age of the subject studied being 18 years and maximum being 34 years. Cervical length at 11-14 weeks in majority of the pregnant women studied was between 3.6-4.0 cm. Minimum cervical length measured was 3 cm and maximum 5 cm. Mean±SD= 3.94 cm± 0.41, Median= 4 cm. Cervical length at 20-22 weeks in majority of the pregnant women studied was between 3.1-3.5 cm with mean cervical length being 3.37 cm. 85% of the subjects studied, had full term. 60 (30%) patients had < 0.5cm reduction in cervical lengths (Group A), 130 (65%) had reduction in cervicallengthsfrom0.5-1cm (group B) and 10 (5%) had reduction in cervical lengths >1cm (Group C). deliveries, whereas 12% had preterm deliveries.

Conclusion: Findings of this study confirms those of previous studies that have found an inverse relation between the length of the cervix, as measured by transvaginal ultrasonography during pregnancy, and the frequency of preterm delivery. The cervical length measured at 11-14 weeks and 20-22 weeks gestation was decreased in asymptomatic women with single to n pregnancies was useful for identifying patients at increased risk for preterm delivery was found in the study.

Keywords: Cervical length, Preterm, Pregnancy.

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Introduction

Preterm labour is defined as the onset of labour before 37 weeks of gestation, in pregnancy beyond 20 weeks of gestation. [1] It is responsible for nearly 75% of all neonatal mortality and neurological morbidity. [2] Preterm birth is a common obstetric problem accounting for 11.4% of deliveries in 2011 and prolonged pregnancy ranged from 4-14%. [3] Similarly, early preterm delivery before 34 weeks of gestation has even a greater impact on perinatal morbidity and mortality.

Preterm delivery is responsible for nearly 75% of all neonatal death and neurological handicap.² PTB is the leading cause of neonatal morbidity and mortality not attributable to congenital anomalies or aneuploidy. If an infant is born preterm the risk of death in the first year of life is 40-fold greater

compared with an infant born at term. [4] There are various methods to predict preterm labor like 1) cervical length 2) fetal fibronectin 3) cortisol level 4) placental hormone level and 5) non-invasive electromyography. [5-9]

Cervical Length (CL) is one of the major determinants of preterm delivery. Ultrasound assessment of the cervix, in recent decades, has become an important part of obstetric diagnostic imaging, especially since the development of transvaginal probes and the increasing acceptance by patients of transvaginal sonography during pregnancy. Transvaginal sonographic measurement of the cervix is a reliable alternative method for the assessment of cervical length as it allows better quality and more accurate visualization of the

uterine cervix. [10] It is controversial whether routine ultrasound assessment of the cervix can be a means of defining the risk of preterm delivery in low-risk women. [11,12]

But previous studies have shown that therapeutic interventions like cervical cerclage and progesterone in women with ultrasonographically determined short cervix reduce the preterm birth incidence among them. [6,13,14] Some have demonstrated that measurement of cervical length at 11-14 weeks was useful, whereas others did not find it as a reliable predictor of preterm delivery. [15,16,17] Many studies have found that cervical length at 20-22 weeks is a reliable predictor of preterm delivery. [18]

Hence there is a need to evaluate the predictive value of transvaginal cervical length between in first trimester (11 to 13+6 weeks) and second trimester (20 to 24 weeks) by using TVS.

Material & Methods

The present study included 200 women attended the OPD at Department of Obstetrics and Gynecology JLN Medical College and Hospital, Bhagalpur, Bihar, India for 12 months (Jan 2018 to December 2018) in between (11to13+6) weeks. Cervical length was measured using transvaginal ultrasonography with the standard longitudinal view of cervix while patient's bladder was empty. USG machine with TVS probe (GE, Model - Logiq P3) was used to measure cervical length. It was measured by keeping the probe 3cm away from the posterior fornix. The cervical length is defined as

the length between the internal os and external os. Patient then followed up and cervical length at 20-24 weeks of gestation was repeated again during the routine anomaly scan. The patients were then followed up until they deliver.

The variables analysed

- (i) The mean cervical length at 1(1to13+6) weeks and at 20-24 weeks.
- (ii) The rate of shortening of cervical length in those who deliver at term and preterm.
- (iii) The cervical length at (11to13+6) weeks and 20-24 weeks was correlated with gestational age at delivery and the predictive value of the same were determined.

Statistical Analysis

The appropriate statistical analysis method was applied based on data analysis. The mean cervical length was calculated at (11to13+6) weeks and 20-24 weeks scans. Student's 't' test was used to determine in the differences in the cervical lengths at the first and second scans for the group of patients who delivered either at term or preterm. Logistic regression analysis was used to determine the independent contribution of shortening of the cervix, the cervical length at the week (11to13+6) and 20-24 week scans, and the demographic characteristics in predicting preterm delivery in women.

Results

Table 1: Patients distribution according to age and according to cervical length at 11-14 weeks

| Age in years | No of pregnant women | % |
|-----------------------|----------------------|----|
| <20 | 68 | 34 |
| 21-25 | 104 | 52 |
| 26-30 | 24 | 12 |
| 31-35 | 4 | 2 |
| Cervical length in cm | | |
| 2.1-2.5 | 0 | 0 |
| 2.6-3.0 | 4 | 2 |
| 3.1-3.5 | 30 | 15 |
| 3.6-4.0 | 110 | 55 |
| 4.1-4.5 | 36 | 18 |
| 4.6-5.0 | 20 | 10 |

52% of women in the study group are in the age group of 21-25 years. Median age was 23 years. Minimum age of the subject studied being 18 years and maximum being 34 years. Cervical length at 11-14 weeks in majority of the pregnant women studied was between 3.6-4.0 cm.

Table 2: Patients distribution according to cervical length of 20-22 weeks and delivery outcome

| Cervical length in cm | No. of pregnantwomen | % |
|-----------------------|----------------------|----|
| 2.1-2.5 | 16 | 8 |
| 2.6-3.0 | 48 | 24 |
| 3.1-3.5 | 20 | 40 |
| 3.6-4.0 | 44 | 22 |
| 4.1-4.5 | 12 | 6 |
| 4.6-5.0 | 0 | 0 |

| Maturity | | |
|-----------|-----|----|
| Preterm | 30 | 15 |
| Full term | 170 | 85 |

Minimum cervical length measured was 3 cm and maximum 5 cm. Mean±SD= 3.94 cm± 0.41, Median= 4 cm. Cervical length at 20-22 weeks in majority of the pregnant women studied was between 3.1-3.5 cm with mean cervical length being 3.37 cm. 85% of the subjects studied, had full term.

Table 3: Patients distribution according to reduction in cervical length

| Reduction in cervical length (cm) | No. of patient | % |
|-----------------------------------|----------------|-----|
| Group A (<0.5cm) | 60 | 30 |
| Group B (0.5-1cm) | 130 | 65 |
| Group C (>1cm) | 10 | 5 |
| Total | 200 | 100 |

60 (30%) patients had < 0.5cm reduction in cervical lengths (Group A), 130 (65%) had reduction in cervical lengths from 0.5-1cm (group B) and 10 (5%) had reduction in cervical lengths >1cm (Group C). deliveries, whereas 12% had preterm deliveries.

Table 4: Diagnostic indices

| Test | Cut off value | Sensitivity | Specificity | PPV | NPV | P value |
|--------------------------------|---------------|-------------|-------------|--------|--------|----------|
| Cervical length at 11-14 weeks | 3.87 cm | 66.69% | 62.38% | 18.02% | 94.10% | 0.02 |
| Cervical length at 20-22 weeks | 2.78 cm | 76% | 100% | 100% | 96.70% | <0.00001 |
| Reduction in cx length | >0.6 cm | 66.68% | 87.3% | 41.19% | 95.05% | <0.00001 |

Diagnostic indices relating to cervical length at 11-14 weeks of gestation cut off value was 3.87 cm was significant for prediction of preterm labour, but cervical length at 20-22 weeks of gestation cut off value was 2.78 cm which is extremely significant for preterm labour.

Discussion

Infants born preterm represent half the children with cerebral palsy, one third of those with abnormal vision, one quarter of those with chronic lung disease, and one fifth of children with mental retardation. In adulthood there is an increased risk of behavioural problems, lower levels of education achievement, reduced rates of reproductive success and an increased incidence of second generation PTB. Given the substantial and far reaching impact of preterm birth, it is important to recognise patients at increased risk of PTB.⁴ Cesarean section (C.S) rate was 15.4% in 2014- 15. Preterm birth remains a major cause of neonatal morbidity and mortality due to complications like necrotizing enter colitis, intraventricular hemorrhage, respiratory distress syndrome and neurological deficit (1). There are various methods to predict preterm labor like 1) cervical length 2) fetal fibronectin 3) cortisol level 4) placental hormone level and 5) non-invasive electromyography. [19-22]

52% of women in the study group are in the age group of 21-25 years. Median age was 23 years. Minimum age of the subject studied being 18 years and maximum being 34 years. Cervical length at 11-14 weeks in majority of the pregnant women studied was between 3.6-4.0 cm. Minimum cervical

length measured was 3 cm and maximum 5 cm. Mean±SD= 3.94 cm± 0.41, Median= 4 cm. Cervical length at 20-22 weeks in majority of the pregnant women studied was between 3.1-3.5 cm with mean cervical length being 3.37 cm. 85% of the subjects studied, had full term. In a similar study by P. Arora et al mean cervical length was 3.2cm with minimum measurement of 2.1 cm and maximum measurement of 4.4 cm. [23]

60 (30%) patients had < 0.5cm reduction in cervical lengths (Group A), 130 (65%) had reduction in cervical lengths from 0.5-1cm (group B) and 10 (5%) had reduction in cervical lengths >1cm (Group C). deliveries, whereas 12% had preterm deliveries. In group A (n= 60); 0 (0%) patient had preterm delivery (<37weeks) and 60 (100%) were delivered at term gestation. In group B (n=130); 5 (3.84%) patients had early preterm deliveries (≤34weeks); 10 (7.69%) had late preterm deliveries (>34weeks) and remaining 115 (88.46%) were delivered at term gestation. In group C (n=10); 5 (50%) patients had early preterm deliveries (≤ 34 weeks); 5 (50%) had late preterm deliveries (>34 weeks) and no term delivery. In group A, the incidence was 13.34% low birth weight; while in group B it was 18.46% and in group C it was 80%. Ismail ozdemir et al [24] concluded similarly (preterm CL-28.4 mm and term CL-37.8 mm). Furthermore, Kagan KO et al [25] and Hebbar S et al [26] emphasized on the role of mid-trimester transvaginal cervical ultrasound in the prediction of preterm delivery.

Diagnostic indices relating to cervical length at 11-14 weeks of gestation cut off value was 3.87 cm

was significant for prediction of preterm labour, but cervical length at 20-22 weeks of gestation cut off value was 2.78 cm which is extremely significant for preterm labour.

Conclusion

Our data suggested that the length of the cervix is an indirect indicator of its competence and should be seen as a continuous rather than a dichotomous variable. The length of the cervix is directly correlated with the duration of pregnancy: the shorter the cervix, the greater the likelihood of preterm delivery. Considering the magnitude of preterm labour, cost of management of preterm babies and morbidity-mortality associated with it, transvaginal ultrasonography of the cervix during routine NT scan and anomaly scan has emerged as a safe, acceptable and a cost-effective test to assess risk of preterm delivery. The predictive value can be further enhanced by calculating cervical index. Correlation with increased levels of fibronectin can increase the predictive value of this method.

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