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To study preterm labor risk prediction by cervical length assessment by TVS at 22-26 weeks of gestation in low risk primigravida

[1]Dr. Dipika Bhoya, [2]Dr. Parul Udhnawala

[1-2]Government Medical College, Surat, Gujarat

Corresponding Author: Dr. Dipika Bhoya, Government Medical College, Surat, Gujarat

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Abstract

Objective: To study preterm labor risk prediction by cervical length assessment by TVS at 22-26 weeks of gestation in low risk primigravida.

Methods: A prospective observational study enrolling 120 consenting low risk primigravida fulfilling inclusion criteria with 22 –26 weeks of gestation for preterm labor risk prediction by cervical length measurement by Transvaginal sonography by single observer during anomaly scan conducted in department of Obstetrics and Gynaecology over a period of 1 year.

Results: In the study, out of 100 patients, 18 (18%) patients had cervical length < 2.5 cm measured at between 22 – 26 weeks of gestation and 82 (82%) had cervical length > 2.5 cm. Among 18 (18%) patients with cervical length < 2.5 cm, 7 (38.88%) patients had preterm delivery that is before 34 weeks of gestation and 4 (22.22%) patients had preterm delivery between 34 – 36 weeks of gestation. Total 82 (82%) subjects delivered after 37 weeks of gestation. Among them, majority 28 (34.14%) subjects had second trimester cervical length of 3.0 – 3.5 cm, 7 (8.53%) subjects had cervical length of < 2.5 cm and 5 (6.09%) had cervical length of 2.5 – 3.0 cm. Out of 18 (18%) patients with cervical length < 2.5 cm, 10 (55.55%) patients had taken Tab. Dydrogestrone, among them 4 (36.36%) had preterm delivery and 8 (44.44%) patients had not accepted Tab. Dydrogestrone, from which 7 (63.63%) patients had preterm delivery.

Conclusion: Ultrasonographic assessment of the cervical length in second trimester in low risk primigravida during anomaly scan has a promising role to offer in the prediction of the risk of developing preterm labor. Considering the magnitude of preterm labor, cost of management of preterm babies and morbidity and mortality associated with it, the use of sonographic assessment of cervix at 22 to 26 weeks of gestation as a routine screening method is cost effective and should be offered to all pregnant women.

Keywords: Preterm labor risk, Cervical length

Introduction

Preterm birth is the leading cause of neonatal morbidity and mortality not attributable to congenital anomalies or aneuploidy. The importance of preterm labor lies in the fact that 75% of all perinatal deaths occur in preterm births and when lethal congenital anomalies are excluded, 85% of all perinatal deaths occur in preterm neonates. Its prevention is a major health care priority. Despite advances in perinatal care, the incidence of preterm birth continues to rise because of the increased multiple pregnancies resulting from assisted reproduction. It has been shown that a shortened cervix is a powerful indicator of preterm births in women with singleton and twin gestations – the shorter the cervical length, the higher the risk of spontaneous preterm birth. Ultrasound measurements of the cervix are a more accurate way of determining cervical length (CL) than using a digital method.

Aims and Objectives

- To determine the mean cervical length in low risk primigravida women at 22 – 26 weeks of gestation.
- To find out the correlation of a cervical length with the risk of preterm delivery.

Materials and Methodology

- Study design: Prospective Observational Study.
- Place of study: Department of Obstetrics and gynaecology, GMC, NCH Surat.
- Period of study: 1 year (after HREC approval).
- Sample Size: 120 consenting low risk primigravidae
- Time of sonography: Gestational age between 22 – 26 weeks.
- Pre-requisites: Empty bladder.
- Position: Lithotomy position.

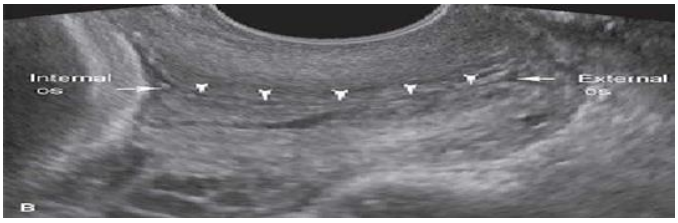

Figure 1

Results

- Among 120 patients, following 20 patients were excluded from the study due to complications developed, hence, from now onwards we will be discussing various parameters among the included 100 subjects.

Table 1: Total No. Of Patients completed the study and cervical length measured at the time of enrolment [22 – 26 weeks of gestation]:

Table 1] shows that out of 100 patients, 18 (18%) subjects had cervical length of < 2.5 cm. Rest 82 (82%) subjects had cervical length > 2.5 cm. Majority 30 (30%) subjects had cervical length between 3.0 – 3.5 cm.

Cervix Length (cm)	No. of Patients (n = 100)	% (Percentage)
<2.5	18	18
2.5 – 3.0	7	7
3.0 – 3.5	30	30
3.5 – 4.0	24	24
4.0 – 4.5	21	21

- Mean cervical length of our study group was 3.2 cm.
- The least cervical length of our study was 2.1 cm.
- The longest cervical length of our study was 4.3 cm.

Table 2: Cervical length and time of delivery:

Cervical length (cm)	Preterm	Term	N=100
< 2.5 cm	11	7	18
> 2.5 cm	7	75	82
	18	82	100

Sensitivity: 11/18 = 61.11%

Positive Predictive Value = 11/18 =61.11%

Specificity: 75/82 = 91.46%

Negative Predictive Value = 75/82= 91.46%

The chi-square statistic with Yates correction is 24.1936.

The p-value is < 0.00001 which is significant.

Table 3: Oral progesterone acceptance by patients and time of delivery:

(n=18)	Preterm	% (Preterm)	Term	% (Term)	Total (n=18)
No. of patients taken Tab. Tab. Dydrogestrone	4	40%	6	60%	10
No. of patients not taken Tab. Dydrogestrone	7	87.50%	1	12.5%	8

This table shows that out of 10 subjects with cervical length < 2.5 cm who had taken Tab.Dydrogestrone, majority 6 (60%) had term deliveries.

Out of 8 subjects with cervical length < 2.5 cm who had not taken Tab.Dydrogestrone, majority 7 (87.50%) subjects had preterm deliveries.

Table 4: Cervical length and gestational age at the time of delivery and total patients:

Cervical length	< 34 weeks	%	34-36 weeks	%	= 37 weeks	%	Total	%
<2.5 cm	7	38.88%	4	22.22%	7	38.88%	18	18%
2.5 – 3.0 cm	1	14.28%	1	14.28%	5	71.42%	7	7%
3.0 – 3.5 cm	0	0	2	6.66%	28	93.33%	30	30%
3.5 – 4.0 cm	0	0	2	8.33%	22	91.66%	24	24%
4.0 – 4.5 cm	0	0	1	4.76%	20	95.23%	21	21%
Total	8	8%	10	10%	82	82%	100	100%

This table shows that out of 100 subjects, majority 82 (82%) subjects delivered after 37 weeks of gestation, 10 (10%) subjects delivered between 34 – 37 weeks of gestation and only 8 (8%) subjects had delivery before 34 weeks of gestation.

Out of 100 subjects, 18 subjects had cervical length of < 2.5 cm and rest 82 (82%) subjects had cervical length > 2.5 cm.

Out of 18 (18%) subjects, with cervical length <2.5 cm, 7(38.88%) subjects delivered before 34 weeks of gestation and 4 (22.22%) subjects had delivery between 34 – 36 weeks of gestation. 7(38.38%) subjects had delivery after 37 weeks of gestation.

Majority 30(30%) subjects had cervical length 3.0 – 3.5 cm, among them 28(93.33%) subjects had delivery after 37 weeks of gestation and only 2 (6.66%) had preterm delivery, that was between 34 – 36 weeks of gestation.

Out of 7(7%) subjects with cervical length between 2.5 – 3.0 cm, only 1 (14.28%) subject had delivery before 34 weeks of gestation and 1(14.28%) had delivery at 35 weeks of gestation.

21(21%) subjects had cervical length between 4.0 – 4.5 cm, among them 20(95.23%) subjects delivered after 37 weeks of gestation and only 1(4.76%) had delivery between 34 – 36 weeks of gestation and that was at 35 weeks 4 days.

Table 5 A: Modes of delivery

Cervical length	Vaginal Delivery	%	C- Sections	%	Total No. Of patients	%
<2.5 cm	18	18%	0	0%	18	18%
>2.5 cm	67	81.70%	15	18.29%	82	82%

[A] We studied the second trimester cervical length and its effect to mode of delivery in our study, which is mentioned in the table below:

Out of 100 subjects, 85 (85%) subjects had vaginal deliveries and 15 (15%) had emergency C- Sections.

Above table shows that, Out of 100 (100%) subjects, 18(18%) subjects had cervical length < 2.5 cm and all subjects had vaginal delivery. 82(82%) subjects had cervical length of > 2.5 cm, among them, majority 67 (81.70%) subjects had vaginal delivery and 15 (18.29%) subjects had emergency C- Sections.

[B] Cervical length and vaginal delivery with time of delivery:

Cervical length	Vaginal Delivery							
	<34 weeks	87.5%	34-36 weeks	%	=37 weeks	%	N=85	%
<2.5 cm	7	38.88%	4	22.22%	7	38.88%	18	21.17%
>2.5 cm	1	1.17%	5	7.46%	61	91.04%	67	78.82%

This table shows the relation between second trimester cervical lengths and gestational weeks at the time of vaginal delivery.

Out of 100 (100%), 85(85%) subjects had vaginal deliveries.

Out of 18 (21.17%) subjects with cervical length < 2.5 cm, 7 (38.88%) subjects had extreme preterm (< 34 weeks of gestation) deliveries and 4 (22.22%) subjects delivered preterm between 34 – 36 weeks of gestation.

Out of 67 (78.82%) subjects with cervical length > 2.5 cm, 61 (91.04%) had delivery after 37 weeks of gestation and 5 (7.46%) subjects had preterm deliveries between gestational age of 34 – 36 weeks and only 1 (1.17%) had extreme preterm delivery.

Discussion

In this prospective observational study, we found that low risk primigravidas with short cervical length [<2.5cm] measured by transvaginal ultrasonography at 22 – 26 weeks of gestation were at a significantly higher risk for preterm delivery. In this study, out of 100 subjects, 18 (18%) subjects had cervical length of < 2.5 cm. and rest 82 (82%) subjects had cervical length > 2.5 cm. Majority 30 (30%) subjects had cervical length between 3.0 – 3.5 cm. Mean cervical length of our study group was 3.2 cm. According to my study, out of 18 subjects with cervical length < 2.5 cm, 11(61.11%) subjects had delivered preterm and out of 82 subjects with cervical length > 2.5 cm, majority 75(91.46%) subjects had term deliveries. In this study, the sensitivity of cervical length measured by transvaginal sonography at 22 – 26 weeks of gestation in predicting preterm labor risk in low risk primigravidas with a cut off < 2.5 cm is 61.11% and specificity is 91.46%.The Positive Predictive Value (PPV) is 61.11% and the Negative Predictive Value (NPV) is 91.46%. So, a probability of pre term labour in woman with a cervical length of < 2.5 cm at 22 – 26 weeks of gestation with no predisposing complications is of 61.11%. The statistical analysis in our study was done by using chi-square test. On doing the chi-square test, the P value obtained is <0.00001, which is significant.

In this study,10 subjects with cervical length < 2.5 cm who had taken Tab. Dydrogestrone, among them majority 6 (60%) had term deliveries and 8 subjects with cervical length < 2.5 cm who had not taken Tab. Dydrogestrone, majority 7 (87.50%) subjects delivered preterm.

There are multiple predictors for preterm labor. In this study, the main aim was to study the correlation of a cervical length with the risk of preterm delivery. There was a strong correlation between short cervical length that was diagnosed in the second trimester pregnancy in low risk primigravidas and preterm labor.

Our study findings confirm the previous studies that have found an increase relationship between the cervical length and preterm delivery. If we pay attention to cervical length in the mid-trimester pregnancy in low risk primigravida, we can find out high risk group for preterm labor.

Conclusion

Ultrasonographic assessment of the cervical length in second trimester in low risk primigravida during anomaly scan has a promising role to offer in the prediction of the risk of developing preterm labor. Considering the magnitude of preterm labor, cost of management of preterm babies and morbidity and mortality associated with it, the use of sonographic assessment of cervix at 22 to 26 weeks of gestation as a routine screening method is cost effective and should be offered to all pregnant women.

Prevention of preterm labor remains a major challenge for the 21st Century. The role of the cervical length measurement by transvaginal ultrasonography in mid-trimester pregnancy is fundamental in predicting preterm labor and thus, in preventing preterm labor.

Women with short cervical length in their second trimester scan should offer oral progesterone/cervical encirclage as its effect also prevent the preterm labor.

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