

Association of Cervical Length at 18 To 23 Weeks Gestation in Predicting Preterm Delivery in Twin Pregnancies: A Prospective Observation StudyKumari Nisha^{1*}, Renu Jha²¹Senior Resident, Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar²Professor, Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar

Received: 25-10-2023 / Revised: 23-11-2023 / Accepted: 26-12-2023

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Conflict of interest: Nil

Abstract:

Background: While only 1.4% of pregnancies end in complications, twin pregnancies account for 15% of infant deaths. Predicting preterm delivery could enable targeted interventions such as cervical cerclage, tocolysis, and prenatal steroid induction, which could improve the outcome for the newborn. Predicting the likelihood of an early delivery can be done with the length of the cervix; a shorter cervix indicates a higher risk. The purpose of this research is to determine the relationship between cervical length and the incidence of preterm birth as well as to assess cervical length at the 18th and 23rd week of gestation in twin pregnancies in order to predict preterm delivery.

Method: 69 prenatal patients in total underwent cervical length screening at 18 weeks and 23 weeks of gestation at DMCH, Laheriasarai, Bihar, as part of this prospective observational study. 17 women were lost to follow-up after failing to deliver at the trial site. Three patients were electively terminated due to obstetrical issues, hence they were not included in the study.

Results: Preterm delivery was delivered by 22.4% of women at 18 weeks of gestation and 42.9% of women at 23 weeks of gestation with cervical lengths less than 25 mm, indicating a statistically significant link between short cervix and preterm delivery (P value < 0.001). Specificity and positive predictive value (PPV) were 100% at the 18- and 23-week gestation periods, respectively, whereas sensitivity was 18.92% and 54.05% at those times.

Conclusion: The current study demonstrates a moderately unfavorable connection between preterm birth incidence and cervical length. This implies that the likelihood of a preterm birth reduces as cervical length increases. Preterm delivery is more likely in women with shorter cervixes.

Keywords: Twin Pregnancy, Cervical Length, Preterm Delivery, Short Cervix, Gestation.

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Introduction

Prematurity is the primary cause of newborn illness and death, whereas twin pregnancies complicate 1.4% of pregnancies but account for 15% of neonatal mortality. [1] Compared to singleton pregnancies, spontaneous preterm delivery occurs in twin pregnancies roughly 7–10 times more frequently and tends to occur at an earlier gestation. [2]. Though it happens in less than 10% of pregnancies, deliveries before 37 weeks account for almost 75% of infant mortality. [3]. Preterm baby survival is mostly influenced by gestational age at birth; for example, survival rises from less than 5% for babies born at 23 weeks to over 95% by 32 weeks. [4, 5] For survivors, the chance of a severe disability drops from over 60% at 23 weeks to less than 5% at 32 weeks. [4–6] Predicting the likelihood of an early delivery can be done with the

length of the cervix; a shorter cervix indicates a higher risk. In women who are asymptomatic and carrying twins, the transvaginal sonographic (TVS) cervical length at 20 to 24 weeks gestation is thought to be a predictor of spontaneous premature birth. [7] In one study, TVS measures of the cervical length were obtained at least twice between the 15th and 24th weeks of gestation for 89 women who were at high risk of preterm delivery. The incompetent cervix can start to shrink as early as 15 weeks of gestation, according to the authors, and the group with an incompetent cervix experienced higher rates of cervical shortening than the group with a normal cervix. [8] Moreover, a number of studies have demonstrated that digital examination is less accurate than ultrasonographic assessment in detecting cervical abnormalities.

However, compared to the trans-abdominal technique, transvaginal cervical length measurement has fewer limits and provides for a higher quality and more accurate visualization of the uterine cervix. [9]

Materials and Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from June 2019 to December 2020. Patients with higher order multiple gestation reduced to twin pregnancy who attended antenatal outpatient department were eligible to participate. The study excluded all instances with a prior history of triplet or quadruplet pregnancies, cervical incompetence, or uterine abnormalities.

After meeting the inclusion and exclusion criteria, 69 prenatal patients were enrolled and had their cervical lengths screened at 18 and 23 weeks gestation. 17 women were lost to follow-up after failing to deliver at the trial site. Three patients were not included in the study because they underwent elective abortions for obstetrical reasons: one for hypertensive problems, one for an unavoidable abortion, and one for a missed abortion. At 18 and 23 weeks gestation, all patients had their cervical length measured by transvaginal sonography (TVS) with an 8 MHz transducer.

The women were asked to void, and a dorsal lithotomy position was used for the assessment. The anterior fornix of the vagina was used to introduce the transvaginal ultrasonography probe, which was covered in a sterile condom, until a sufficient sagittal image of the cervix was visible. The triangular echo density of the exterior OS and the 'V'-shaped appearance of the inside OS are used to identify them. The cervical length was measured

as the separation between the two. The internal, external, and endocervical canals must be visible, with at least 75% of the image taking up the screen, in order to be considered a sufficient image for measuring cervical length. Two measurements were made to determine the cervical length in millimeters (mm). For such patient, the cervical length was determined by taking the mean of the two measurements. Determining the gestational period at birth and its correlation with cervical length at 18 and 23 weeks gestation were the study's main goals. The factors that we took into account were: 1) brief cervix: cervix < 25 mm; funneling of the internal os > 1 cm; identification of the dilatation of the internal os with membrane herniation on speculum examination. 2) An early preterm birth occurs when a baby is born between 28 and 33 weeks and 6 days of pregnancy. 3) Late preterm birth: a delivery that occurs after 34 weeks of pregnancy but before 37 weeks and 6 days.

The statistical studies were carried out utilizing SPSS version 12.0. Fisher's exact test was used to determine if cervical length and premature delivery were related. A statistically significant result was defined as $p < 0.001$, and a significance level of 0.05 was used.

Results

37 preterm deliveries (75.5%) out of the 49 women examined in the study included 11 patients (22.44%) who delivered at 18 weeks and 26 patients (53.06%) who delivered at 23 weeks.

The mean gestational age of the 11 patients whose cervical length was less than 2.5 cm at 18 weeks of gestation was determined to be 33.01 weeks. As ten more patients reached the 23-week gestational phase, the cervical length further shrank, resulting in a mean gestational age of 33.21 weeks, as indicated in Table 1.

Table 1: Association of gestational age at delivery with cervical length at 18 weeks and 23 weeks period of gestation

Cervical length at 18 weeks in cm	Number of patients	Gestational age (weeks)	p-value
≤2.5	11	33.01±2.82	<0.001
2.51-3.00	14	34.36±2.73	
3.01-3.50	10	36.19±1.13	
3.51-4.00	12	36.77±1.34	
>4.00	2	37.57±0.00	
Cervical length at 23 weeks in cm	Number of patients	Gestational age (weeks)	p-value
≤2.5	21	33.21±2.68	<0.001
2.51-3.00	9	36.27±0.80	
3.01-3.50	14	36.64±1.42	
3.51-4.00	4	37.18±1.29	
>4.00	1	36.86±0.00	

Table 2 indicates a statistically significant relationship between short cervix at 18 and 23 weeks of gestation and premature delivery.

Table 2: Association of cervical length (CL) at 18 weeks and 23 weeks period of gestation and preterm delivery

Mode of delivery	CL 18 weeks in cm	Preterm		Total	p-value
		Yes	No		
LSCS	• ≥ 2.5	22	04	26	0.621
	• < 2.5	04	00	04	
	• Total	26	04	30	
Vaginal	• ≥ 2.5	08	08	16	0.228
	• < 2.5	03	00	03	
	• Total	11	08	19	
Mode of delivery	CL 23 weeks in cm	Preterm		Total	p-value
		Yes	No		
LSCS	• ≥ 2.5	15	04	19	0.268
	• < 2.5	11	00	11	
	• Total	26	04	30	
Vaginal	• ≥ 2.5	2	08	10	0.001
	• < 2.5	9	00	09	
	• Total	11	08	19	

Specificity and positive predictive value (PPV) were 100% at the 18- and 23-week gestation periods, respectively, whereas sensitivity was 18.92% and 54.05% at those times. According to Table 3, the negative predictive value (NPV) was 28.57% at 18 weeks and 41.38% at 23 weeks of gestation.

Table 3: Association of cervical length at 18 weeks and 23 weeks period of gestation and preterm delivery in study group

Cervical length at 18 weeks in cm	Preterm		Total
	Yes	No	
< 2.5	07	00	07
≥ 2.5	30	12	42
Total	37	12	49
Sensitivity%	Specificity%	PPV%	NPV%
18.92	100.00	100.00	28.57
Cervical length at 23 weeks in cm	Preterm		Total
	Yes	No	
< 2.5	20	00	20
≥ 2.5	17	12	29
Total	37	12	49
Sensitivity%	Specificity%	PPV%	NPV%
54.05	100.00	100.00	41.38

Discussion

Compared to women expecting a single child, women who become pregnant again run a higher danger to both themselves and their unborn children. 43.6% of all twin births are preterm, compared to 5.6% of singleton pregnancies. [10] Preterm births (PB) in twin pregnancies are not uncommon. However, twin pregnancies are linked to higher rates of morbidity and mortality, which are nearly invariably due to the consequences of preterm. [11]

Transvaginal ultrasonography screening for cervical length is a reliable indicator of PB risk. Serial cervical length measurements were performed on women with twin gestations between 14–18 weeks and 28–32 weeks. Results showed that cervical length exhibited four patterns: stable, early-rapid shortening, late-shortening, and early shortening with a plateau. Each pattern exhibited a distinct risk of postpartum hemorrhage, with the

early-rapid shortening group having the highest risk. [12]

Cervical length measured in asymptomatic twin pregnancies in the middle of the third trimester, however, was not a good indicator of PB < 32 weeks gestation. [13] A 3-week period revealed that a cervical length shortening of more than 10% was linked to a higher risk of postpartum hemorrhage. [14]

It was revealed that women who had cervical dilatation had a higher risk of postpartum hemorrhage (PB), and that preterm birth was independently correlated with short cervical length. [15] The best cut-off for predicting the actual preterm labor with 81% specificity and 83% positive predictive value was found to be a cervical length of less than 15 mm. [16] Comparably, other studies have found different ideal CL cutoff values for preterm labor, ranging from 18 to 30 mm. For our purposes, we chose a cutoff of 25 mm for CL,

which was assessed twice at 18 and 23 weeks of gestation. The mean gestational age of 11 individuals, whose cervical length was less than 2.5 cm at 18 weeks of gestation, was determined to be 33.01 weeks. When 10 additional patients reached the 23-week gestational period, the cervical length further shrank, resulting in a mean gestational age of 33.21 weeks. This can be explained by the observation that the number of women with shorter cervixes rises as the pregnancy goes on, as the process of cervix shortening is a constant. The current study discovered a strong link between a short cervix at [18] and 23 weeks of gestation with preterm delivery.

When Souka et al. [17] examined cervical length in 215 twin pregnancies at 23 weeks gestation, they discovered that the distribution of cervical length was skewed toward shorter length, with a median value of 38 mm. They discovered that the length was up to 25 mm in 11.2% of instances and up to 15 mm in 4.2% of cases, respectively. After examining 464 twin pregnancies, Skentou et al. [18] discovered that the cervical length distribution had a leftward skewed median value of 36 mm. Similar to the current study; the rate of spontaneous birth before 33 weeks was inversely correlated with cervical length at 23 weeks.

Gibson et al. [19] conducted transvaginal ultrasound assessments of cervical length serially at 18, 24, 28, and 32 weeks' gestation for 248 twin pregnancies. They discovered that the best predictors of preterm delivery were cervical lengths of less than 25 mm at 18 weeks (LR+ 9.7, sensitivity 14.3%) and less than 22 mm at 24 weeks (LR + 9.6, sensitivity 28.6%). Consistent with current data, which show sensitivity of 18.92% at 18 weeks and 54.05% at 23 weeks of gestation, they also determined that this test's low sensitivity renders it inappropriate as a stand-alone predictor of premature delivery.

In their analysis of 65 twin pregnancies, Yang et al. [20] measured the cervical length at 22 and 24 weeks of gestation. They discovered that cervical funnelling in twin pregnancies under 26 weeks of gestation and cervical length <30 mm are both independently and strongly associated with a high risk of preterm birth. A lengthy cervix (longer than 35 mm) is linked to a very low (4%) risk of premature delivery. In their investigation, Berghella et al. [21] came to the conclusion that transvaginal ultrasonography cervical length is unquestionably better at predicting preterm labor than the clinically employed manual dilatation.

The most reliable and valid variable for transvaginal ultrasonography cervical assessment in preterm birth prediction is cervical length. [22] The prediction made just on cervical length is not improved by adding funnelling. Cervical length

was strongly predictive of preterm labor, while funnelling (>5mm) was not found to be predictive in the Vendittelli 23 trial.

Conclusion

According to the current study, there is a moderately strong negative association between the likelihood of preterm delivery and cervical length, meaning that the likelihood of preterm birth lowers as cervical length increases. Additionally, a short cervix can be used as a screening tool to anticipate preterm labor and is a good predictor of preterm birth in twin pregnancies.

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