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A Study to Assess Effect of Cervical Length on Preterm Delivery in a Tertiary Care Institute

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Original Research Article

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Abstract: Preterm birth is the leading cause of perinatal morbidity and mortality. Risk assessment of preterm delivery remains difficult and part of clinical problems arises from the absence of objective criteria for the prediction of early diagnosis of preterm labour. A decrease in cervical length in the second trimester is predictive of spontaneous preterm birth, with the highest risk in women with early and substantial cervical shortening. Till now very few reports of serial transvaginal ultrasonographic measurements of cervical length design prospectively in the evaluation of preterm labour are available. The studies on the correlation of length of cervix during pregnancy and outcome of pregnancy as preterm labour or full term delivery are also scanty. The present study was thus conducted with the objective of assessing the cervical length amongst the low risk pregnant women and to determine the effect of cervical length on outcome of pregnancy.
Keywords: Preterm, cervical, labor, perinatal.

INTRODUCTION

Despite advances in perinatal care, the incidence of preterm birth continues to rise, primarily because of the increased multiple pregnancies resulting from assisted reproduction [1-4].

Tocolytics prolong pregnancy minimally once preterm labour has begun but they can be associated with significant undesirable maternal, fetal and neonatal consequences [5-8]. In order to address the prematurity problem, it is important to identify those at increased risk.

Improved management of this condition may result if the patient at risk for preterm delivery could be identified before the onset of uterine activity [9].Cervical shortening (ie, effacement) is one of the first steps in the processes leading to labor and can precede labor by several weeks. A decrease in cervical length in the second trimester is predictive of spontaneous preterm birth, with the highest risk in women with early and substantial cervical shortening [10,11].

Cervical length screening and intervention can be cost-effective [12,13], as approximately 30 percent of these women will deliver before 35 weeks of gestation without intervention.

Traditional methods of evaluating the cervix in pregnancy are risk scoring system and digital examination of cervix. However these methods have limitations and they lack in accuracy and hence are unsatisfactory. Several studies have attempted to predict the onset of preterm labour using risk scoring systems based on epidemiological data or digital examination of cervix. However risk scoring systems have a limited role because they may identify up to only about 30% of the population [14].

Ultrasonography provides an objective method for the measurement of cervical length during pregnancy. This can be done either on transabdominal or transvaginal approach. In transabdominal ultrasonography, the bladder filling improves visualisation of the cervix and the length of cervix can be measured. However it artificially lengthens the cervical measurements and hence accurate measurements are not possible by this method [15]. Transvaginal ultrasonographic examination has the potential of providing precise, objective and repeatable measurements of cervical length without confounding effect of distended bladder.

The scanning of the patient with ultrasonography involves no risk, no discomfort and is non-invasive and thus has distinct advantage over

digital measurements of cervical length. Adequate measures to retain the wanted pregnancy can be taken if short cervical length is diagnosed earlier.

MATERIALS AND METHODS

160 pregnant women attending the OPD at a tertiary care hospital were included in the study. Transvaginal sonography was performed at 18-20 weeks and 28-30 weeks of gestation. Cervical length was measured using transvaginal ultrasonography with the standard longitudinal view of cervix while patient's bladder was empty. PHILIPS HD 7 1 4-18 MHz Transvaginal probe was used to measure cervical length. It was measured by keeping the probe 3 cm away from the posterior fornix . The cervical length is ideally defined as length between the internal os and the external os. Patients were then followed up till delivery. The gestational age at delivery and the fetal outcome, in terms of baby weight were then noted.

Inclusion criteria
- Women with singleton pregnancy
- Women at gestational age 18-20 weeks and 28-30 weeks
- Primigravida

Exclusion criteria
- Multiple pregnancy
- Women with obstetric and medical complications like Pregnancy Induced Hypertension , Diabetes Mellitus , Renal Disorders etc
- Women with diagnosed uterine anomalies , previous history of surgery on cervix like conisation etc
- Congenital fetal anomalies.
- Cervical length less than 2 cm because these patients will be advised encirclage.

RESULTS

In the present study amongst 145 patients studied, the pregnancy outcome depicted that 4 (2.76%) patients aborted, 5 (3.45%) had preterm delivery and 136 (93.79%) patients had term delivery. The abortion and preterm delivery taken together was 6.2%. At 18-20 weeks, mean cervical length of subjects with abortion, pre-term and term deliveries were 22.5 mm, 26.2 mm and 42.03 mm respectively ($p<0.01$; all groups). At 28-30 weeks, mean cervical length of females with pre-term and term deliveries were 23.0 mm and 32.4 mm respectively ($p<0.01$).

Table-1: Mean cervical length of subjects measured at 18-20 weeks and 28-30 weeks

Cervical Length (mm)	Gestation Age	Mean	SD	Min	Max
	18-20 weeks (n-145)	41.90	8.70	23.00	56.00
	28-30 weeks (n-141)	30.94	8.62	20.00	54.00

Mean cervical length at 18-20 weeks was 41.90 mm while at 28-30 weeks was 30.94 mm.

Out of 145 females, term birth was seen in 93.8% while pre-term birth and abortion was seen in 3.4% and 2.8% cases respectively.

Table-2: Distribution of subjects based on type of delivery

Type of Delivery	N	%
Term Birth	136	93.8%
Pre-term Birth	5	3.4%
Abortion	4	2.8%
Total	145	100.0%

Table-3: Association of Cervical length at 18-20 weeks and pregnancy outcome

Cervical length (18-20 weeks) in mm	Pregnancy Outcome		Total
	Term	Preterm	
20-29	1	8	9
	11.1%	88.9%	100.0%
30-39	65	1	66
	98.5%	1.5%	100.0%
40-49	61	0	61
	100.0%	0.0%	100.0%
50-59	9	0	9
	100.0%	0.0%	100.0%
Total	136	9	145
	93.8%	6.2%	100.0%
p- value <0.01			
*4 females with cervical length between 20-29 mm aborted before 28			

weeks

At 18-20 weeks, out of 9 cases of cervical length between 20-29 mm 8 had pre-term termination of pregnancy, while only 1 case out of 136, with cervical length above 30 mm had pre-term delivery (p<0.01)
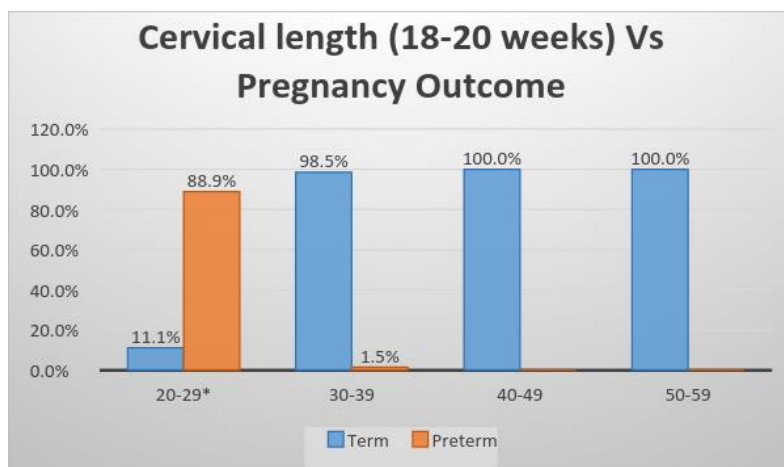
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Table-4: Association of Cervical length at 28-30 weeks and pregnancy outcome

Cervical length (28-30 weeks)	Pregnancy Outcome*		Total
	Term	**Preterm**	
20-29	3	5	8
	37.5%	62.5%	100.0%
30-39	83	0	83
	100.0%	0.0%	100.0%
40-49	49	0	49
	100.0%	0.0%	100.0%
50-59	1	0	1
	100.0%	0.0%	100.0%
Total	136	5	141
	96.5%	3.5%	100.0%
p- value <0.01			

*4 females with cervical length between 20-29 mm aborted before 28 weeks

At 28-30 weeks, out of the 8 cases of cervical length between 20-29 mm, 5 had pre-term termination of pregnancy, while none of the cases out of 136, with cervical length above 30 mm had pre-term delivery (p<0.01).
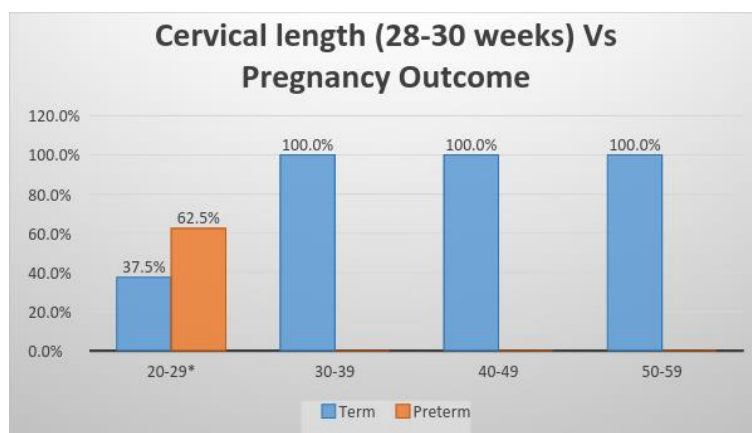
Table-5: Distribution of study subjects as per change in cervical length between 2 follow ups

Cervical Length Change between 2 follow ups	N	%
Increased	12	8.5%
No Change	21	14.9%
Decreased	108	76.6%
Total	141	100.0%
* 4 cases were aborted		

On studying the variation between cervical lengths during 18-20 to 28-30 weeks, we observed that cervical length decreased in 76.6% of cases while it was static and increased in 14.9% and 8.5% cases respectively.

DISCUSSION

Mean cervical length at 18-20 weeks was 41.90 mm while at 28-30 weeks was 30.94 mm. The shortest length observed was 21 mm and 20 mm and longest was 57 mm and 54 mm at 18-20 and 28-30 weeks respectively.

In the present study amongst 145 patients studied, the pregnancy outcome depicted that 4 (2.76%) patients aborted, 5 (3.45%) had preterm delivery and 136 (93.79%) patients had term delivery. The abortion and preterm delivery taken together was 6.2%. At 18-20 weeks, mean cervical length of subjects with abortion, pre-term and term deliveries were 22.5 mm, 26.2 mm and 42.03 mm respectively (p<0.01; all groups). At 28-30 weeks, mean cervical length of females with pre-term and term deliveries were 23.0 mm and 32.4 mm respectively (p<0.01).

An attempt was made to find out cut off point of cervical length to decide the preterm versus term delivery as the final outcome. It was found that cervical length of more than 30 mm resulted in full term delivery while cervical length less than 30 mm resulted, either in abortion or preterm delivery. At cut-off point of 30 mm at 18-20 weeks, the sensitivity, specificity, PPV and NPV of cervical length to predict pre-term deliveries was 88.9%, 99.3%, 88.9% and 99.3% with diagnostic accuracy of 98.6%

CONCLUSION

It is concluded from the present study that the use of transvaginal sonography to evaluate the cervical length provides important prognostic information for prediction of preterm labour. The risk of preterm delivery increases steeply as cervical length decreases. The cervical length of less than 30 mm at 18-20 weeks, can predict a preterm delivery with good diagnostic accuracy.

All the cases of pre-term delivery showed cervical shortening at subsequent follow up (28-30 weeks). It is thus recommended that serial estimations of cervical length by transvaginal sonography at various weeks of gestation should be carried out whenever possible.

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