

# To Evaluate Efficacy of Sonographic Cervical Length to Predict Preterm Labour.

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## ABSTRACT

**Background:** Preterm birth is a major challenges faced by obstetricians worldwide during their practice. Preterm birth is one of a leading direct cause of neonatal death (27%) and more than one million preterm newborns die annually due to various complications. This study done to look for diagnostic efficacy of sonographic cervical length to predict preterm labour.

**Methods:** A prospective study comprised of a total of 132 pregnant women with a singleton foetus with symptoms of preterm labour. Sonographic trans-cervical length measurement taken in all patients. **Results:** Out of which 17 patients were lost during follow up, 3 patients develop premature rupture of membrane. Hence, a study was conducted over 112 patients. Among these 62 patients went in preterm labour and 50 patients delivered at term. For predicting preterm delivery, sensitivity, specificity, positive and negative predictive value of cervical length was 82.2%, 74%, 79.6% and 77%.

**Conclusion:** Sonographic cervical length is a good predictor. Patients with reduced cervical length are more likely to deliver preterm.

**Keywords:** Cervical length, Preterm birth, Sonography.

## INTRODUCTION

Preterm birth is a major challenges faced by obstetricians worldwide during their practice. Preterm birth is one of a leading direct cause of neonatal death (27%) and more than one million preterm newborns die annually due to various complications.<sup>[1]</sup> According to report 'India is among the top 10 countries that account for 60 per cent of the world's preterm births. Nearly half of all child deaths in India are caused due to premature births, making it the second leading cause in the country, said a report by international NGO "Save the Children".

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Preterm labour is defined by the world health organization as the onset of labour prior to the completion of 37 week of gestation, in a pregnancy beyond 20 week of gestation. The traditional criteria for preterm labour is persistent uterine contractions

accompanied by cervical effacement and dilatation (contraction frequency is six or more per hour, cervical dilatation is 3 cm or more effacement is 80% or more). These criteria have suboptimal sensitivity and specificity because of the common occurrence of symptoms and signs of early preterm labour in normal pregnancy, and the imprecision of digital examination of the cervix, the rate of false positive diagnosis rises to as much as 40%. The practice of initiating tocolytic drugs for contraction frequency without any additional diagnostic criteria results in unnecessary treatment of women who do not actually have preterm labour.

There are various methods available to detect preterm labour early, which includes cervical length measurement by ultrasound examination.

### Aims and Objectives

To evaluate the efficacy of sonographic cervical length to predict preterm labour.

## MATERIALS AND METHODS

This prospective study was conducted in GSVM Medical College, Kanpur, department of obstetrics and gynaecology and radio diagnosis.

**Inclusion criteria:** 132 patients with a singleton pregnancy admitted to our hospital with symptoms of preterm labour were included in this study. Others inclusion criteria involve no history of apparent genitourinary infection, normal pre pregnancy BMI, Previous history of preterm labour and with history of threatened abortion.

**Exclusion criteria:** Patients with Cervical dilation >2cm, Multiple gestation, premature rupture of membrane, Antepartum haemorrhage, sign of fatal distress, any foetal congenital anomaly and intrauterine death, Metabolic syndrome and Cardiovascular disease, History of cervical incompetence, cone biopsy, history Cervical circlage, previous Manchester repair and History of associated infection and inflammation were excluded from study.

**Methodology:** After taking thorough history & complete examination (general, systemic, per speculum and vaginal), all basic routine ANC investigations were taken and sent to laboratory. After abdominal ultrasound to confirm the foetal maturity, amount of liquor and congenital anomaly TVS was performed with a vaginal probe with a scanning field of 90° and 5 MHz/7.5 MHz frequency for cervical length measurement in radiology department of our hospital. The receiver operating characteristic curve analysis was applied to determine the optimal cut-off values of sonographic cervical length for predicting delivery before 37 completed gestational weeks. These patients were followed by delivery.

Out of total 132 patients included in study, 17 patients were lost during follow up, 3 patients develop PPROM. Hens study was conducted over

112 patients. Among these 62 patients went in preterm labour and 50 patients delivered at term. On the basis of cervical length patients were divided into two groups:-

1. Patients with normal cervical length ( $\geq 30\text{mm}$ ).
2. Patients with decreased cervical length ( $< 30\text{mm}$ ).

Logistic regression analysis, Hanley & McNeil ROC curve analysis, independent sample t-test were used to analyse the data using Medcalc and Instat statistical software.

## RESULTS

Regarding age distribution, majority of patients delivered preterm i.e. 34(54%) was between 21 – 25 years and minimum 4(6.4%) patients were  $> 30$  years. Regarding parity incidence of preterm delivery were higher in primigravida (56.4%) than multigravida (43.5%).

In our study significant difference of mean cervical length on admission was found between patients delivered preterm and term [Table 1].

**Table 1: Mean cervical length in term & preterm groups.**

	Term	Preterm	P value
Mean cervical length (mm)	32.59 $\pm$ 4.0	24.83 $\pm$ 6	.0001
Total no. of patients	50	62	

Among patients delivered preterm (n=62) maximum 23 (37%) patients had gestational age  $< 24$  weeks on admission. Mean cervical length on admission and mean gestational age of delivery were  $21.22 \pm 4.6$  mm and  $26.5 \pm 2.5$  weeks respectively. Mean cervical length increased and mean gestational age of delivery decreased [Table 2].

**Table 2: Mean CRP value and mean cervical length in different gestational age groups in patients delivered preterm.**

Gr.	Gestational Age on admission	No. of cases		Mean CL $\pm$ SD (mm)	Mean GA of delivery(weeks)
		No.	%age		
I	$< 24$ weeks	23	37	$21.22 \pm 4.6$	$26.53 \pm 2.5$
II	24 – 28 weeks	14	22.5	$25.88 \pm 3.8$	$28.22 \pm 1.7$
III	28 – 32 weeks	13	21	$27.92 \pm 2.1$	$30.48 \pm 1.9$
IV	$> 32$ weeks	12	19.3	$27.96 \pm 1.8$	$36.17 \pm 0.75$

**Table 3: Comparative statistical analysis of ROC curve cervical length.**

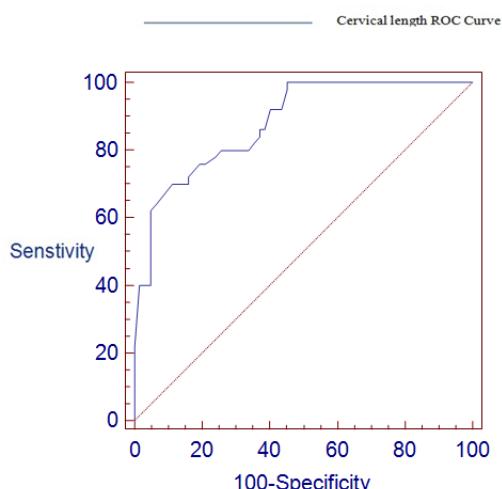
	Cervical length
Area under ROC curve	.763
Standard error	.0453
95% confidence interval	.673 to .838
Z statistics	
Significant level (p value)	5.808 $< .0001$

Area under ROC curve for Cervical length was higher (.88) [Table 3] and [Figure 1]. So according to our study cervical length is good predictor with

high sensitivity (82.2%) and high specificity (74%) in if preterm delivery taken in account ( $< 37$  weeks). But, sensitivity (89 %) and specificity (53 %) is changes if preterm delivery taken in account of  $< 34$  weeks [Table 4].

**Table 4: Diagnostic accuracy of cervical length in predicting preterm delivery.**

	Sn	Sp	PPV	NPV
Cervical length $< 37$ weeks	82.2%	74%	79.6%	77%
Cervical length $< 34$ weeks	89%	53%	44%	92%



**Figure 1:** ROC curve of cervical length.

## DISCUSSION

Prematurity continues to be the major cause of neonatal morbidity and mortality across the world accounting for an enormous 70% of neonatal deaths in non-anomalous babies Wen S. W.(2004)<sup>[2]</sup>. Efforts to predict preterm delivery have classically been based on history and examination findings only. But these risk assessment scores have poor predictive values Lembet A. (2002)<sup>[3]</sup>& Kwek K ( 2004 )<sup>[4]</sup>. Prediction of preterm delivery by simple technique will help in early intervention and subsequent prevention of preterm labour. This is especially important in a country like ours where intensive care unit facilities are often not available or may be financially not possible. Preterm birth is the main cause of morbidity and mortality during the perinatal period. Classical risk factors are held responsible for only 1/3 of preterm births and no current intervention has produced an appreciable reduction of this event.<sup>[5]</sup>

Cervical length is normally distributed and remains relatively constant in pregnancy until the third trimester. If there is any statistically significant reduction in length, it is not clinically significant (<0.5 mm /week)<sup>[6-10]</sup>.

According to our study best cut off value for sonographic cervical length for predict Preterm delivery was 30 mm with Sensitivity and specificity 82.2% and 74%. Our results are consistent with those of Jams et al (1996)<sup>[11]</sup> and Honest et al (2003)<sup>[12]</sup>that accurately measured ultrasound cervical length have an inverse relationship with the risk of preterm birth

The statistically significant difference in mean cervical length we noted between patients delivered preterm (<37 weeks) and term (p value=.0001). In 2010 Sotiriadis et al<sup>[13]</sup> published a meta analysis of Cervical length measurement in patient presenting with symptoms of preterm labour and suggest that cervical length measurement can be used to

discriminate between those at higher and those at lower risk of preterm labour which may help to rationalize their management. Like our study Berghenella et al (2007)<sup>[14]</sup> and Adhikari K(2009)<sup>[15]</sup> also found that gestational age at which trans-vaginal U/S cervical length measured significantly affect the risk of spontaneous preterm birth. Spontaneous preterm birth risk increases as the length of the cervix decline and gestational age decreased and is important for counselling and managed for women with various degree of short cervical length at different gestational age.

It was observed in the present study that sensitivity and specificity for both sonographic cervical length (82.2% and 74%) was high so it can be used as a screening tool for prediction of preterm labour but sonographic cervical length has a higher negative predictive value (77%). So, sonographic cervical length were more effective in discriminating between true and false birth Singleton pregnancy.

## CONCLUSION

Based on this study it can be concluded that sonographic cervical length is good predictor for preterm delivery as sensitivity and specificity and negative predictive value of sonographic cervical length was good. So, sonographic cervical length is differentiate women who were likely to deliver preterm than those who were not. This information may help patients avoid unnecessary interventions of unproven value such as tocolysis, hospitalization, and activity restriction in patients presenting with symptoms of preterm labour.

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