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Research Article

Prediction of risk of preterm delivery by cervical assessment by trans-vaginal ultrasound

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ABSTRACT

Background: Our Objectives were to determine the mean cervical length in low risk asymptomatic pregnant population at 22-24 weeks of gestation and to find out the correlation of a cervical length <2.5 cm and presence of funneling with the risk of preterm delivery.
Methods: This study was done at a Tertiary care centre. Cervical assessment for cervical length and presence or absence of funneling was done for low risk asymptomatic pregnant women at 22-24 weeks of gestation. Females 50 in number with cervical length <2.5 cm and 50 with cervical length ≥2.5 cm were followed till delivery. The results were analyzed by obtaining p value.
Results: 90.9% of subjects with a Cervical length <2.5 cm and presence of funneling delivered preterm. 90% of subjects with cervical length ≥2.5 cm delivered at term. The p value of this study was <0.001 indicating that cervical length <2.5 cm at 22-24 weeks of gestation with presence of funneling, is highly predictive of preterm delivery.
Conclusions: There is a definitive correlation between short cervical length with presence of funneling and occurrence of preterm delivery. Trans-vaginal Ultrasound of cervix is a safe, acceptable, sensitive and a cost effective screening test to assess the risk of preterm delivery.

Keywords: Trans-vaginal ultrasound, Cervical length, Funneling, Preterm delivery

INTRODUCTION

Preterm birth is defined as birth before 37 weeks of gestation.[1] The importance of preterm labour 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.[2]

Most common causes of preterm labour include genital tract infections and inflammation, uterine over distension, bleeding in choriodecidual interface and idiopathic causes.[3]

Severe morbidity such as intra-ventricular haemorrhage, respiratory distress syndrome, bronchopulmonary dysplasia, necrotising enterocolitis is common in neonates born before 28 weeks and extends into 30-32 weeks range.[2,4]

Seeing to the complications of preterm births it is desirable to take measures to prevent preterm delivery if possible or to refer women with risk of preterm delivery to centres with well-equipped neonatal care units.[5]

Several methods like home uterine monitoring, cervical examination, fetal fibronectin in cervico-vaginal secretions etc. have been used for identifying women at risk of preterm delivery. But these methods have been associated with either low sensitivity or specificity or are not cost effective.

Cervical assessment including cervical length and presence or absence of funnelling at 22-24 weeks of gestation using trans-vaginal ultrasound has emerged as a sensitive, specific and cost effective tool for prediction of risk of preterm delivery.

METHODS

The subjects for the study were low risk asymptomatic pregnant females at 22-24 weeks of gestation. Trans-vaginal sonographic cervical assessment including measurement of cervical length and presence or absence of funneling was done for these females after written informed consent.

50 women with cervical length <2.5 cm and another 50 with cervical length ≥2.5 cm were followed till delivery. The study was done using 7.5 mhz trans-vaginal probe on Honda machine. The cervical length was measured as the distance between triangular echogenicity of external os and V shaped notch of internal os. Sonography was done on empty bladder in dorsal position. The vaginal probe was manipulated to obtain a sagittal view of entire cervix with echogenic mucosa along the length of cervical canal. Undue pressure on cervix was avoided. Criteria for exclusion of subjects from study.

- Females with history of preterm births
- Females with present or past history of genital infections
- Females with medical disorders like diabetes, heart diseases or conditions like pregnancy induced hypertension
- Females with conditions like multiple pregnancy, congenital malformation, intrauterine death, placental infarction, placenta previa or abruption, polyhydraminos, big baby.

Informed consent was obtained from all individual participants included in the study.

RESULTS

In this study 88% of the subjects with a cervical length <2.5 cm delivered preterm. The presence of funnelling increased the probability of preterm delivery.

90.9% of the subjects with a cervical length <2.5 cm and presence of funnelling delivered preterm.

85.71% of subjects without funnelling but cervical length <2.5 cm delivered preterm.

90% of subjects with cervical length ≥2.5 cm delivered at term.

The mean cervical length at 22-24 weeks of gestation was found to be 36.43±7.98 mm.

The statistical analysis was done using Chi square test.

The results are shown in Table 1 and 2.

The p value of this study was <0.001 indicating that cervical length <2.5 cm at 22-24 weeks of gestation with presence of funnelling is highly predictive of preterm delivery.

Table 1: Tabular representation of fate of subjects with cervical length <2.5 cm.

Cervical length <2.5 cm	Funnelling	Preterm delivery	Term delivery
	Present 22	20	2
	Absent 28	24	4
Total	**n=50**	**n=44**	**n=6**

Table 2: Tabular representation of fate of subjects with cervical length ≥2.5 cm.

Cervical length ≥ 2.5 cm	Funnelling	Preterm delivery	Term delivery
	Present 4	1	3
	Absent 46	4	42
Total	**n=50**	**n=5**	**n=45**

DISCUSSION

Though preterm birth occurs in approximately 5-15 % of all deliveries it accounts for the major bulk of perinatal and especially postnatal deaths.[6] The risk of neonatal morbidity and mortality mainly depends on the gestational age at delivery. Survival rate increases with increasing period of gestation. In a developing country like ours, where intensive care facilities are often unavailable, mortality figures would be much higher at a lower gestation period at delivery.

The main reason for low success rate of tocolytic therapy is failure to detect patient at an early stage. Thus it becomes essential to identify women, both symptomatic and asymptomatic, who are at risk of preterm delivery early enough so that an optimum treatment in the form of tocolysis or cerclage can be given in time. Unfortunately current methods of identifying women at risk of preterm delivery like a scoring system based on demographic factors and digital examination of cervix have low sensitivity and specificity. Objective methods such as evaluation of the presence of cervico-vaginal fibronectin, direct or indirect assessment of subclinical infection including bacterial vaginosis, and assessment of cervical or amniotic cytokine concentration are accurate, but expensive and often unavailable.

Ultrasonographic assessment of the cervix has emerged as an alternative method to objectively assess cervical length and morphology for prediction of preterm labour. Acceptability and repeatability of this procedure were

found to be good. In this study cervical length <2.5 cm was taken as cut off value. 88% of the subjects with a cervical length <2.5 cm delivered preterm. The presence of funneling increased the probability of preterm delivery. 90% of the subjects with a cervical length ≥2.5 cm delivered at term. Thus cervical length <2.5 cm as a screening test for the prediction of risk of preterm delivery has a sensitivity of 89.8%, a specificity of 88.2%, a positive predictive value of 88% and a negative predictive value of 90%. Our results are in consonance with those of Tanveer SG et al, Lim K et al.[7,8]

CONCLUSION

There is a definite correlation between short cervical length with presence of funnelling and occurrence of preterm delivery. Trans-vaginal ultrasound of cervix is a safe acceptable, sensitive and a cost effective screening test to assess the risk of preterm delivery.

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