



**CERVICAL LENGTH ASSESSMENT BY TRANSVAGINAL
SONOGRAPHY AT 22-24 WEEKS OF GESTATION AND ITS
ASSOCIATION WITH PRETERM DELIVERY AMONG LOW RISK
ASYMPTOMATIC PREGNANT WOMEN**

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ABSTRACT

Preterm birth, defined as delivery before 37 weeks of pregnancy, continues to be leading cause of perinatal morbidity and mortality. The frequency of preterm delivery in live birth ranges from 5%-15% and it is responsible for approximately 80% of neonatal mortality. The present study was done to study association between cervical lengths (at 22-24 weeks of gestational age) measured by transvaginal

ultrasound (TVUS) and risk of preterm delivery among low risk asymptomatic pregnant women. Cervical assessment by TVUS was done in 200 low risk asymptomatic women 22-24 weeks of gestational age. Length of cervix and status of internal os were recorded. These parameters were correlated with period of gestational age. Gestation at delivery in women with cervical length <3 cm (group A, n=45) were compared to women with cervical length \geq 3 cm (group B, n=155). Statistical analysis was done by Chi-square test. Mean cervical length in present study was 33.04 ± 6.73 mm with no significant difference between primigravida and multigravida. There was definitive positive correlation between cervical length at 22-24 weeks and gestational age at delivery (r-value= 0.051). Average gestation age at delivery in group A was 33.06 ± 4.58 weeks as compared to 38.60 ± 1.16 weeks in group B ($p < 0.005$). Transvaginal ultrasonic examination of cervix is a simple, sensitive method of assessing risk of preterm delivery.

KEYWORDS: Transvaginal ultrasound, Preterm birth, Cervical length, Gestational age

INTRODUCTION

Preterm birth, defined as delivery before 37 weeks of pregnancy, continues to be leading cause of perinatal morbidity and mortality. ^[1] The frequency of preterm delivery in live birth ranges from 5%-15% and it is responsible for approximately 80% of neonatal mortality. This makes early diagnosis of preterm labour a prime objective.

Short cervical length is associated with increased risk of preterm delivery so evaluation of cervix is important. Digital examination of cervix is subjective and variable while ultrasonographic measurements of cervical lengths offer a good objective way to examiner. Normal length of cervical is distributed along a bell shaped area with a mean of 3.5 cm at 24-28 weeks of gestation. Studies have shown that risk of preterm labour is inversely proportional to cervical length at 24-28 weeks as shortening occur above 10 weeks before onset of labour. ^[2-4]

The present study was done with an objective to evaluate cervical length assessment by TVUS and to study the correlation between cervical length and preterm delivery.

MATERIALS AND METHODS

This hospital based observational study was conducted in department of Obstetrics and Gynaecology in a tertiary care hospital from January 2009 to January 2010. The participants were selected based on the following inclusion and exclusion criteria.

Inclusion criteria- Asymptomatic low risk pregnant women with definitely known last menstrual period who attended antenatal OPD with singleton live pregnancy at 22-24 weeks of gestation regardless of parity.

Exclusion criteria- Multiple pregnancy, uterine malformation, pregnancy with fibroid uterus, history of first trimester bleeding, congenital malformation of fetus, medical or surgical illness which may influence pregnancy outcome, cervical incompetency, history of previous preterm delivery.

Eligible patients who had prior written consent underwent TVUS at 22-24 weeks of gestation to determine cervical length. All enrolled women regularly followed up at defined intervals till delivery. Findings of cervical lengths assessment were then correlated with periods of gestation at delivery. Gestational age at delivery was calculated by best estimate according to menstrual history. Preterm delivery was defined as delivery before 37 completed of gestation.

RESULTS

A total of 200 subjects were included in the study.

Table 1: Distribution according of gestational age at time of delivery

Gestational age at delivery	Group-A (Cervical length <3 cm)	Group-B (Cervical length ≥3 cm)	Total
Term (Gestational age ≥37 weeks)	7 (15.56%)	132 (85.16%)	139 (69.50%)
Preterm (Gestational age < 37 weeks)	38 (84.45%)	23 (14.84%)	61 (30.50%)
Total	45 (100%)	155 (100%)	200 (100%)

Table 1 shows incidence of preterm delivery in study population was 30%, out of this 84.5% were in group A (cervical length < 3cm) and 14.84% in group B (cervical length ≥ 3 cm).

Table 2: Relationship of cervical length with gestational age at time of delivery

Cervical length (cm)	Term	Preterm (Gestational age in weeks)			Total
		<28 wks	28-32 wks	33-37 Wks	
1.5-1.9	0 (0.0%)	8 (17.77)	2 (4.44%)	0 (0.0%)	10 (22.23%)
2.0-2.4	2 (4.44%)	3 (6.66%)	9 (20.0%)	4 (8.88%)	18 (40.0%)
2.5-2.9	5 (11.11%)	1 (2.23%)	3 (6.66%)	8 (17.79%)	17 (37.77%)
3.0-3.4	40 (25.80%)	1 (2.23%)	2 (4.44%)	17 (10.97%)	60 (38.71%)
3.5-3.9	77 (49.67%)	0 (0.0%)	0 (0.0%)	3 (1.94%)	80 (51.62%)
4.0-4.4	15 (9.67%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (9.67%)

Table 2 shows patients with cervical lengths <2 cm were 22.23% and risk of preterm delivery was 100%., patients with cervical length between 2-2.4 cm were 40% and risk of preterm delivery was 88.88%,in patients with cervical length between 2.5-2.9 cm were 37.77% and risk of preterm delivery was 70%, patients with cervical length between 3-3.4 cm were 38.71% and risk of preterm delivery was 50%, patients with cervical length between 3.5-3.9 cm were 51.62% and risk of preterm delivery was 3.7%, patients with cervical length > 4cm were 9.67% and risk of preterm delivery was 0%.

Table 3: Correlation of open internal os and funnelling and preterm delivery

Gestational age(wks)	Group-A (C.L. <3cm)		Group-B (C.L. ≥3cm)	
	Closed(<5mm)	Open(>5mm)	Closed(<5mm)	Open(>5mm)
<28	0(0.0%)	12(26.66%)	0(0.0%)	5(3.22%)
28-32	0(0.0%)	14(31.11%)	0(0.0%)	18(11.61%)
33-37	0(0.0%)	12(26.66%)	0(0.0%)	0(0.0%)
>37	7(15.55)	0(0.0%)	132(85.16%)	0(0.0%)

Table-3 shows there was definite correlation between open internal os and incidence of preterm delivery. Patients with open internal os (internal os diameter ≥ 5 mm) were 30% and had 100% risk of preterm delivery. Patients with closed internal os (internal os diameter < 5 mm) had 0% risk of preterm delivery.

Table 4: Validity of present study

Cut off value of cervical length by TVUS	Sensitivity	Specificity	PPV	NPV
3 cm	62.29%	94.90%	84.44%	85.16%

Table 4 shows sensitivity, specificity, PPV and NPV of <3 cm cervical length for prediction of preterm delivery is 62.69%, 94.90%, 84.44%, and 85.16% respectively.

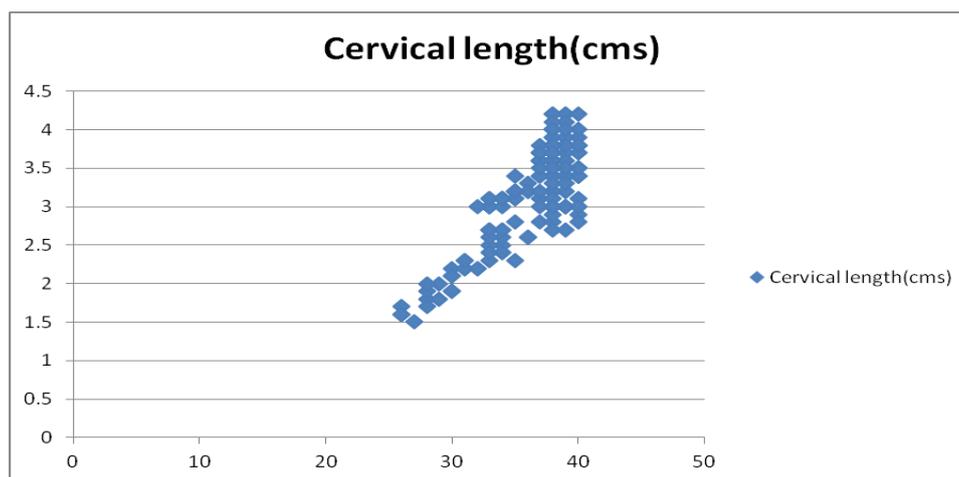
**Figure 1: Correlation between cervical and gestational age**

Figure-1 shows positive linear correlation between short cervical length and gestational age at delivery (r value is $+0.851$).

DISCUSSION

In present study patients with cervical length <3 cm were screened at 22-24 weeks of gestation by TVUS. It had sensitivity of 62.29%, specificity of 94.9%, PPV of 84.44% and

NPV of 85.16%. There was a positive correlation between cervical length and period gestation at delivery. These results were comparable to previous studies. [5-9]

Isao Hasegawa et al [10] determined usefulness of TVUS cervical assessment for prediction of preterm delivery in apparently normal population. Cervical length showed best correlation with pregnancy outcome. It gradually decreased as gestational age progressed. When mean cervical length minus one S.D. at each gestational age was chosen as cut off value, group with shortened cervix showed a significantly high preterm delivery rate.

J M Crane et al [5] compared effectiveness of TVUS versus digital examination in predicting preterm delivery in women with suspected preterm labour. Of potential predictors, including endocervical length, funnelling, dilatation and effacement, only endocervical length was an independent predictor of preterm delivery at less than 34 weeks of gestation. Endocervical length <3 cm had sensitivity of 81%, specificity of 65%, PPV of 46% and NPV of 90% respectively.

Goffinet et al [11] concluded sensitivity specificity PPV and NPV of TVUS for cervical length < 2.7 cm at 24-26 weeks of gestational age were 79.2%, 66.6%, 40.4%, 91.8% respectively for delivery before 37 weeks gestation. The predictive values are impressive and allow better discrimination between women at high risk of preterm delivery and those in false preterm labour.

Felicetti M, Di Domenico et al [12] also showed cervical lengths < 4 cm and internal os diameter > 5 mm were predictive factors of preterm labour.

In study by Leung TN et al [13] both short cervix and funnelling (measured at 18-22 weeks of gestational age) were independent predictor for spontaneous preterm delivery < 34 weeks of gestation. Coexistence of funnelling and cervical length < 2.7 cm gave a PPV and likelihood ratio of spontaneous delivery <37 weeks of 14.7% and 26% respectively..

CONCLUSION

Mean value of cervical length in pregnant women at 22-24 weeks of gestation in present study was 3.304 ± 0.673 cm. There was a definite correlation between short cervical length with an open internal os and occurrence of preterm delivery. Transvaginal ultrasound of cervix is safe, acceptable, sensitive screening test to assess risk of preterm delivery. It gives

an opportunity to initiate preventive measures and treatment so as to avoid or postpone preterm delivery therefore decrease perinatal morbidity and mortality and improve outcome.

Conflict of interest: None

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