

Role of cervical ultrasound in prediction of preterm labor

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Abstract

Aim: To compare the difference in the cervical length measured digitally or by transabdominal and transvaginal sonogram examination for prediction of preterm labour

Method: This was a prospective randomized, controlled study in the Department of Obstetrics and Gynaecology at TMA Pai Hospital, Udipi from March 2001 to May 2002 where 200 women coming for routine antenatal care were recruited for the study. A total of 168 women were evaluated, out of which 145 were control group and 23 cases of threatened preterm labor formed study group.

Results: The mean length of cervix measured by TVS at 20- 24wks of pregnancy was 3.87 cm. There after there was a slight decrease in the length mainly towards term and or 36 wks of pregnancy i.e. 3.27 cm. Cervical length measured on an average 0.8cm more than TVS(4.9CM versus 3.52cm) Similarly digital examination of cervix yielded shorter length, compared to TVS measurement (2.86 cm versus 3.5cm).

Conclusion: This study has shown TVS is a simple tool for prediction of preterm labour as decrease in cervical length was observed in women with threatened preterm labor (2.34 cm) and this decrease was statistically significant compared to that of the control (3.7 cm).

Key words: Trans abdominal, transvaginal, preterm labour

Introduction

Preterm labour accounts for less than 10% of pregnancies and 75% of all neonatal deaths. Efforts to forecast preterm labour to reduce perinatal morbidity and mortality have been hindered by the lack of a significant correlation of preterm labour with age, previous spontaneous vaginal delivery, tocolytic therapy or history of preterm labour¹. It is known however that cervix plays an important role in pregnancy outcome. Cervical ripening is the first sign of preterm labour, short cervix hence being a risk factor for preterm labour and delivery. Several studies have shown increased risk of preterm delivery among women with cervical effacement²⁻⁴ Sonographic evaluation of cervix, determined by transabdominal, transvaginal and transperineal scanning has a significant role to predict preterm labour. As this is more precise but less invasive procedure as compared to digital assessment. Latter

having limitation to palpate the supravaginal portion of cervix thus underestimated the cervical length confirmed from sonography.⁶ Premature rupture of membrane was more common with women who had repeated pelvic examination.⁷

Disadvantages of Transabdominal Sonography (TAS) are requirement of full bladder for adequate visualization of cervix while over distention of the bladder is found to compresses the lower uterine segment, lengthening the cervix. Even in the absence of over distention there appears to be a linear increase in cervical length with increasing bladder volume, which gives false assurance of a long and competent cervix. This limitation can be overcome by using transvaginal and translabial approach. Transvaginal Sonogram is a gold standard for the measurements of cervix where bladder as confounding factor can be removed.⁸

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In this study attempts have been made to evaluate total length of cervix, by digital examination, transabdominal and transvaginal sonogram in pregnancy for prediction of preterm labour.

Methodology

This was a prospective randomized controlled study in the Department of obstetrics and Gynaecology at TMA Pai Hospital, Udipi from March 2001 to may 2002.

The inclusion criteria were as follows: Singleton live pregnancies at 20 wks of gestation with cervical length >2cm; regardless of parity and bad obstetric history. Two hundred women attending antenatal care were recruited for study after satisfying the inclusion criteria. Exclusion criteria were history of first trimester bleeding, presence of uterine malformations, fibroid, medical illness which may influence the pregnancy, congenital malformation of fetus, twins, placenta previa.

Procedural steps

Length of the cervix was measured by digital examination, TAS, TVS.

First of all digital examination was done and cervical findings were noted. Then TAS was preformed by using ATL ultramark 4 machines. Cervical length was measured with a 3.5 MHz curvilinear probe in a partially filled bladder. The cervical canal was visualized from external Os to internal Os. Serial scans were taken. Similarly Transvaginal cervical measurements were taken with a 5 MHz vaginal probe.

The measurements were taken twice in sagital plane by each method and the mean of the two measurements were taken from each method. The initial scan was done at 20-24 wks of pregnancy and it was repeated at least on one occasion between 28-32 wks of pregnancy. In patients with symptoms of threatened preterm, it was again repeated at 36 wks of pregnancy.

All the patients were followed up till delivery. Data were analyzed with Microsoft, SPSS statistical package. Statistical significance was calculated by using chi square and student t -test.

Results

Out of 200 women, 24 women were lost for follow up and on remaining 176 women; only 168 women were available for final analysis because in 8 women pregnancy had to be iatrogenically terminated before term for antenatal complications like intra uterine growth retardation (IUGR), oligohydramnios, severe pregnancy induced hypertension (PIH) and eclampsia.

Of these 168 women, threatened preterm labour occurred in 23 [(13) delivered before 37 completed weeks of gestation; (10) cases had term delivery after successfully treatment with tocolytics and bed rest as their pregnancy were around 34 wks gestation at the initial presentation.

It is seen that the cervical length measurement at two different period gestation 20-24 weeks or 28-30 weeks using TVS falls in the middle between digital and TAS measurement.

Table 1. Cervical measurements made by digital examination and TVS

	Gestation Weeks 20 – 24		“t” & “p” values		Significance	Gestation weeks 28 – 32		“t” & “p” values		Significance
	Digital	TVS	Digital	TVS		Digital	TVS			
Mean (cm)	2.86	3.52	‘t’ = 21.11		Yes	2-84	3.41	‘t’= 18.99		Yes
S.D.	0.31	0.60	P<0.01			0.32	0.61	P<0.01		
Significance			yes					yes		

Table 2. Cervical measurements by transabdominal (TAS) and TVS

	Gestation Weeks 20 – 24		“t” & “p” values		Significance	Gestation weeks 28 – 32		“t” & “p” values		Significance
	TAS	TVS	TAS	TVS		TAS	TVS			
Mean (cm)	4.31	3.52	‘t’ = 24.03		Yes	4.32	3.41	‘t’= 25.47		Yes
S.D.	0.97	0.60	P<0.01			0.96	0.61	P<0.01		

The cervix appears to be shortest on digital examination and longest in transabdominal scan.(Table1-2). There is statistical significance of the measurements.

In table 3, the mean cervical parameter measurements obtained by TVS in threatened preterm labour and control group has shown statistical significance when

Cervical length at midtrimester had reasonably good sensitivity (65%), (99%), positive predictive value (83%) and negative predictive value (95%) at cut off value of 2.5cm.

The risk of preterm labour was 60%, 50%, 20% and 0.7% at cervical measurement of 2.0-2.2cm, 2.2-2.4cm,

Table 3. Comparison of cervical length measurement using TVS in threatened preterm labour and control

Cervical parameter in gestational weeks	Threatened preterm (n=23)		Control (n=145)		Statistical significance	
	Mean in (cms)	S.D	Mean (in cms)	S.D	t-value	p
20- 24	2.34	0.46	3.70	0.40	23.8	(p<0.05)
28 -32	2.30	0.40	3.59	0.44	23.1	(p<0.05)

T test for independent group was used to analyze data. Lower values were seen in threatened preterm labour group both at second and third trimester (period of gestation: 20-24 weeks and 28-32 weeks).

Discussion

The mean length of cervix at 20-24 wks of pregnancy was 3.87cm by TVS. There after there was a constant decrease in length mainly towards term i.e. 3.27cm around 36 wks. Similar observation was found in a study done by TR Verma¹⁰ in pregnancy at 10 wks to 36 weeks.

By TAS cervical length measured 0.8cm on an average, which was more than TVS (4.31cm vs3.52cm). Anderson¹¹ et al has reported the same findings. G. Marc Jackson¹² in his study has found cervical length was underestimated by digital examination with respective measurement.

Similarly digital examination of cervix yielded shorter length, compared to TVS measurement (2.86cm vs3.52 cm) and it was 0.7 cm less.

There was statistically significant difference in the mean length of whole cervix between control and case (those who had symptoms of premature contraction) ie 3.70 cm Vs 2.34cm, Similar differences were observed between control and those who had preterm labour (3.62cm vs 2.30cm).

2.4-2.6cm, 2.6-2.8cm. Survival analysis showed that significant proportion of patients deliver before 37 weeks when cervical length is less than 2.5cm and major proportion continued their pregnancies till term when cervical length measured more than 2.5cm when it is >2.5cm.

Conclusion

TVS is a simple tool of great diagnostic importance in prediction of preterm labour. Cervical length measurement by TVS has acceptable performance at both gestational age (20-24wks and 28-32wks).

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