E-ISSN:2454-9894 P-ISSN: 2454-9886
International Archives of
BioMedical and Clinical Research
(An Official Publication of "Ibn Sina Academy of Medieval Medicine & Sciences")
WWW.IABCR.ORG

Original Article

Cervical Evaluation By Transvaginal Ultrasonography as a Predictor of Preterm Labour

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ABSTRACT

Aims and Objective: *To determine the efficacy of TVS ultrasonographic evaluation of cervical biometry in predicting preterm delivery in asymptomatic low risk pregnant women.* ***Material and Methods*** *- a prospective analysis of low- risk pregnant patients at 22-24 weeks attending antenatal OPD at a tertiary level teaching hospital over a period of one year. There were 200 antenatal patients overall equally divided into two groups GrA with 100 patients and cervical length< 2.5cm and GrB with 100 patients having cervical length >/= 2.5cm. Transvaginal ultrasonography was performed and cervical evaluation done by measuring cervical length and recording presence or absence of funnelling. These women were followed till delivery and results analysed by finding p-value.* ***Results:*** *The results proved that with cervical length, 2.5cm the preterm deliveries were 88% while term deliveries were only 12%. This was statistically significant with a P-value of < 0.001. Of the 88 patients that had preterm delivery, in 36 patients there was presence of funneling and only 2 of these could carry their pregnancies till term and 34 of them ie. 94.4% had preterm deliveries. In patients with cervical length >/= 2.5cm the total preterm delivery rate was only 8% in asymptomatic pregnant women and the term deliveries were 92%. Of the Preterm deliveries in this group 2 (25%) had funneling while in 6 (75%) it was absent.*
Conclusion: *This study has re-established the relevance of TVS in cervical assessment for prediction of preterm labour.*

Key words: *Cervical length, Funneling, Transvaginal Ultrasonography (TVS), preterm labour*

INTRODUCTION

Primary prevention of preterm birth has been an important topic in public health for many years, where the screening for early signs has always been an important topic in practical obstetric care. Traditionally, attention has focused on symptoms suggestive of preterm labour and the results of the digital vaginal examination. During the last two decades, the detection of fetal fibronectin (FFN) from cervicovaginal secretions and cervical shortening diagnosed by transvaginal ultrasonography have emerged as the major secondary predictors of preterm birth.[1] There is a gradual relationship between the length of the cervix uteri and the risk of preterm birth. The relative risk of birth before 35 weeks of gestation was calculated to be 14-fold higher if the cervical length is below the first centile and nine fold higher if it is below the fifth centile.[2] Cervical ultrasonography, including the measurement of cervical length and the detection of a dilated internal cervical os by vaginal ultrasound, has found to be useful to predict preterm birth in a series of studies. Early detection is the key to timely action in the form of either tocolysis or cerclage. The onset of preterm labour can be aborted and the fetal morbidity and mortality owing to low birth weight and gestational age can be prevented. **Aims and Objectives:** The aim of this study was to determine the efficacy of TVS ultrasonographic evaluation of cervical biometry in predicting preterm delivery in asymptomatic low risk pregnant women. This information would lead to development of a sound predictor enabling an early diagnosis of patients susceptible to preterm labour and hence measures can be taken to prevent a preterm delivery.

Access this article online	
Website: www.iabcr.org	Quick Response code
DOI: 10.21276/iabcr.2016.2.3.23	

Received:15.07.16| **Revised**:23.07.16| **Accepted**:25.07.16

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MATERIALS AND METHODS

This study involved a prospective analysis of pregnant patients attending antenatal OPD at a tertiary level teaching hospital over a period of one year. Detailed history and antenatal examination was performed and cases were selected after a meticulous scrutiny, informed consent and fulfilling of the selection criteria.

Inclusion criteria:

1. All pregnant women (primigravida and multigravidas) with singleton pregnancies.
2. At a gestational age between 22-24 weeks
3. Who were sure of their last menstrual period (correct dating of pregnancy.
4. Who gave consent to undergo a transvaginal ultrasound scan.
5. With no medical/obstetric complications.
6. Who were willing for follow up and delivery at our institution

Exclusion criteria:

1. Women with previous history of preterm delivery
2. Pregnant women with high risk for preterm labour (eg. with uterine over distension viz. twin/multifetal gestation, polyhydramnios, fetal macrosomia etc, Incompetent os, uterine anomalies)
3. Women with medical/ surgical complication or high risk.

There were 200 antenatal patients overall equally divided into two groups GrA with 100 patients and cervical length< 2.5cm and GrB with 100 patients having cervical length >/= 2.5cm. The patients were asked to empty their bladder and TVS was performed on a Toshiba Nemio machine with an endovaginal probe PVF -620 ST 6 Mhz. The probe was manipulated gently to obtain a distinct view of the cervical canal which appears echogenic in the sagittal view owing to endocervical glandular mucosa. The cervical length was measured as the distance between the triangular echogenicity of the external os and the notch of the internal os as two specific points. Funneling was recorded as a wedge shaped extension into the cervical canal at the level of the internal os. These subjects were closely monitored till delivery.

RESULTS

Our study revealed that majority of the patients were from the age-group of 25-35years of which there were 120 primigravidas (60%) and 80 (40%) multigravidas. The mean cervical length of these patients was 3.72cm without there being much difference in the measurements of the primigravidas from the multigravidas.

Table 1: Obstetric Outcome in subjects with cervical length <2.5cm

Cervical Length <2.5cm	Funneling	Preterm Delivery	Term Delivery	P – value
	Present 36	34	2	
	Absent 64	54	10	
Total	N=100	88	12	< 0.001

The results proved that with cervical length, 2.5cm the preterm deliveries were 88% while term deliveries were only 12%. This was statistically significant with a P-value of < 0.001. Of the 88 patients that had preterm delivery, in 36 patients there was presence of funnelling and only 2 of these could carry their pregnancies till term and 34 of them ie. 94.4% had preterm deliveries.

Table 1: Obstetric outcome in subjects with cervical length >/=2.5cms

Cervical Length >_2.5cm	Funneling	Preterm Delivery	Term Delivery	P-value
	Present 10	2	8	
	Absent 90	6	84	
Total	N=100	8	92	<0.001

Table 2 shows that in patients with cervical length >/= 2.5cm the total preterm delivery rate was only 8% in asymptomatic pregnant women and the term deliveries were 92%. Of the Preterm deliveries in this group 2 (25%) had funneling while in 6 (75%) it was absent.

DISCUSSION

Globally, Preterm Birth (PTB) is the single largest cause of neonatal deaths. A birth that takes place before the mother has been pregnant for at least 37 weeks or 259 days construes a preterm birth. In India, among the total 27 million babies born annually, 3.6 million babies are born preterm3, and over 300,000 of these preterm babies die each year because of associated complications. India, with its highest number of PTBs and the highest number of preterm deaths worldwide, contributes 25% of the overall global preterm related deaths. Despite substantial efforts to introduce new therapies for prevention, it continues to contribute significantly to neonatal and infant mortality. The rate of preterm deliveries has remained stable over the last decade, ranging between 6–8%[4,5] in Europe and Australia and 9.6–11.6% in Canada and North America.[6,7] In developing countries there is a need for a simple, safe, easily producible, and cost effective method for predicting the possibility of preterm delivery in asymptomatic women. Our study of assessing the cervical parameters seems to be a sound predictor and our results are comparable with the similar studies done in the past. The mean cervical length in our study was 37.2mm whereas that by Kore et al was 36.4 +/- 7.98mm8 and that by Iam showed a mean of 35.2+/- 8.3mm at 24 weeks.[9] Our study showed significant association of short cervical length and increased incidence of preterm labour at a cut off value of 2.5cm measured at a gestational age of 22-24weeks which was similar to the study done by Tanvir et al[10] with comparable results.

CONCLUSION

In summary, the recommendations for cervical length measurement as a screening test are based on the fact that sonographical assessment is a widely accepted and well-standardized method, which requires only a relatively short training period. It not only evaluates the cervix but also provides an opportunity for looking at fetal parameters, anomalies, placenta and liquor. These are of value in determining the course of management. Another advantage

is its high negative predictive value, which has been found in many studies including low and high-risk women. This provides the opportunity to avoid unnecessary tocolysis and reduce time of hospitalisation, or to indicate lung maturation treatment more precisely based on the cervical length. Even the outcome of preventive interventions such as cerclage seems to depend on the cervical length.[11]

The probable drawback of cervical evaluation as a predictor of preterm delivery is, there is still a low sensitivity of the test relating to the low prevalence of preterm deliveries in a low-risk population. A combined assessment of cervical length and dilatation of the internal os increased the sensitivity, but only up to 29%. Compared with a high-risk population, with a prevalence for preterm birth >30%, a sensitivity of 79%, and a positive predictive value of 67% is acceptable, but a sensitivity of 19–39% and a positive predictive value of 6–20% is not acceptable in low-risk populations with a prevalence for preterm birth <4%.

Some other points worth mentioning are that it is ultrasonography and operator dependant and errors can occur due to undue pressure on the cervix, or if the bladder is not emptied prior to evaluation. However this method is superior to digital examination which does not give the accurate length, assessment of internal os is incomplete and repeated examinations increase the risk of preterm. New markers more directly related to preterm labour have recently been proposed, some of which relate to direct causes of preterm labour such as, fetal fibronectin (FFN), salivary estriol, serum Corticotropin-releasing hormone (CRH) and bacterial vaginosis. Several of these have predictive values, which are potentially useful for clinical practice but are either not available or not cost effective.

This study has re-established the relevance of TVS in cervical assessment for prediction of preterm labour.

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How to cite this article: Bhonsale D, Jaisal P. Cervical Evaluation By Transvaginal Ultrasonography as a Predictor of Preterm Labour. Int Arch BioMed Clin Res. 2016;2(3):93-95. DOI: 10.21276/iabcr.2016.2.3.23

Source of Support: Nil, **Conflict of Interest:** None