Role of Cervical Length Measurement at 37 Weeks in Prediction of Time of Delivery

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ABSTRACT

Background Information: The cervical length means the length of the lower part of the uterus (cervix) between external and internal os. The Studies have suggested that the ultrasound assessment of the uterine cervical length is more accurate than the digital examination of the cervix. Trans vaginal ultrasound is a known objective method for assessing cervical length.

Objective: The purpose of carrying out the study was to examine the potential value of the routine measurement of cervical length in singleton low risk pregnancies at 37 weeks in prediction of onset and outcome of labor. Primary outcome was gestational age at delivery and duration of labour. Secondary outcome was need of caesarean for failed progress and post term delivery.

Materials and Methods: It is a prospective observational study which was conducted in the obstetrics and gynecology department of the HMG, Sweidi, Riyadh, Saudi Arabia, which is a 350 bedded multidisciplinary hospital.

Results: Gestational age at delivery was compared in both the groups, 32% (n=41) of the patients delivered within 7 days if the cervical length was shorter than 3 cm as compared to 22%(n=31) but the difference was statistically insignificant. The rate of the post term pregnancy is 30%(n=42) in group B, as compared to 16%(n=21) in group A. Though the rate of post term pregnancy is higher in the patients with more than 3.0 cm cervical length but the difference was not found significant. We found no difference in the first and second stage of the labor and the mode of delivery in two groups.

Conclusion: It was found in the current study that the cervical length measurement does not help in predicting time of delivery. The rate of post term delivery was found insignificantly high in patients having cervical length more than 3.0cm. It was found that the cervical length has no relationship with the duration of labour and mode of delivery. We also conclude that the rate of failed progress of labor cannot be predicted with the measurement of the cervical length alone.

Key words: Cervical length, transvaginal ultrasound, mode of delivery, vaginal birth

INTRODUCTION

Labor pain at term is the most common clinical presentation which brings the pregnant women to the labour ward.[1]The cervical length which means the ultrasound assessment of the length of the lower part of the uterus (cervix) between external and internal os has been previously used to distinguish between true and false labour,[2] to predict the risk of the preterm delivery[3] and to estimate the risk of post term pregnancy.[4] The measurement of the cervical length has been used widely in women before induction of labor to predict its outcome.[5,6] Few studies are available in which the cervical length estimation was done at term and its role to predict the spontaneous onset of labor was evaluated.[7,8]

Research is focusing on other biomarkers which are mainly based on

ultrasonographic features such as cervical angle, head position, head to perineum distance or angle of progression. Among these the cervical length is the one parameter which is evaluated the most, although the results regarding its value as a predictor of successful induction of labor are conflicting.[9]

The cervical length can be measured by the digital examination, trans-abdominal ultrasound, trans-perineal ultrasound and trans-vaginal ultrasound. Digital examination suffers from being subjective[10] and secondly studies suggested that the ultrasound assessment of the uterine cervical length is more accurate than the digital examination of the cervix.[11] Transvaginal ultrasound is a known objective method for assessing cervical length.[12] Kogan and Sonek described trans vaginal assessment of the cervix as a superior modality.[10] We therefore have chosen the trans-vaginal route for the assessment of the cervix.

We have experienced as an obstetrician that the most frequently asked question by the pregnant females is that "what is my due date and exactly when will I deliver?" This question highlights that predicting the chances of vaginal delivery is of extreme concern for not only the pregnant women but her relatives as well.[13] So far to answer their question; we are using two tools, the last menstrual period and the first trimester ultrasound. [14] Nonetheless only 5 % of the pregnant females deliver exactly on their due date. The laboring women either go in spontaneous labor or undergo induction of labor. As the rate of induction of labor has been rising globally, with 26% annually reported in the united states[15] the concern for the successful induction is raised as well.

Currently we have little to predict when a pregnant woman will deliver at term exactly.

Over a last few years, the cervical assessment has moved from digital examination to ultrasound evaluation and ultrasound assessment of the cervix has been focus of much research.[7] Trans vaginal ultrasound cervical length has been used in women before induction of labor to predict induction outcome,[7] and to predict the gestational age at delivery.

We tried to contribute in the collection of evidence that how good the cervical measurement at 37 weeks is for the prediction of the time of the delivery.

The purpose of carrying out the study was to examine the potential value of the routine measurement of cervical length in singleton low risk pregnancies at 37 weeks in predicting onset and outcome of labor. Primary outcome was gestational age at delivery and duration of labor. Secondary outcome was need of caesarean for failed progress and Post term delivery

MATERIALS AND METHODS:

It is a prospective observational study which was conducted in the obstetrics and gynecology department of the HMG, Suwaidi, Riyadh, Saudi Arabia, which is a 350 bedded multidisciplinary hospital.

The study duration was one year. We got the approval of the study from the institutional review board (IRB) on 8th may 2019 via approval letter no. H-01-R-082. The study was then conducted from first June 2019 till 31ST May 2020.

All low risk obstetric women having singleton pregnancy were included and those with history of previous caesarean section, preterm labor, history of cervical surgery and patients with history of cervical length less then 2.5cm at 18-22 week were excluded from the study population.

The sample size was calculated by using the WHO calculator as 270. The confidence interval was set at 95% with 5% margin of error.

For the purpose of the current study the technique used for measurement of the cervical length was standardized. The cervical length was measured by the transvaginal route, with women in dorsal lithotomy position after voiding urine. The ultrasound probe is placed in the anterior vaginal fornix and sagittal view is obtained,

endocervical mucosa is identified and the linear distance between the triangular area of the echo density at the external os and the

V-shaped notch at the internal os is measured over the period of 3-5 minutes. We have categorized cervical length in two groups, group A with cervical length less than 3.0cm and Group B with cervical length 3.0 or more than 3.0cm.

As it is very difficult to record the duration of the first stage of the labor so we recorded the active phase defined by the regular painful uterine contractions associated with the progressive cervical dilatation from 4.0cm till full cervical dilatation,[17] multiparity in our study is labeled when the patient has delivered three or more than three babies
The data was collected with the help of the predesigned proforma.

Statistical Analysis:

Once the data was collected it was inserted and analyzed by using SPSS version 26. The qualitative data was analyzed by chi-square test while student t test was applied to the quantitative data. The P-value of 0.05 or less than that was considered as significant.

RESULTS

Once the data is collected, we divided the total population in two groups. Group A and group B. The demographics were almost the same in both the groups. The mean age in group A and group B was 29.5years with standard Deviation (Std. Deviation) of 5.706 and 28 .8 years with Std Deviation of 4.995, respectively.

The distribution of parity was also found to be insignificantly different in both the groups. The number of the patients who had two or less than two babies in group A and B were 75.9%(n=98) and 78.7%(n=111) respectively. Similarly, the multiparity was also found equally prevalent being 24.03% (n= 31) in group A and 21.2%(n=30) in group B.

Gestational age at delivery was compared in both the groups, 32% of the patients delivered within 7 days if the cervical length was shorter than 3 cm as compared to 22% as shown in Table I, but the difference was not found statistically significant as the P-value was 0.498 which was calculated after applying the T-test.

TABLE-I EFFECT OF CERVICAL LENGTH ON GESTATIONAL AGE AT DELIVERY

GESTATIONAL AGE(WEEKS)	CERVICAL LENGTH(CM)		
	Group A (1.5-2.9)	Group B (3.0-4.5)	
37^0-37^6	31.8%(n=41)	21.98%(n=31)	26.56%(n=72)
38^0- 38^6	23.2 %(n=30)	21.98%(n=31)	22.59(n=61)
39^0- 39^6	28.7 %(n=37)	26.24(n=37)	27.40(n=74)
40^0- 40^6	16.3%(n=21)	29.78%(n=42)	23.33(n=63)
TOTAL	100%(n=129)	100%ss(n=141)	100%(n=270)

The rate of the post term pregnancy is 30%(n=42) in group B, as compared to 16%(n=21) in group A. Though the rate of post term pregnancy is higher in the patients with more than 3.0 cm cervical length but the difference was not found statistically significant.

Insignificant differences were noted in the two groups when the mode of delivery was compared, as shown in Table-II. P-value being 0.334, which is calculated after applying the Chi Square test as the data was qualitative.

TABLE-II: EFFECT OF CERVICAL LENGTH ON MODE OF DELIVERY

| MODE OF DELIVERY	CERVICAL LENGTH(CM)		
	1.5-2.9	3.0-4.5	
SVD	74.42% (n=96)	66.67%(n=94)	70%(n=190)
OVD	4.65%(n=06)	03.54 %(n=05)	04% (n=11)
LSCS	20.93%(n=27)	29.79 %(n=42)	26%(n=69)
TOTAL	100 % (n= 129)	100% (n=141)	100% (n=270)

The number of patients who delivered by caesarean, in group A and B were 20.93%(n=27) and 29.79 %(n=42), respectively. The most common indication of the caesarean section was

fetal distress in both the groups. As shown in table-III the risk of caesarean section for failure to progress was not statistically different.

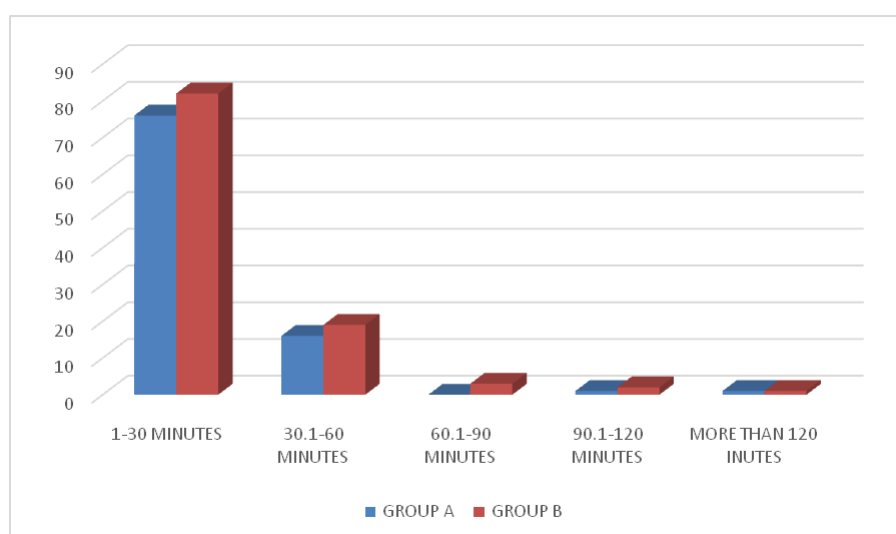**TABLE-III: EFFECT OF CERVICAL LENGTH ON INDICATION OF CAESSARIAN SECTION**

INDICATION OF CAESSARIAN SECTION	CERVICAL LENGTH(CM)		
	1.5-2.9	3.0-4.5	
FETAL DISTRESS	51.85% (n=14)	61.9%(n=26)	57.97 %(n=40)
FAILURE TO PROGRESS	44.44%(n=12)	35.7 %(n=15)	39.13% (n=27)
OTHERS	3.70%(n=01)	2.38 % (n= 01)	2.89%(n=02)
TOTAL	100 % (n= 27)	100% (n=42)	100% (n=69)

When the duration of the first stage (active phase) was compared in both groups the differences found were not significant as the calculated P-value was 0.235, which was calculated after applying the T-test, as shown in graph -1.
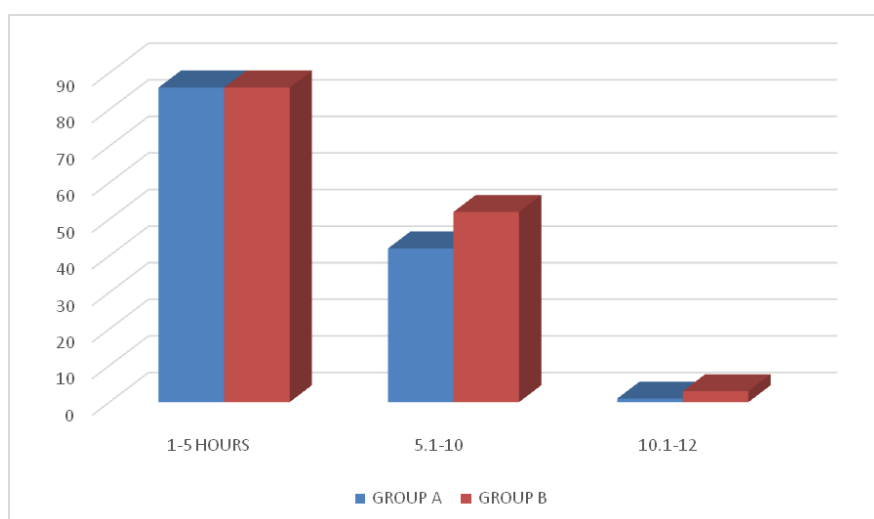
GRAPH-I: EFFECT OF CERVICAL LENGTH ON DURATION OF FIRST STAGE OF LABOR

The duration of the second stage of the labor was also found to be least effected by the cervical length. Out of 201 patients who delivered normally, 94 patients had cervical length less than 3 cm and 80% (n=76) of them had length of second stage less than 30 minutes as compared to the 76.6%(n=82) in the group B, the P-value calculated is 0.243 after applying the T-test.

GRAPH-II: EFFECT OF CERVICAL LENGTH ON DURATION OF SECOND STAGE OF LABOR

DISCUSSION

We concluded that the cervical length assessment at 37 weeks does not help in predicting the time of delivery. Mukherji et al [16] in the study conducted in Indian population concluded that the single measurement of the cervical length cannot predict the spontaneous onset of labor. However, the serial measurements from 36-38 weeks can help in prediction. The cut of point at gestational age of 38 in his study was 3.1 cm for predicting the postdate pregnancy. While Jaisaby et al[17] found that single cervical length measurement in any gestational age of term can help in predicting time of delivery. However, he took the patients who presented with labor pains in his study, while we included the non labouring patients.[9]

Contrary to our results several previous studies have determined the strong association between the preinduction cervical length and the induction to delivery interval. One study with 128 pregnant participants with singleton vertex presentation at 39-40 weeks has reported a significant association between sonographically measured cervical length and the likelihood of the spontaneous onset of labor in the subsequent 7 days.[18]

It was observed in our study that the mode of the delivery cannot be predicted with the measurement of the cervical length at 37 weeks, which was supported by Giyahi and colleagues[8] who did the prospective observational study in Iran on 126 low risk pregnant women with cephalic presentation, however they revealed that the shorter cervical length measurement at 37 weeks can predict the spontaneous onset, which is in contrast to our observations.

Ezebialu IU and Colleagues [19] who did a Cochrane database review also found that the cervical length is not superior to the other methods to predict the mode of delivery which further reinforces our findings. Recently Papillon-Smith and Abenhaim[20] and El-Mekkawi[5] also demonstrated the same finding.

Uzun and colleagues [21] results also support our study results as they also did not find the ultrasound measurement of the cervical length as a superior modality to predict the mode of delivery.

De-Vries and his team [22] in their prospective study of 212 patients concluded that the increased cervical length of more than 3.2 cm is associated with more risk of intrapartum caesarean section, but their results do not support the use of cervical length alone as a predictor of cesarean section. The potential value of the cervical length lies in combining it with other known predictors of cesarean section in labor.

However, Taha and colleagues [13] did find that the cervical length can predict the mode of delivery in 162 women in Egypt. He found that women with shorter cervices have a more chance of having vaginal delivery.

Gibreil mohamed[12] also found that the patients who delivered normally and by caesarean section had mean cervical length of 2.7cm and 3.6 cm respectively.

Strengths and Limitations of the Study:

Strengths of our study is that it was a prospective study done with low risk non labouring patients having singleton pregnancy at term, with same age group and parity. Secondly, we have stratified data by gestational age which makes the sub group analysis feasible.

The limitation of the study was that the sample size was small and it was observational study.

Further studies with increased sample size are suggested for predicting the role of cervical length measurement in answering the patient question of time of delivery.

CONCLUSION

It was found in the current study that the cervical length measurement does not help in predicting time of delivery. The rate of post term delivery was found insignificantly high in patients having cervical length more than 3.0cm. It was

found that the cervical length has no relationship with the duration of labour and mode of delivery. We also conclude that the rate of failed progress of labor cannot be predicted with the measurement of the cervical length alone.

Authors' contribution:
NS: Concept and design of the study, acquisition and analysis of data, drafting the manuscript, final approval of the manuscript.
IS: Data collection and drafting the manuscript.
AS: Data collection and drafting the manuscript
HIS: Analysis and interpretation of data, drafting the manuscript

Financial Disclosure: None to declare.
Conflict Of Interest: None to declare

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