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''CERVICAL LENGTH IN MIDPREGNANCY AND LABOUR OUTCOME ''

Gynaecology

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ABSTRACT

It is a prospective study conducted in the Institute of Obstetrics and Gynecology. The objective is 1) To study the relationship between cervical length at midpregnancy and gestational age at delivery, onset of labour - spontaneous or induced, mode of delivery and caesarean section due to failed induction. 2) To determine the mean cervical length in our population.

MATERIALS AND METHODS: 500 antenatal women were included in the study. Transvaginal ultrasound was done between 20-24 weeks and cervical length was recorded. The women were subsequently managed according to the hospital protocol. The women were followed up to term and their labour outcome was recorded.

RESULTS Lower the cervical length, higher is the risk of preterm labour. Increase in the cervical length at midtrimester is associated with increase in the incidence of postterm pregnancy, failure of spontaneous onset of labour and cesarean section in view of failed induction.

KEYWORDS:

Cervical length, Preterm labour, Postterm pregnancy, Cesarean section, failed induction.

INTRODUCTION:

Normal parturition at term is dependent on the programmed development of the cervix early in pregnancy. The cervix undergoes preparative changes weeks before the onset of labour. It is well known that a reduced midtrimester cervical length is associated with an increased risk of spontaneous preterm birth. By extrapolating this, an increased midtrimester cervical length would be associated with an increased risk of postterm pregnancies, failure of spontaneous onset of labour and caesarean delivery during labour.

AIM:

To study the relationship between cervical length in midpregnancy and labour outcome.

PRIMARY OBJECTIVE:

The objective is to study the relationship between cervical length at midpregnancy and 1) Gestational age at delivery, 2) Onset of labour, whether spontaneous or induced, 3) Mode of delivery and 4) Caesarean section due to failed induction

SECONDARY OBJECTIVE:

To determine the mean cervical length in our population.

MATERIALS AND METHODS:

It is a prospective study conducted in Institute of Obstetrics and Gynaecology, Egmore, Chennai from January 2015 to March 2016. Informed written consent was obtained from all antenatal women who had participated in this study. Duration of the study was 1year6months.

Inclusion Criteria:

1) Asymptomatic primigravida with singleton pregnancies between 20 – 24 weeks attending the antenatal clinic.

Exclusion Criteria:

Women unsure of dates, multiple pregnancy, women with previous history of caesarean section, polyhydramnios, women with haemoglobin <8g%, women with suspected foetal abnormalities, extremely short statured women, women with skeletal abnormalities, women with pre eclampsia, medical disorders, smokers.

Determination of cervical length:

This was done between 20 to 24 weeks. The internal os, external os, cervical canal and endocervical mucosa were identified. The endocervical mucosa was used to define the site of the internal os. The image was magnified. The distance between the internal and external os was measured. Three measurements were taken over a period of 3 minutes to observe any dynamic changes in the cervix and the mean of these three measurements was considered. The presence of funneling and diameter of internal os was noted.

Labour Outcome:

The women were followed upto term. They were subsequently managed according to hospital protocol. Data on labour outcome including the gestational age at delivery, onset of labour whether spontaneous or induced, mode of delivery and indication for cesarean section were recorded.

RESULTS AND ANALYSIS:

This study analysed the cervical length of 500 antenatal women by transvaginal ultrasonography between 20 to 24 weeks and its association with labour outcome.

Mean cervical length in the population:

The mean cervical length in our study population was 3.632cm with a standard deviation of 0.4703cm.

Analysis of confounding factors:

1)Maternal age and labour outcome:

The mean age in our study population was 24.364 years with 4.2%(21) below 19 years, 50%(250) at 20-24 years, 36.2% (181) at 25-29 years and 9.6% (48) at more than 30 years. It was found that there was no statistically significant association between maternal age and labour outcome.

2)Maternal body mass index (BMI) and labour outcome:

The mean body mass index in our study population was 22.013kg/m2. BMI less than 22.99 was seen in 66.8% (334), 23-27.99 in 31.6% (158) and more than 28 in 1.6% (8). It was found that there was no statistically significant association between maternal body mass index and labour outcome.

3)Maternal socioeconomic status and labour outcome:

Socio economic status was analysed by modified Kuppusamy's classification. 8%(40) were in socioeconomic class III, 52.6%(263) in class IV and 39.4%(197) in class V. It was found that there was no statistically significant association between maternal socioeconomic status and labour outcome.

CERVICAL LENGTH IN MIDPREGNANCY AND PRETERM LABOUR:

Of the 500 women in the study, 30(6%) went in for preterm labour. There exists a statistically significant association between the cervical length and preterm labour with a P value <0.001. Lower the cervical length, higher is the risk of preterm labour

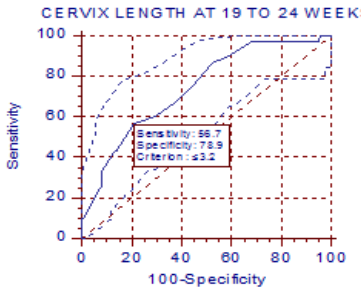

Figure 1

The mean cervical length for patients who went into preterm labour is 3.263cm. The mean cervical length for patients who did not go into preterm labour is 3.655 cm. Area under Receiver Operator Characteristic curve is 0.740071. Cervical length <3.2 cm predicts preterm labour with a sensitivity of 56.7% and specificity of 78.9%.

CERVICAL LENGTH IN MIDPREGNANCY AND POSTTERM PREGNANCY:

Of the 500 women in the study, 104 (20.8%) had post term pregnancy. There exists a statistically significant association between the cervical length and post term pregnancy with P value <0.0001

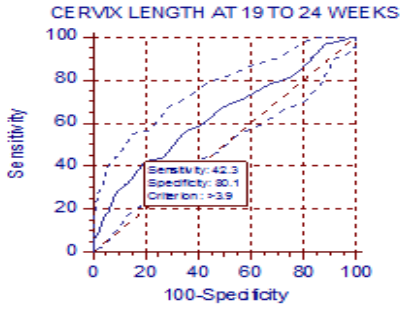

Figure 2

The mean cervical length for patients who had postterm pregnancy is 3.863 cm. The mean cervical length for patients who did not have postterm pregnancy is 3.578 cm. Area under Receiver Operator Characteristic curve is 0.634. Cervical length >3.9 cm (optimum cut-off) predicts postterm pregnancy with a sensitivity of 42.3% and specificity of 80.1% whereas the specificity increases to 90% at a cervical length of >4.08 cm and 97% at a cervical length of 4.5cm.

CERVICAL LENGTH IN MIDPREGNANCY AND ONSET OF LABOUR:

Of the 500 women in the study, 346 (69.2%) had spontaneous onset of labour. There exists a statistically significant association between the cervical length and onset of labour. Increasing cervical length is associated with a failure of spontaneous onset of labour. Cervical length >4cm predicts failure of spontaneous onset of labour with a specificity of 88.7%, >4.5cm with a specificity of 97.1% and >5cm with a specificity 99.4%.

The mean cervical length for patients who had spontaneous onset of labour is 3.549 cm. The mean cervical length for patients who did not have spontaneous onset of labour is 3.817 cm. Area under ROC curve is 0.668. Cervical length >3.7 cm (optimum cut-off) predicts failure of spontaneous onset of labour with a sensitivity of 57.1% and specificity of 68.8%.

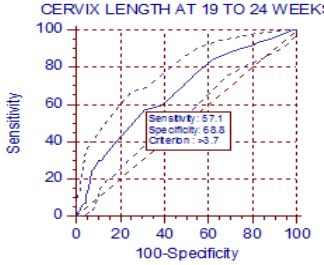

Figure 3

CERVICAL LENGTH IN MIDPREGNANCY AND MODE OF DELIVERY:

Of the 500 women in the study, 275 (55%) had caesarean delivery. There exists a statistically significant association between the cervical length and caesarean delivery. Increasing cervical length is associated with increase in the incidence of caesarean delivery. Cervical length >4cm predicts caesarean delivery with a specificity of 94.22% and >4.8cm predicts caesarean delivery with a specificity of 100%

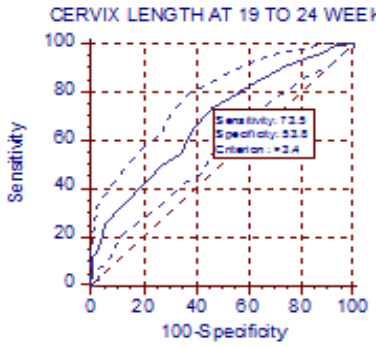

Figure 4

The mean cervical length for patients who had caesarean delivery is 3.772 cm. The mean cervical length for patients who did not have caesarean delivery is 3.461 cm. Area under ROC curve is 0.683. Cervical length >3.4 cm (optimum cut off) predicts caesarean delivery with a sensitivity of 73.5% and specificity of 53.8%.

Odds Ratios and 95% Confidence Intervals
Table

Variable	Odds ratio	95% CI
Cervix length at 20 to 24 weeks	4.4006	2.7553 to 7.0284
Onset of labour	1.9323	1.2565 to 2.9717

Multivariate analysis of mode of delivery with BMI, cervical length, gestational age at delivery, postterm pregnancy and onset of labour was done. It was found that mode of delivery is not influenced by body mass index and gestational age at delivery. The probability of caesarean delivery increases 4 fold with every 1cm increase in cervical length (P<0.0001) and the probability increases twice when the labour is induced (P<02).

Logistic regression

By using logistic regression, the equation is

LOG IT= -5.3356+1.48175(Cervical Length) +0.65873(Onset of labour)

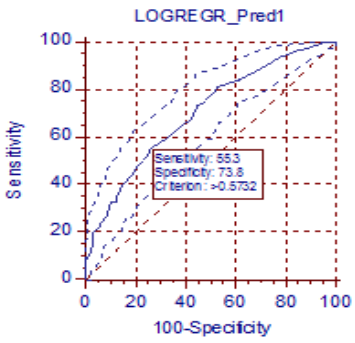

Figure 5

CERVICAL LENGTH IN MIDPREGNANCY AND CAESAREAN SECTION DUE TO FAILED INDUCTION:

Of the 500 women in the study, 107 (21.4%) had caesarean section due to failed induction. Increasing cervical length is associated with a statistically significant increase in the incidence of caesarean section. This association is more specific when the caesarean section is taken up for failed induction. The specificity increases from 88.5% when cervical length is >4cm, to 97.46% at >4.5cm and to 99.49% when the cervical length is >5cm.

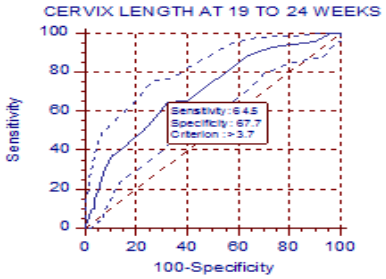

Figure 6

The mean cervical length for patients who had caesarean delivery due to failed induction is 3.897 cm. The mean cervical length for patients who did not have caesarean delivery due to failed induction is 3.559 cm. Area under ROC curve is 0.702. Cervical length >3.7 cm predicts caesarean delivery due to failed induction with a sensitivity of 64.5% and specificity of 67.7%.

Multivariate analysis was done between caesarean section due to failed induction, cervical length and postterm pregnancy. The probability of caesarean section due to failed induction increases 4 fold with every 1cm increase in cervical length (P<0.0001) and the probability increases twice when the pregnancy is postterm(0.003).

Odds Ratios and 95% Confidence Intervals (Table 2)

Variable	Odds ratio	95% CI
Cervix length at 20 to 24 weeks	4.0138	2.4389 to 6.6057
Postterm	2.1503	1.2950 to 3.5703

Logistic regression

By using logistic regression, the equation is

LOG IT= -6.6598+1.38974(Cervix length) +0.76559(Onset of labour)

CONCLUSION:

It was found that age, body mass index and socioeconomic status did not influence the duration of pregnancy, onset of labour or mode of delivery.

There is a significant association between cervical length and preterm labour. Lower the cervical length, higher is the risk of preterm labour.

The risk of postterm pregnancy increases significantly with increase in cervical length and the risk is greater when the cervical length is more than 3.9cm.

The chances of failure of spontaneous onset of labour increases significantly with increase in cervical length and the risk is greater when the cervical length is more than 3.7cm.

The risk of caesarean delivery increases significantly with increase in cervical length and the risk is greater when the cervical length is more than 3.4cm. This association is more specific when the caesarean section is taken up for failed induction. Increase in cervical length by 1cm is associated with a fourfold increase in the incidence of caesarean delivery.

Measurement of cervical length by transvaginal ultrasound at mid trimester can be used as an easy predictive tool to determine the possible outcome of labour and risk of caesarean section. As ultrasound machines are widely available in almost every antenatal clinic, it could be easily implemented in clinical practice. The patients with risk of adverse labour outcome could be referred earlier to higher centres equipped to handle them.

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