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Original Research Article

TO STUDY CERVICAL LENGTH IN MIDPREGNANCY AND LABOUR OUTCOME: A PROSPECTIVE STUDY

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ABSTRACT

Background: The successful delivery of a baby at the conclusion of pregnancy relies on the systematic growth of the cervix during the early stages of pregnancy. The cervix experiences anticipatory modifications many weeks before to the initiation of labour. The objective of the study was to examine the correlation between cervical length during the middle stage of pregnancy and the result of labour.

Material and Methods: This study is a prospective investigation carried out at the Department of Obstetrics and Gynaecology Government Medical College, Srikakulam, Andhra Pradesh, India. All prenatal women who participated in this study provided informed written consent. This study was conducted between January 2023 to December 2023.

Results: This study examined the cervical length of 200 pregnant women using transvaginal ultrasonography between 19 to 24 weeks of gestation, and investigated its relationship with the outcome of labour. An analysis was conducted to examine maternal parameters such as age, body mass index, and socioeconomic status for any potential confounding factors. The studied labour outcomes included the initiation of labour, whether it occurred naturally or was induced, the gestational age at delivery, whether it was preterm or extended beyond 40 weeks, the method of delivery, and the occurrence of a caesarean section owing to unsuccessful induction.

Conclusion: Ultrasound equipment is readily available in nearly all prenatal clinics, making its integration into clinical practice simple. Patients who run the risk of having a difficult labour could be referred to higher centres sooner if they are better equipped to handle them.

Keywords: cervical length, mid pregnancy, labour outcome.

INTRODUCTION

The controlled maturation of the cervix throughout the first trimester of pregnancy is essential for a healthy delivery at term. Alterations to the cervix occur in the weeks leading up to the start of labour. It is commonly recognised that a shorter cervical length during the third trimester increases the likelihood of a baby being born prematurely without medical intervention. Extrapolating from this, we find that longer cervical lengths throughout the third trimester are related with an increased risk of preterm birth, complications during labour, and the need for a caesarean section.[1-3]

As a noun, "cervix uteri" (meaning "neck of the womb" in Latin) is where our English term "cervix" gets its start. At right angles to the vagina, the lower cylindrical part of the uterus—the cervix—enters the vagina. Its length ranges from 2 to 4 centimetres. The narrowing of its lumen, known as the isthmus, marks its connection to the uterus. A fatty tissue layer separates the bladder from the cervix, which is located anteriorly. Covering the cervix from the back, the peritoneum continues along the back of the vagina and

forms the posterior cul de sac when it reflects off the rectum. The broad ligament and parametria attach laterally to the cervix. From its point of entry into the uterine cavity at the internal os, the cervical canal continues on to its point of exit into the vagina at the external os. Ultrasound imaging via the vaginal canal can reveal several of these anatomical details.[2-4]

Over the past few years, the global rate of caesarean sections has increased at an exponential rate. Poor labour progress is the main reason for primary caesarean delivery at term. Foetal discomfort, aberrant foetal presentation, and dystocia account for more than 85 percent of primary caesarean deliveries. Maternal age, body mass index, and length of pregnancy are some of the variables that have been linked to slow labour progress. There is still a lack of knowledge on the exact biological processes that cause labour to progress slowly.[3-5]

Preterm labour prediction using cervical length has been studied for more than 20 years. In conjunction with the regular anomaly scans, it is a straightforward, non-invasive, and readily available technique. Early prediction of preterm labour, protracted pregnancies, and caesarean deliveries would improve their management and outcome because these factors are linked to higher perinatal mortality and morbidity.[4-6]

Aiming to learn how cervical length in the middle of pregnancy relates to the outcome of labour, this study set out to do just that. The study set out to examine the correlation between cervical length midway through pregnancy.

MATERIAL AND METHODS

This study is a prospective investigation carried out at the Department of Obstetrics and Gynaecology Government Medical College, Srikakulam, Andhra Pradesh, India. All prenatal women who participated in this study provided informed written consent. This study was conducted between January 2023 to December 2023.

Inclusion Criteria

- Attending the prenatal clinic as an asymptomatic primigravida with a singleton pregnancy between 19 and 24 weeks;
- No underlying medical conditions

Exclusion Criteria

- Uncertainty about dates among women
- Multiple pregnancies
- Polyhydramnios

RESULTS

200 prenatal women participated in the study, and their cervical length was examined between 19-24 weeks. The patients were monitored till birth and their results were examined.

In our study, the average cervical length of 200 pregnant women was 3.123 with a standard deviation of 0.5148. [Table 1]

Out of the 200 women in the research, 20 (10%) experienced premature labour. [Table 2]

Out of the 200 women included in the study, 40 individuals, or 20.0%, experienced protracted pregnancy. The remaining patients gave birth before to their Expected Date of Delivery. [Table 3]

Out of the 200 women included in the study, 140, which accounts for 70.0%, experienced spontaneous commencement of labour. Labour was induced for several reasons. [Table 4]

Out of the 200 women in the study, 90 (45%) had vaginal delivery, which included operative vaginal delivery, whereas 110 (55%) underwent caesarean delivery. [Table 5]

Out of the 200 women included in the study, 44 individuals, representing 22.0%, underwent a caesarean section as a result of unsuccessful induction. The remaining ladies underwent either vaginal delivery or caesarean delivery for different reasons. [Table 6]

Table 1: Average cervical length in the research group

	Patients	Mean
Cervix length at19 to 24 weeks	200	3.123

Table 2: Preterm labour

Sr. No.	Preterm	Patient	%
1.	No	180	90.0
2	Yes	20	10.0
	Total	200	100.0

Table 3: Post-term pregnancy

Post-term pregnancy		Patient	%
	No	160	80.0
	Yes	40	20.0
	Total	200	100.0

Table 4: Labour initiation

Sr. No.	Onset Of Labour	Patient	%
1	Spontaneous	140	70.0
2	Induced	60	30.0
	Total	200	100.0

Table 5: Delivery Method

Sr. No.	Mode of delivery	Patient	%
1	Vaginal	90	45.0
2	Cesarean	110	55.0
	Total	200	100.0

Table 6: Caesarean section performed as a result of unsuccessful induction

Sr. No.	Cesarean section due to failed induction	Patient	%
1	No	156	78.0
2	Yes	44	22.0
	Total	200	100.0

DISCUSSION

Using transvaginal ultrasonography, this study examined the cervical length of 200 pregnant women from 19 to 24 weeks along with its correlation to the outcome of delivery. We looked for potential confounding factors in the mother's age, BMI, and socioeconomic position. The factors that were taken into consideration when analyzing the labour outcomes were the method of delivery, the number of caesarean sections performed as a result of unsuccessful induction, the gestational age at delivery,[5-7] (whether it was premature or protracted beyond 40 weeks), and the birthing environment. Our research cohort had a mean cervical length of 3.632 and a standard deviation of 0.4703. Our research population had an average age of 24.364 years, with 4.2% being under the age of 19, 50% between the ages of 20 and 24, 36.2% between the ages of 25 and 29, and 9.6% beyond the age of 30. There was no correlation between the mother's age and the success or failure of the delivery process.[8-10]

Our study cohort had a mean body mass index of 22.013. Only 1.6% had a body mass index (BMI) higher than 28, while 66.8% had a BMI between 23 and 27.99. The results of the labour were unrelated to the mother's body mass index, according to the study. A modified version of Kuppusamy's classification was used to analyse socioeconomic status. Class III socioeconomic status was held by 8%, class IV by 52.6%, and class V by 39.4%. Mothers' socioeconomic situation did not correlate with the outcome of their labour, according to the study.[11,12]

Preterm delivery occurred in 6% of the 200 women who participated in the research. A statistically significant correlation between the length of the cervical canal and the occurrence of preterm labour (P value <0.001) is present. There is an increased risk of preterm labour with a shorter cervical length. Patients who experienced premature labour had a mean cervical length of 3.263. The average length of the cervical spine in women who did not experience premature labour is 3.655. A value of 0.740071 is found under the Receiver Operator Characteristic curve. Preterm labour can be predicted with a sensitivity of 56.7% and a specificity of 78.9% when the cervical length is less than 3.2 cm. The percentage of women whose pregnancies went beyond 40 weeks was 20.8% out of 200. The correlation between cervical length and longer pregnancy is statistically significant (P value <0.0001).

For patients who experienced a lengthy pregnancy, the average cervical length is 3.836.[13-15]

Patients whose pregnancies did not last more than 37 weeks had a mean cervical length of 3.578. The value of 0.634336 is the area under the receiver operator characteristic curve. A sensitivity of 42.3% and specificity of 80.1% for a cervical length greater than 3.9 cm is associated with a longer gestational period, while specificity climbs to 90% for a cervical length greater than 4.08 cm and 97% for a cervical length greater than 4.5 cm. Where the average cervical length for patients experiencing a lengthy pregnancy was 3.78 cm, while the average cervical length for those who gave birth before the due date was 3.77 cm.[16,17]

In the study, 69.2% of the 200 women who gave birth experienced the start of labour without any intervention. A woman's cervical length is significantly related to when she goes into labour. When the cervical length increases, the chances of the labour not starting on its own increase as well. The rate of spontaneous commencement of labour is 88.7 percent, 97.1 percent, and 99.4 percent, respectively, for cervical lengths greater than 4 cm, 4.5 cm, and 5 cm. Patients whose labour began spontaneously had a cervical length of 3.549 on average. For women who did not go into labour of their own will, the average cervical length is 3.817. There is an area under the receiver operating characteristic (ROC) curve of 0.668. With a sensitivity of 57.1% and specificity of 68.8%, cervical length >3.7 cm predicts the failure of spontaneous beginning of labour.[18-20]

Coronary angiography was performed by 55% of the 200 women who participated in the cohort. The correlation between cervical length and caesarean delivery is statistically significant. The rate of caesarean delivery rises in correlation with the length

of the cervical canal. With a specificity of 94.22% and a specificity of 100%, respectively, cervical lengths more than 4 cm and > 4.8 cm indicate the need for a caesarean section during labour. For patients who have a caesarean section, the average length of the cervical spine is 3.772. Patients whose deliveries were vaginal have a mean cervical length of 3.461. A ROC area of 0.683 is presented. There is a 73.5% sensitivity and a 53.8% specificity in predicting caesarean delivery when the cervical length is greater than 3.4 cm. The following factors were factored into the multivariate analysis of method of delivery: body mass index (BMI), cervical length, gestational age at delivery (GDA), length of pregnancy (PMI), and labour onset. Researchers discovered that gestational age and body mass index had no effect on the mode of birth. A one-centimeter increase in cervical length quadruples the likelihood of a caesarean section, and inducing labour doubles the likelihood.[19-21]

When induction attempts failed, 21.4% of the 200 women surveyed had to undergo a caesarean section. The incidence of caesarean section is significantly increased by longer cervical lengths. When the induction attempt fails, the caesarean section becomes more associated with this specificity. As the cervical length increases from 4 centimetres to 5 centimetres, the specificity rises from 88.5% to 97.46% to 99.49%. Patients who underwent a caesarean section because induction failed had a mean cervical length of 3.897. When induction attempts fail, the average cervical length for patients who do not undergo caesarean section is 3.559. The ROC area is 0.702.[22-24] Caesarean birth as a result of unsuccessful induction can be predicted with a sensitivity of 64.5% and a specificity of 67.7% if the cervical length is more than 3.7. The factors that led to a caesarean section—as a result of either a short or long cervical length—and the length of the pregnancy were examined using multivariate analysis. The likelihood of a caesarean section as a result of an unsuccessful induction rises by a factor of four for every centimeter of cervical length and by a factor of two for each extra week of pregnancy. Gordon Smith et al. found that a risk of caesarean section was 1.8 times higher when the cervical length was more over 4 cm.[25-27]

CONCLUSION

In order to anticipate the result of labour and the likelihood of a caesarean section, a simple predictive tool can be employed: mid-trimester transvaginal ultrasonography measurements of cervical length. It might be readily integrated into clinical practice because to the widespread availability of ultrasonography machines in nearly all prenatal clinics. It would be more efficient to refer patients at risk of bad labour outcomes to higher centres that are better able to manage them earlier.

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