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Analysis of Effect of Cervical Effacement on Labour Progression in Spontaneous Onset Labour

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ABSTRACT

This study was conducted to evaluate the effect of the cervical effacement to rate of cervical dilatation in spontaneous onset labour in low risk pregnant women in order to improve the accuracy of the current partogram. We conducted an observational study of women who were admitted for vaginal delivery at SSMC, Rewa from august 2017 to july 2018. During labor, dilatation curve was plotted in different graphs for women with spontaneous onset labour admitted at SSMC, Rewa during this time period..They were divided into 2 groups based on degree of effacement at admission, whether it was more than 80% or less than equal to 80% and then their labour curve was separately evaluated and compared with each other. From 8839 women admitted during this time period, 1386 nulliparous and primiparous and 145 multiparous women were eligible for the study. An adjusted generalized estimating equations multivariable model showed that effacement had a significant relationship with rate of cervical dilatation and speed of labour progression. In women With effacement greater than or equal to 80% at 4 cm dilatation rate of cervical dilatation was 1.57 cm/hr which decreases to 1.20 cm /hr for women with effacement <80% at 4 cm dilatation and this association is found statistically significant. Mean duration of active phase of first stage of labour was 241.8 minutes with study group having effacement < 80% at 4 cm cervical dilatation, which decreased significantly to 204.6 minutes in study group having effacement ≥80% at 4 cm cervical dilatation. Regarding the acceptable predictive value of effacement, we believe considering effacement and dilatation together can improve the power of the existing partogram for the assessment of labor progression and detection of failure to progress.

INTRODUCTION

Recently, the Consortium on Safe Labor (CSL) labor curves have replaced the traditional labor curve proposed by Friedman^[1-4]. The importance of understanding normal labor progression was highlighted by Rouse and colleagues in 1999 when they challenged the idea that arrest of labor could be diagnosed after only 2 hours of inadequate cervical change^[5]. Rouse and colleagues found that 60% of women who were given 2 additional hours to demonstrate cervical change went on to deliver vaginally. This observation highlighted that an inappropriate model of normal labor can lead to an over diagnosis of arrest disorders of labor and subsequently unnecessary cesarean deliveries. The American College of Obstetrics and Gynecology and the Society for Maternal-Fetal Medicine consensus statement on the Safe Prevention of the Primary Cesarean Delivery recommends using the CSL labor curves to define normal labor progress^[6].

The CSL labor curve emphasizes the notion that active labor may not begin until 6 cm of cervical dilation. The CSL labor curve does not specifically address the role of cervical effacement in predicting normal rates of cervical change. Cervical effacement, however, has been used by many authors as a traditional part of the definition of active labor^[7] and clinical experience would suggest that cervical effacement plays a role in labor progress. The current study assesses the association of cervical effacement with the rate of intrapartum cervical change among low risk pregnant women with spontaneous onset labour.

MATERIALS AND METHODS

This was a prospective observational study conducted from August 2017 to July 2018. The study was conducted at Department of Obstetrics and Gynaecology, SS Medical College Rewa. The study was approved by Institutional Ethics Committee. All patients admitted in the labour room during the course of study and fulfilling the inclusion and exclusion criteria were enrolled in the study. After considering inclusion and exclusion criteria all laboring females were allowed to progress naturally and a four hourly partogram was recorded. All females who required augmentation, caesarean or instrumental delivery were excluded from the study. On the basis of individual labour progress chart which were obtained, a final composite labour graph was derived and appropriate statistical tests were applied.

Inclusion Criteria:

- Term pregnant female of Indian origin
- Maternal age: 18-35 years old
- Gestational age: 37 weeks to 41 weeks

- Spontaneous onset of labour
- First to fourth gravida with singleton pregnancy with vertex presentation
- Cervical dilatation less than or equal to 4cm
- Normal neonatal outcome

Exclusion Criteria:

- Induced labour, Elective LSCS or emergency LSCS
- With history of any medical illness
- High risk pregnancy
- Oxytocin augmented labour

Out of total 6759 vaginal deliveries during this time period 5800 women fulfilling inclusion criteria were taken initially for study. On further study 4237 were excluded due to oxytocin augmentation needed or due to instrumental or caesarean delivery needed. 1563 remaining were further studied. Among 1563 women, neonates of 32 women required resuscitation so these 32 were also excluded. Finally 1531 women were taken in study group. Cervical dilatation and effacement was measured 4 hourly by different obstetricians. This may lead to inter observer variations as have been found by many studies^[8,9]. So to reduce the inter observer variation we had divided the study group Based on degree of effacement, those having cervical effacement more than or equal to 80% at 4 cm cervical dilatation in one group and those having cervical effacement less than 80% at 4 cm cervical dilatation in another group. Cervical dilatation graph was plotted for each group separately. Mean values of rate of cervical dilatation was calculated for both group and compared.

RESULTS

In present study 57.3% cases had extent of effacement $\geq 80\%$ at 4 cm cervical dilatation. Cervical effacement was found to be directly associated with rate of cervical dilatation. It was found that with effacement $\geq 80\%$ at 4 cm cervical dilatation, rate of cervical dilatation was 1.57 cm/hr which decreases to 1.20 cm/hr when effacement was $< 80\%$ at 4 cm cervical dilatation. Mean duration of active phase of first stage of labour was 241.8 minutes with study group having effacement $< 80\%$ at 4 cm cervical dilatation, which decreased significantly to 204.6 minutes in study group having effacement $\geq 80\%$ at 4 cm cervical dilatation.

Table 1: Association of cervical dilatation rate with cervical effacement

Cervical dilatation (cm)	Duration in minutes - Effacement $< 80\%$	Duration in minutes - Effacement $\geq 80\%$
4-5	70.80	61.20
5-6	50.40	42.00
6-7	37.80	30.60
7-8	28.80	24.60
8-9	28.80	22.80
9-10	28.20	23.40
Total	241.8 min	204.6 min

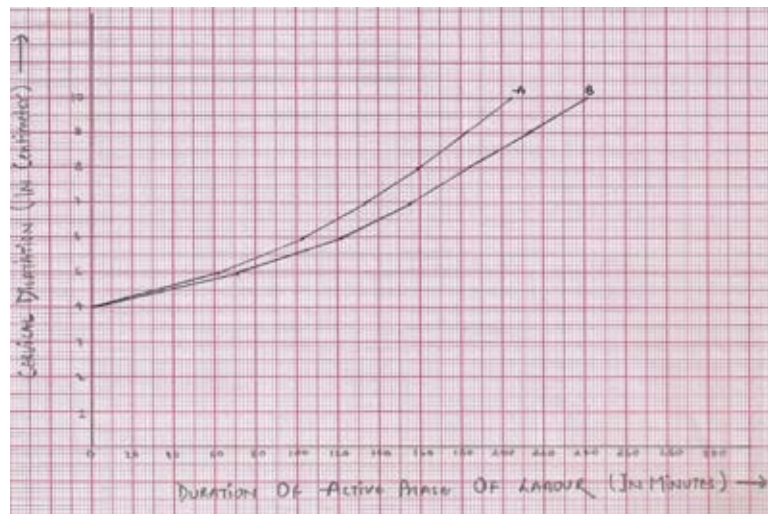


Fig. 1: A: study group having cervical effacement $\geq 80\%$ at 4 cm cervical dilatation, B: study group having cervical effacement $< 80\%$ at 4 cm cervical dilatation

Table 1 is showing association of cervical dilatation rate with cervical effacement. With effacement greater than or equal to 80% at 4 cm dilatation rate of cervical dilatation is fast and this association is found statistically significant.

It was found that labour was more slow in women with effacement $< 80\%$ before 7 cm than after 7 cm in comparison with women having effacement greater than equal to 80%. Figure 1 is also showing the same relation in graphical representation.

Comparison of labour curve among study group having effacement $\geq 80\%$ Vs study group having effacement $< 80\%$ at 4 cm cervical dilatation.

DISCUSSION

Labor is defined as “uterine contractions that bring about demonstrable effacement and dilation of the cervix^[10]. While labor involves both dilation and effacement, existing labor curves demonstrate only the rate of cervical change in relationship to cervical dilation (1-4). We sought to investigate how cervical effacement might influence expectations of the rate of cervical change. In this cohort of low risk pregnant women with spontaneous onset labour, the rate of cervical dilation in labor was significantly associated with cervical effacement. Langen *et al.*^[11] also concluded in his study that rate of cervical dilatation among nulliparous women is associated with not only the degree of cervical dilatation, but also with cervical effacement. Agah *et al.*^[12] also found that both dilatation and effacement had a significant relationship with fetal descent.

Much attention has been paid to when the transition to active labor begins. The CSL data suggest that active labor may not begin until 6 cm^[1,6]. This strict criterion, however, has been challenged by Cohen and

Friedman who “discouraged the use of any specific degree of dilation for the identification of the active phase”^[13]. They argue that the timing of active labor depends on assessment of the individual patient, but is typically between 3 and 6 cm. Our observations suggest that combining the assessment of cervical dilation with cervical effacement may allow us to better define the beginning of active labor. If our findings are confirmed, future labor guidelines may wish to include the combination of cervical dilation and effacement when defining active labor.

Our analyses consistently demonstrated that achievement of 80% or more cervical effacement was associated with faster labor progression. Even comparisons were statistically significant. Even though our study cohort was not very large but still results point towards the possible association.

Strengths of this study include the prospective collection of data from a large number of number of women. Rate of labor progress was measured 4 hourly, but potential observer errors may be present. By separating women into those who were 80% effaced vs. not, we hoped to eliminate some of the inter-observer variability that is inherent in measuring cervical effacement^[9,10]. This decision was designed to provide more-reproducible results, while allowing us to provide insight into how cervical effacement is associated with labor progression.

Our study is applicable only to women who share characteristics with the women in the original study. We do not have data on any high risk women. Also, our analysis was limited to those who arrived at the hospital with spontaneous onset labour and agreed to participate in the randomized trial before reaching 4 cm dilation. Those missed would include women whose labor was slow needed oxytocin augmentation

or needed emergency caesarean section due to varied reasons and therefore without sufficient opportunity to enroll in the trial. Lastly, those who chose to participate in the randomized trial may be different from those who did not.

Labor involves a complex process of both cervical dilation and effacement. As we wish to safely reduce the number of unnecessary cesarean deliveries, we expect that an understanding of how cervical effacement may impact the expected rate of cervical change in labor will allow obstetricians to more appropriately diagnose arrest disorders.

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