



Pattern of cervical dilatation in women with a previous cesarean section

Tripathi Jagruti B, Doshi Haresh U,

Department of Obstetrics and Gynecology, B. J. Medical College and Civil Hospital, Ahmedabad.

OBJECTIVE(S) : To examine the role of intrapartum cervicogram in vaginal birth after cesarean section (VBAC).

METHOD(S) : Prospective partographic analysis of 81 women who had one previous cesarean section was done. Duration of labor, initial dilatation rate (IDR) and average dilatation rate (ADR) were calculated. Statistical analysis was done with 'Z' test.

RESULTS : Vaginal birth was successfully achieved in 74%. The mean duration of first stage and of second stage of labor were 10.93 ± 5.86 hours and 23.44 ± 16.23 minutes respectively. The mean duration of first and of second stage were shorter in women with previous vaginal birth compared to those who had no previous vaginal birth. The mean IDR and ADR of vaginally delivered women were 0.74 cm/hour and 1.14 cm/hour respectively. The women requiring repeat cesarean section had significantly slower dilatation rate (mean IDR 0.4 cm/hour, mean ADR 0.29 cm/hour). Ninety-five percent of the women with $IDR \geq 1$ cm/hour and 97% women with $ADR \geq 0.5$ cm/hour delivered vaginally while 67% women with $IDR < 0.5$ cm/hour and 87% women with $ADR < 0.5$ cm/hour required repeat cesarean section. Alert line was crossed in 25 women and 21 of them required repeat cesarean section.

CONCLUSION(S) : $IDR \geq 1$ cm/hour and $ADR \geq 0.5$ cm/hour have 95% and 97% positive predictive value respectively for VBAC. Alert line is helpful in identifying cases requiring intervention.

Key words : previous cesarean section, vaginal birth after cesarean section, trial of labor, partogram

Introduction

In an appropriate clinical setting and properly selected group of women, vaginal delivery after cesarean section (VBAC) is safe and effective¹. However women with previous cesarean section in labor often tax the obstetrician's judgment regarding continuation or termination of labor. Considering the fact that skilled physicians are scarce in most developing countries, it is important that obstetric services develop simple methods for monitoring of labor. Partogram, a graphic record of labor, increases the quality and regularity of observation giving an early warning for detection of abnormal progress and assists in early decision for intervention. The place of partogram in the management of normal and abnormal labor is now well established for nearly two decades²⁻⁴.

Paper received on 13/02/2004 ; accepted on 09/11/2004

Correspondence :

Dr. Tripathi Jagruti B
Department of Obstetrics and Gynecology,
B.J. Medical College and Civil Hospital,
Ahmedabad.

The present study aimed to examine the predictive value of intrapartum cervicogram in VBAC.

Material and Methods

A prospective partographic study of labor was done in 81 women with previous one cesarean section, with or without previous vaginal birth. Case selection was done as per ACOG guidelines⁵—

- Singleton pregnancy
- Gestational age > 34 weeks with vertex presentation
- History of single lower segment cesarean section (Women with classical cesarean section and those with inverted T incision were excluded)
- Nonrecurring indication for previous cesarean section.

All women had a thorough clinical and obstetric examination on admission. Progress of labor was recorded on a 'WHO' partogram. Cervical dilatation, effacement and fetal head

descent were evaluated by vaginal examination done every 2 to 4 hours. Maternal and fetal well-being were assessed and plotted regularly. Uterine scar was assessed by maternal tachycardia, scar tenderness, fetal tachycardia, color of urine, and vaginal bleeding more than show. This procedure was continued till full dilatation or till trial of vaginal delivery was abandoned and repeat cesarean section undertaken. Initial dilatation rate (IDR) was calculated by dividing the total cervical dilatation achieved by the time in hours taken for it. The mode, time and complication, if any, of delivery, and fetal outcome were noted. Statistical analysis of the data was carried out by Z test. Sensitivity and positive predictive value were calculated when required.

Results

Partographic records of all 81 women were examined to study the course of labor, initial dilatation rate (IDR), average dilatation rate (ADR), duration of labor and relationship of the cervicogram to the alert line. Of the 81 women studied, 48 had normal vaginal delivery and 11 had instrumental vaginal delivery. Thus 74% of women had successful vaginal delivery and 26% (22/81) ended in repeat cesarean section. The commonest indication for instrumental delivery was fetal distress and meconium stained liquor (n=8). Prolongation of 2nd stage and prophylactic forceps were the other indications for instrumental delivery. Repeat cesarean section was done for failure to progress (n=11), cephalo-pelvic disproportion (n=5), fetal distress (n=4) and threatened scar rupture (n=2).

Twenty-two women in the study had previous vaginal delivery and 59 had no previous vaginal delivery. Table 1 shows the durations of 1st and 2nd stages of labor in women who delivered vaginally. The mean duration of 1st and 2nd stage was 10.93 ± 5.36 hours and 23.44 ± 16.236 minutes respectively. In women without prior vaginal birth the durations of 1st and 2nd stages were longer than those in women with prior vaginal birth (Table 1). However the differences were statistically nonsignificant.

Table 1. Duration of labor.

Women delivered vaginally	Mean duration of 1st stage (hours)	Mean duration of 2nd stage (minutes)
With prior vaginal birth (n=19)	9.63 ± 5.04	15 ± 13.41
With no prior vaginal birth (n=40)	11.55 ± 5.42	27.75 ± 17.58
Total (n=50)	10.93 ± 5.36	23.44 ± 16.23

The mean IDR and ADR were 0.65 cm/hour and 0.9 cm/hour respectively. Table 2 shows the fact that women requiring repeat cesarean section had significantly slower

dilatation rates, compared to those in women who delivered vaginally (P < 0.001, Table 2).

Table 2. Mean dilatation rates.

Outcome	Mean IDR (cm/hour)	Mean ADR (cm/hour)
Vaginal delivery (n=59)	0.74 ± 0.13	1.14 ± 0.49
Cesarean section (n=22)	0.4 ± 0.2	0.29 ± 0.22
Total (n=81)	0.65 ± 0.36	0.9 ± 0.58

IDR = Initial dilatation rate ADR = Average dilatation rate

The dilatation rates were slower in patients requiring repeat cesarean section. The differences observed in the mean IDR and mean ADR in vaginal birth group and repeat cesarean section group were highly significant statistically (P < 0.001 by Z test).

Effect of IDR on the outcome of labor is shown in Table 3. Ninety-five percent of women with IDR ≥ 1 cm/hour delivered vaginally and 67% with IDR < 0.5 cm/hour required repeat cesarean section. Fifty percent of women requiring repeat cesarean section had IDR < 0.5 cm/hour.

Table 3. Effect of IDR on outcome of labor.

IDR (cm/hour)	Vaginal birth	Repeat cesarean section
< 0.5 (n=18)	06 (33%)	12 (67%)
0.5 - 0.9 (n=41)	32 (78%)	09 (22%)
1.0 - 1.4 (n=15)	14 (93%)	01 (7%)
> 1.4 (n=7)	07 (100%)	--

IDR = Initial dilatation rate
 IDR ≥ 1 cm/hour — Sensitivity 36% ; Specificity 95% ; Positive predictive value: 95% ; Negative predictive value 36%.
 IDR ≥ 0.5 cm/hour — Sensitivity 90% ; Specificity 55% ; Positive predictive value 84% ; Negative predictive value 67%.

Table 4 shows the effect of ADR on outcome of labor. It can be appreciated that 97% of the women with ADR ≥ 0.5 cm/hour delivered vaginally and 87% women with ADR < 0.5 cm/hour required repeat cesarean section. On partographic analysis, 25 women crossed the alert line and 21 (84%) of them required repeat cesarean section. Only 1.78% (1/56) who did not cross the alert line (Table 5) required repeat cesarean section.

The incidence of scar rupture was 1.2%. There was minimal maternal or perinatal morbidity. The woman with uterine scar

rupture also had bladder trauma and required two units of blood transfusion. Thus maternal morbidity was low. There was no perinatal mortality or morbidity.

Table 4. Effect of ADR on outcome of labor.

ADR (cm/hour)	Vaginal birth	Repeat cesarean section
<0.5 (n=23)	03 (13%)	20 (87%)
0.5 - 0.9 (n=18)	17 (94%)	01 (6%)
1.0 - 1.4 (n=25)	24 (96%)	01 (4%)
>1.4 (n=15)	15 (100%)	

ADR = Average dilatation rate.

ADR \geq 0.5 cm/hour — Sensitivity 95%. Specificity 91%. Positive predictive value 96.5%. Negative predictive value 87%.

Table 5. Alert line and outcome of labor.

Alert line	Vaginal birth	Cesarean section
Crossed (n=25)	04	21
Not crossed (n=56)	55	01

Alert line — Sensitivity 95%. Specificity 92%. Positive predictive value 80%. Negative predictive value 98%.

Discussion

The success rate of 74% vaginal delivery observed in the present study is comparable to that reported in other similar studies ^{1,6,7}. The durations of 1st and 2nd stage reported by Guleria et al ⁶ are 11.18 \pm 5.35 hours and 29.4 \pm 27.3 minutes respectively. The durations of 1st and 2nd stage are different in various studies ^{8,9}, probably because of the difference in the indication for previous cesarean section. However studies have proved the fact that duration of labor in previous cesarean section cases is not much different ^{8,9}, rather shorter ⁶ than in their nulliparous and multiparous counterparts. In our study, 95% women with IDR \geq 0.5 cm/hour delivered vaginally. IDR \geq 1cm/hour had a positive predictive value of 95% and

ADR \geq 0.5 cm/hour had a positive predictive value of 97% for VBAC. In the study by Guleria et al ⁶ all the women with IDR \geq 1 cm/hour and 96% women with ADR \geq 0.5 cm/hour delivered vaginally. Higher rates of repeat cesarean section with IDR and ADR of < 0.5 cm/hour observed in our study are confirmed by various other studies ^{6,7,10}.

The alert line provides good indication for requirement of intervention. In our study 95% women requiring repeat cesarean section had crossed the alert line. Guleria et al ⁶ quote this figure to be 87.5% and other studies ^{7,10} quote this to be as high as 90 to 100%. The rate of scar rupture in the present study is also comparable to that quoted in different other studies ^{1,6,10}. Our study shows that previous cesarean birth does not increase the duration of labor in the next pregnancy while alert line helps the clinician to identify high risk cases requiring intervention.

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