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Original Research Article

Study of partogram in relation to labour outcome and significance of alert line in partogram

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ABSTRACT

Background: The partogram is a simple, inexpensive tool to provide a continuous pictorial overview of labor. The goal of this study is to use partograph to monitor labor, initiate uterine activity that is sufficient to produce cervical changes, fetal descent while avoiding uterine hyperstimulation, hypostimulation and fetal distress and provide timely surgical intervention where required.

Methods: Total 200 term patients, both primigravida and multigravida were selected for study and partograph recording were commenced at 4 cm dilation close maternal and fetal monitoring was done throughout the labour and partogram was plotted to detect any deviation from normal course.

Results: Patients were grouped into primigravida and multigravida and based on partogram finding divided into delivered "before alert line" and "between alert and action line" and after action line. 175 women delivered vaginally, out of this 106 delivered before alert line, 83 between alert line and action line and 11 after crossing action line.

Conclusions: Partographic management of labour is a time honored and evidence based scientific way of managing labour. Partograph improves the quality of delivery care, since it permits to identify dystocia and make logical and effective interventions. It reduces unnecessary strain on mothers by reducing total duration of labour, without any increased foetal morbidity and mortality.

Keywords: Action line, Alert line, Partogram, Labour

INTRODUCTION

Partograph is a visual/graphical representation of related values or events over the course of labour. It is an important tool for managing labour. The first graphic assessment of progress of labour was designed by Friedman in 1954, and further improved by Philpott and Castle.¹ In response to the recommendations of the Safe Motherhood, WHO produced a partograph, and tested its practical value to reduce maternal and perinatal morbidity and mortality.² Childbirth is a prolonged difficult and laborious process. The authenticity of Ian Donald's statement "of all the journeys we ever make, the most dangerous one is the very first one we undertake through the last 10 cm of birth canal" can never be doubted. To

achieve this, good obstetrician must always be alert to detect any sign and symptoms of abnormal labour. Prolongation of labour presents a picture of mental anguish, physical morbidity and may lead to surgical intervention. Mother is exposed to higher risk of infection, dehydration, ketosis unrecognized obstructed labour and loss of moral. The foetus on the other hand is exposed to the dangers of infection, asphyxia and excessive cranial moulding. Thus, obstetrician concern should centre the duration of labour which has the great influence on both maternal and fetal morbidity. The goal of this study is to use partograph to monitor labour, initiate uterine activity that is sufficient to produce cervical change and fetal descent while avoiding uterine hyper stimulation, hypo stimulation and fetal distress and

provide timely surgical intervention where required. Partograph use is recommended for routine monitoring of labour, and helps the health care provider in identifying slow progress in labour, and may help initiate appropriate interventions to prevent prolonged and obstructed labour.^{3,4} The partograph is an inexpensive tool designed to provide a continuous pictorial overview of labour and has been shown to improve outcomes when used to monitor and manage labour. It is a single sheet of paper which includes information about the foetus' heart rate, uterine contraction, any drugs used and other important factors that could help avoid extensive descriptive notes. It is a practical device when employed in a busy labour room with many cases, but limited personnel to screen for abnormal labour. With its use, there is no need to record labour events repeatedly. It helps predict deviation from normal progress of labour and supports timely and proven intervention. It also helps to facilitate responsibility to the person conducting labour.⁵

Different Types of partogram

- Friedman's partogram devised in 1954 was based on observations of cervical dilatation and foetal station against time elapsed in hours from onset of labour. Plotting cervical dilatation against time yielded the typical sigmoid or 'S' shaped curve and station against time gave rise to the hyperbolic curve. Limits of normal were defined.⁶
- Philpott and Castle introduced the concept of "ALERT" and "ACTION" lines. Alert line was drawn at a slope of 1 centimetre/hr for nulliparous women starting at zero time i.e. time of admission.^{7,8}
- The action line was subsequently drawn two hours to the right of the alert line enabling the transfer of the patient to a specialized tertiary care centre.
- The first WHO partograph or 'Composite partograph', covers a latent phase of labour of up to 8 hours and an active phase beginning when the cervical dilatation reaches 3 cm. The active phase is depicted with an alert line and an action line, drawn 4 hours apart on the partograph.^{9,10}

This partograph is based on the principle that during active labour, the rate of cervical dilation should not be slower than 1 cm/hour. Since a prolonged latent phase is relatively infrequent and not usually associated with poor perinatal outcome, the usefulness of recording the latent phase of labour in the partograph has been questioned. Moreover, differentiating the latent phase from false labour is often difficult. To alleviate these disadvantages, a modified WHO 'partograph' (see Figure 1) was introduced and incorporated removal of the latent phase and defined the beginning of the active phase at 4 cm cervical dilatation.¹¹

The goal of this study is to use partograph to monitor labour, initiate uterine activity that is sufficient to produce cervical change and fetal descent while avoiding

uterine hyper stimulation, hypo stimulation and fetal distress and provide timely surgical intervention where required.

The objectives of the current study are to compare the partogram of primigravida and multigravida, to study the significance of alert line in partogram and to study the effect of partogram in relation to labour outcome in terms of its Mode of delivery and Neonatal- Apgar score and need of resuscitation.

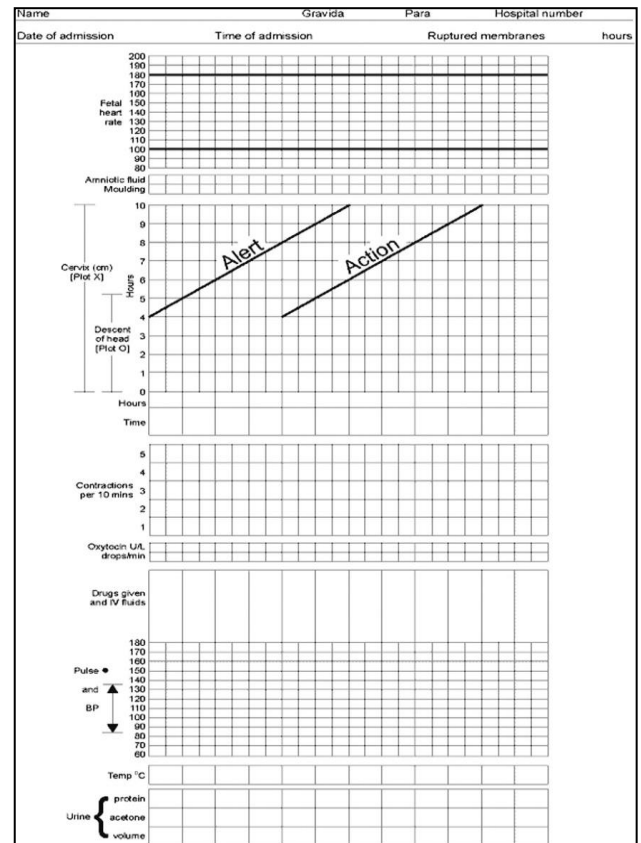


Figure 1: Modified WHO Partograph.

METHODS

A prospective randomized study was taken place in Department of Obstetrics and Gynecology NSCB Medical College, Jabalpur M.P, India for 1 year from 2012-2013.

Using WHO modified partogram. In this study 200 patients were selected randomly. It included primigravida and multigravida women. Sample size of study population consisted of 200 pts with more than 37 weeks who went into spontaneous or induced labour

Inclusion criteria

- Singleton pregnancy with cephalic presentation with gestational age >37 weeks

- Previous cesarean section with non-recurring indication
- Primigravida without CPD
- Spontaneous onset of labour or those with induction labour at or near term

Exclusion criteria

- Multiple pregnancy
- Malposition
- Malpresentation
- Gestational age <37 weeks
- Fetal distress on admission
- Gross CPD
- Obstructed labour
- Previous two caesarian section
- Fetal malformation
- All absolute indication for caesarean section

On admission to labour room, for each patient, a detailed history was taken, and a thorough examination was done with particular reference to the points as per proforma.

General examination of patient was carried out including height, weight, pulse, BP. They were examined for presence of pallor, edema, icterus and fever. Thorough examination of CVS and RS was done to rule out any kind of systemic diseases. P/A examination was carried out by Leopold’s maneuvers. Height of uterus, fullness of flanks was noted. Lie, presentation and position of the fetus were confirmed. Amount of liquor was noted. Part of head palpable in fifths was noted. Duration, intensity and frequency (per 10 minutes) of uterine contractions were noted. Vaginal examination under all aseptic precautions performed to note position of cervix, consistency of cervix, cervical dilatation in cm, effacement of cervix, presence of membranes, station of presenting part, position of occiput. Detailed pelvic assessment was done to rule out obvious CPD. All above findings were recorded on partogram.

In active phase of labour P/V examination was done at 4 hours interval and fetal heart was monitored at 1-hour interval. If cervical dilatation had progressed on left to alert line, the labour was considered to progress normally. But if it had moved to right of alert line, after confirming fetal well-being and excluding gross CPD, augmentation was done. Rupture of membranes was done if they were present. Further progress was seen until delivery. If labour progress was satisfactory, labour was allowed to continue. If obstruction or fetal distress was diagnosed at any time CS was done.

The end points for study were

- Mode of delivery
- Maternal and fetal outcome
- Comparison of labour progress in primigravida and multigravida

RESULTS

In this study 200 patients were selected who were admitted in labour room at or near term (>37wks). Out of 200 patients 120 were primigravida and 80 were multigravida. most of the patients included in study were had gestational age of 38-41 weeks (Table 1) and majority of them are in 21-30 years of age group.

Table 1: Background characteristics of the studied subjects.

Variable	Groups	No of patients (%)
Age	<20years	22 (11%)
	21-25	90 (45%)
	26-30	85 (42.5%)
	>30	3 (1.5%)
Locality	Rural	82 (41%)
	Urban	118 (59%)
Weight	<50kg	13 (6.5%)
	51-54	81 (40.5%)
	55-59	94 (47%)
	>59	12 (6%)
Height	<150cm	9 (4.5%)
	151-155	123 (61.5%)
	156-160	68 (34%)
Gestational age	37-38 weeks	39 (19.5%)
	39-40	122 (61%)
	41-42	34 (17%)
	43-44	5 (2.5%)

According to basic maternal parameters of labour (Table 2) 174 women went into spontaneous labour, induction required only in 26 patients.

Table 2: Distribution of patients according to basic maternal parameters of labour.

		Primi (n=120)	Multi (n=80)	Total (N=200)
Labour onset	Spontaneous	101 (84.2%)	73 (91.2%)	174 (87%)
	Induced	19 (15.8%)	7 (8.8%)	26 (13%)
Station of Head	-5	4 (3.3%)	6 (7.5%)	10 (5%)
	-4	4 (3.3%)	3 (3.8%)	7 (3.5%)
	-3	69 (57.5%)	48 (60.0%)	117 (58.5%)
	-2	42 (35%)	23 (28.7%)	65 (32.5%)
	-1	1 (0.8%)	0 (0%)	1 (0.5%)
Status of members	Absent	12 (10.0%)	7 (8.8%)	19 (9.5%)
	Present	108 (90.0%)	73 (91.2%)	181 (90.5%)

In majority of patients, head is at -3 and -2 station on admission and membranes were present in 181 patients and were absent in 19 womens. Augmentation done with oxytocin in 129 patients (Table 3).

Table 3: Distribution of patients according to intervention.

Intervention		Primi (n=120)	Multi (n=80)	Total (N=200)
Inductions	Not Done	101 (84.2%)	73 (91.3%)	174 (87.0%)
	Done	19 (15.8%)	7 (8.8%)	26 (13.0%)
Augmentation	Not Done	48 (40.0%)	23 (28.8%)	71 (35.5%)
	Done	72 (60.0%)	57 (71.2%)	129 (64.5%)

Table 4: Distribution of patients according to alert line and action line in primigravida and multigravida before delivery.

Partogram findings		Primi (n=120)	Multi (n=80)	Total (N=200)
Crossed alert line	Yes	65 (54.2%)	29 (36.3%)	94 (47.0%)
	No	55 (45.8%)	51 (63.7%)	106 (53.0%)
Crossed action line	Yes	7 (5.8%)	4 (5.0%)	11 (5.5%)
	No	113 (94.2%)	76 (95.0%)	189 (94.5%)

Out 120 primigravida 103 delivered vaginally and 17 by Caesarean section while out of 80 multigravida 72 delivered by vaginal route and 8 by C.S (Table 5). Out of 200 women 94 (47%) delivered after crossing alert line and 11 (5.5%) delivered after crossing action line (Table 4).

Table 5 Maternal Outcome in terms of mode of delivery

Mode of delivery	Primi (n=120)	Multi (n=80)	Total (N=200)
Vaginal	103 (85.8%)	72 (90.0%)	175 (87.5%)
LSCS	17 (14.2%)	8 (10.0%)	25 (12.5%)

65/120 (54.27%) primigravida crossed the alert line while only 29/80 (36.25%) multigravida crossed alert line. Total 106 patients delivered before alert line out of this 99.06% were delivered vaginally of 0.94%. were delivered by LSCS.

94 patients crossed the alert line out of this 74.74% delivered vaginally and 25.34% by LSCS. 11 patients crossed the action line and all were delivered by LSCS (Table 6).

There was no significant effect of status of membranes Station of head on the progress of labour. Out of 200 newborn only 7 had Apgar score < 7 at 5 minute. There was no significant difference of Apgar score at 5 minutes between the patients who delivered before alert line or after alert line (Table 7).

Table 6 Mode of delivery and indication for caesarean section on basis of alert line and action line.

Mode of delivery	Before alert line (n=106)	After alert line (n=83)	After action line (n=11)
NVD (n=175)	105 (99.1%)	70 (84.3%)	0 (0%)
LSCS (n=25)	1 (0.9%)	13 (15.7%)	11 (100%)
Indication of LSCS	FD (5)	1	4
	FD PPOL (9)	0	9
	NPOL (11)	0	0

FD-Fetal Distress, PPOL-Poor progradation of labour, NPOL-Non progradation of labour, LSCS-Lower segment caesarean section

Table 7 Feta outcome on the basis of alert line and action line in terms of Apgar score.

Action line	Apgar score	
	≥7	<7
Patients does not crossed alert line (n=106)	102 (96.2%)	4 (3.8%)
Patients crossed alert line but not crossed action line (n=83)	80 (96.4%)	3 (3.6%)
Patients crossed action line (n=11)	11 (100.0%)	0 (0%)

DISCUSSION

Since 1954, when Friedman first reported graphic representation of progress in labor, obstetric caregivers have used the concept of a “Partogram” to aid intrapartum care.^{6,12,13} Friedman’s curves were based on observations of cervical dilatation and fetal station graphed against time in hours from the onset of labour. An S-shaped curve of typical cervical dilatation plotted against time was described, and normal durations of labour were defined. Philpott developed the first formal Partogram in Zimbabwe.^{8,9} His aim was to promote early recognition of dystocia and referral of women from remote areas into hospitals with CS facilities. His Partogram combined the graphic details of labour progress, developed by Friedman in 1954, with Hendricks’ concept of a carefully defined starting time and added information about fetal and maternal condition.¹⁴ Beazley and Kurjak modified the partogram to commence at the first vaginal examination and end at delivery.¹⁵ In England, Studd et al studied 741 consecutive spontaneous labours to identify high-risk labours that needed oxytocin stimulation.^{12,13} uterine contractions were augmented if progress extended two hours past the limit indicated by the Partogram. This resulted in shorter labours, fewer instrumental deliveries and Caesarean sections, and higher neonatal Apgar scores than in those labours that were not stimulated. This study, building on the reports of Philpott and Castle was

followed by increased use of the Partogram in the United Kingdom, and its use subsequently spread throughout the world.^{7,8} Since the 1970s, efforts have been made in many countries to reduce rising rates of CS. In addition to peer review committees and support for vaginal birth after CS (VBAC), interventions to reduce primary CS for dystocia have also been studied. The various components described by O' Driscoll in his program have been studied, both collectively and separately. In our study, we randomly selected 200 patients who were admitted for term labour in Obstetrics and Gynecology department after matching for inclusion and exclusion criteria, out of 200 patients 117 (58.50%) came from urban areas and 83 (41.50%) were from rural areas. 120 (60%) were primigravida & 80 (40%) were multigravida.

In our study 94 (47%) out of 200 patients crossed the alert line, out of them 65/120 (65%) were primi and 29/80 (36.25%) were multigravida. In WHO study 34.5% primi and 21% Multigravida crossed the alert line.⁹ In Philpotts, study 11% crossed the action line, while in our study 11 (5.5%) out of 200 crossed the action line 7 were primigravida and 4 were multigravida.⁷ In WHO study 9.9% patients crossed the action line while in our study significantly fewer patients (5.5%) crossed the action line similar to levander et al study (5.3%).^{9,16} In present study, induction of labour was done with PGE2 gel in 26 (13%) out of 200 patients, more induction was required in primi patients (15.83) then multigravida (8.75%). Out of 200 patients 181 (90.5%) had membrane present at the time of admission and 19 (9.5%) patients presented with absent membranes, there was no difference on the progress of labour in pts who came with absent membranes and intact membranes. No significant difference was found in patients crossing alert line and in who's who did not cross the alert line with regards of maternal age, height, weight, gestational age, baby weight. With our management protocol there was no difference in Apgar score at 5min whether patient crossed or did not cross the alert line or action line. Similar to study by Manjulatha VR this study none of the newborns required NICU care.¹⁷

In our study 175 (87.50%) patients delivered vaginally, out of this 105 (60%) delivered before alert line. CS was done more frequently in primigravida 17 (14.16%) as compared to multigravida 8 (10%) while in Frigotto et al 78.3% and in Pattison et al study 63.66% patients delivered vaginally.^{18,19}

CONCLUSION

This study shows that using the Partogram improves the quality of delivery care, since it permits to identify dystocia and make logical and effective interventions.

Using the Partogram with alert and action lines makes it easier to establish conducts to be used during labour with a normal evolution, as well as to diagnose any changes, identifying and preventing dystocia, changing intuitive conduct into a precise action.

This study shows that active management in primigravida using Partogram has got definitive role in modern obstetrics. It reduces unnecessary strain on mothers by reducing total duration of labour, without any increased foetal morbidity and mortality. If accepted as routine procedure, it will be suitable in all situations where the labour room remains busy and congested day and night. Thus, it seems that the value of active management of labour will be realized by most of the obstetricians and it will be accepted as a routine procedure for better and more efficient management of labour.

The only disadvantage is that it requires continuous monitoring but at the same time it gives satisfaction to labouring women as she is monitored by the same doctor there by lessening her anxiety

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Ethical approval: The study was approved by the Institutional Ethics Committee

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