Partographic Analysis of Spontaneous Labour at Term in Primigravida

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Abstract

Purpose of the Study To study the use of partogram in the analysis of spontaneous labour at term in primigravida with cephalic presentation.

Methodology Partographic analysis of labour was done in 200 primigravidae. Partographic variables are plotted, and the study population was divided into three groups. Group I: Cervix dilatation and descent curve falling to the left of alert line; Group II: Cervix dilatation and descent curve falling to the right of alert line; and Group III: Cervix dilatation and descent curve falling to the right of action line. Maternal and neonatal outcomes were studied in each of three groups.

Results Amongst the 200 primigravid labours analysed, 133 (66.5 %) belonged to group I, 40 (20.0 %) belonged to group II and 27 (13.5 %) belonged to group III. Mean durations of active phases of labour were 4.1 h, 6.9 h and 9.6 h, in groups I, II and III, respectively. In group I, 130 women (97.7 %) delivered vaginally, 3 (2.3 %) underwent

LSCS. In group II, 29 (72.5 %) delivered vaginally, 4 (10 %) delivered instrumentally and 7 (17.5 %) underwent LSCS, and in group III, 5 (18.5 %) delivered vaginally, 7 (25.9 %) delivered instrumentally and 15 (55.5 %) delivered by LSCS.

Conclusion Mean duration of active phase of labour increased as the partographic curve fell to the right of alert and action line. Increased rates of instrumental deliveries, LSCS, babies with lower APGAR score at 5 min, and NICU admissions were observed in group III compared with groups I and II.

Keywords Partogram · Alert line · Action line · Labour

Introduction

Partogram is a graphic record of progress of labour and maternal and fetal condition during labour in a single sheet of paper which is useful in detecting the labour that is not progressing normally at an early stage and helpful in its management. The Partograph graphically represents key events in labour and provides an early warning system. The World Health Organization Partographs are the best-known Partographs in the low-resource setting. Partographs when used with defined management protocols is an inexpensive tool which can effectively monitor labour and be helpful in reducing incidences of both maternal and fetal morbidity and mortality by reducing the number of operative interventions, prolonged labour, obstructed labour and caesarean section [1].

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A picture is worth a thousand words. A partograph review if well recorded and provides rapid, comprehensive information about progress in labour when compared with a review of detailed hand written case sheets. Partogram has been used since 1970 to detect labour that is not progressing normally and to indicate when augmentation of labour is required and for early detection of any deviation from normal labour. Cochrane data base review done in 2009 has recommended the use of partogram curve in the developing countries because of poor access to health care resources [2]. In developing world, there are a higher number of incidences of maternal and fetal morbidity and mortality due to prolonged labour. Therefore, there is an increasing need for evaluation of the usefulness of active management of labour and use of partogram in detecting any deviation from normal labour. Partogram is a useful tool in making early decision to transfer the patient to higher centre when labour is not progressing normally, and therefore, it is used in peripheries.

The safe mother initiative programme emphasises that the monitoring of labour for early detection of dystotia is one of the most important approaches in reducing incidences of maternal and neonatal morbidity and mortality, and it also emphasises the usefulness of partogram for worldwide application as it is not affected by social and cultural differences between the countries. It described that WHO-modified partogram is an excellent tool in reducing obstructed labour and its consequences. The crucial factor in active management of labour is the timings of interventions as and when needed, such as amniotomy, augmentation with oxytocin, caesarean section or transfer to a higher centre. Partogram is a useful tool in indicating optimum time for such interventions. Partogram is a useful tool in the improvement of maternity care by allowing midwives and obstetricians to record intrapartum details pictorially.

The aim of this study is to analyse the spontaneous labour in primigravidae by means of partogram and the active management of labour depending on partographic parameters.

The WHO-modified partograph involves various parameters to assess progress of labour, and maternal and fetal conditions during labour, and all the parameters are plotted graphically on a single sheet of paper. The parameters are as mentioned below.

A. Parameters used to assess progress of labour:

1. Cervical dilatation
2. Descent of head
3. Uterine contractions

B. Parameters used to assess fetal condition:

1. Fetal heart rate
2. Colour of liquor
3. Moulding of fetal skull

C. Parameters used to assess maternal condition:

1. Pulse rate
2. Blood pressure
3. Temperature
4. Urine for volume, protein and ketone bodies

Methodology

The study was conducted using the WHO-modified partogram. The labour details were plotted when the woman enters into active phase of labour, i.e. 4 cm of cervical dilatation with good uterine contractions. The WHO-modified partogram, using action lines (4 h) after crossing alert line, was used for plotting intrapartum details. This is a prospective observational study conducted on 200 primigravidae with spontaneous onset of labour at term. This study was conducted at Vanivilas hospital, attached to Bangalore Medical College and Research Institute.

The study group is divided into three groups as follows. group I: Cervix dilatation and descent curve falling to the left of alert line; group II: Cervix dilatation and descent curve falling to the right of alert line; and group III: Cervix dilatation and descent curve falling to the right of action line. Inclusion criteria are Primigravidae with the spontaneous labour at term with cephalic presentation and Singleton pregnancy. Exclusion criteria are as follows: Primigravidae other than cephalic presentation, Primigravidae with obstetric risk factors and Primigravidae with multiple pregnancy and higher order of pregnancy.

The primigravidae in labour had a careful monitoring of progress of labour, which was recorded in detail on a composite graph, which displayed all the features of labour on a single sheet of paper. Monitoring of maternal and fetal conditions were carried out clinically and plotted on partogram. Following instructions were carried out wherever necessary: adequate nourishment and hydration of the patient; amniotomy at 4-cm cervical dilatation for all women, If hypotonic uterine contractions is noted; oxytocin augmentation done till adequate contractions were achieved; decision for LSCS or instrumental delivery taken whenever indicated; and active management of the third stage done in all the groups. The study group was divided into three groups as already mentioned, and the outcome of labour management was studied with respect to each group.

Results

Of the 200 primigravidae studied in labour with partographic analysis of labour, 133 (66.5 %) belong to group I, 40 (20.0 %) belong to group II and 27 (13.5 %) belong to

group III. Amongst this study group population, a majority of them were in the age group of 20–25 years, i.e. 90 (45.0 %) followed by those aged 15–20 years, i.e. 87 (43.5 %).

The mean durations of active phase of labour in groups I, II and III are 4.1, 6.9 and 9.6 h, respectively, i.e.—cervical dilatations were at the rate of 1.4, 0.8, 0.6 cm/h in groups I,

II and III, respectively. The mean duration of active phase of labour is the main factor that is prolonged as the curve falls to the left of alert and action line, and the difference is statistically significant (p value < 0.001) (Table 1).

The mean durations of the second stage of labour in groups I, II and III are 54 min, 53 min and 57 min, respectively. The mean durations of the third stage of

Table 1 Comparison of mean durations of Active phases amongst the groups

	Group	N	Mean	SD	Minimum	Maximum	F	'p' value
Duration of active phase (min)	Group I	133	251.28	41.385	180.00	360.00	397.2	<0.001
	Group II	40	414.75	38.960	240.00	480.00		
	Group III	27	581.11	125.953	420.00	720.00		
	Total	200	328.50	132.834	180.00	720.00		

The above graph shows the mean duration of active phase of labour in each group

In group I, it is 4.1 h, i.e. cervical dilatation at the rate of 1.4 cm/h

In group II, it is 6.9 h, i.e. cervical dilatation at the rate of 0.8 cm/h

In group III, it is 9.6 h, i.e. cervical dilatation at the rate of 0.6 cm/h

labour in groups I, II and III are 12 min, 12 min, and 15 min, respectively. The differences between the mean durations of the second and third stages of labour in the groups are not statistically significant.

In the present study, oxytocin accelerations were done in 21 (15.8 %), 35 (87.5 %) and 26 (96.3 %) women in groups I, ii and III, respectively. There is statistically significant difference in the acceleration required in group III compared to groups I and II ($p < 0.001$).

In group I, 130 (97.7) women delivered vaginally and 3 (2.3 %) women delivered by LSCS. In group II, 29 (72.5 %) delivered vaginally, 7 (17.5 %) had instrumental delivery and 4 (10.0 %) delivered by LSCS. In group III, 5 (18.5 %) women delivered vaginally, 7 (25.9 %) had instrumental delivery and 15 (55.6 %) delivered by LSCS. There is statistically significant difference in the mode of delivery in group III compared to groups I and II (' p ' value < 0.001), (Table 2).

In the present study, fetal distress was the main indicator for instrumental delivery/LSCS in groups I and II, i.e. 3 (100 %) in group I and 11 (100 %) in group II. In group III, indicators for instrumental delivery/LSCS are fetal distress in 9 (40.9 %) women, secondary arrest of descent 11

(50 %) and secondary arrest of dilatation 2 (9.1 %). In the present study, lack of progress of labour due to secondary arrest of dilatation and descent was the indicator for LSCS in 8 (38 %) women, and fetal distress was the indicator in 14 (62 %) women. In group III, lack of progress contributed to 53.3 % of indication for LSCS (Table 3).

In the present study, there is no statistically significant difference in the colour of the amniotic fluid in the study group. 104 (52 %) women had clear liquor and 96 (48.0 %) women had meconium stained liquor during labour. Mean birth weight in the present study group is 2.8 kg.

In the present study, there is no statistically significant difference in the APGAR score at 1 min amongst the groups. APGAR score in the range of 3–8 was seen in 91 (68.4 %) babies in group I, 30 (75 %) babies in group II and 21 (77.8 %) babies in group III. APGAR score >8 is seen in 42 (31.1 %) babies in group I, 10 (25.0 %) babies in group II and 6 (22.2 %) babies in group III. In the present study, there is a statistically significant difference in APGAR score at 5 min in the babies. APGAR score was in the range of 3–8 in 4(3.0 %) babies in group I, 4 (10.0 %) babies in group II and 9 (33.3 %) babies in group III. APGAR score >8 is seen in 129 (97.0 %) babies in

Table 2 Comparison of mode of delivery amongst the groups

Group	Type of delivery			Total	χ^2 value	'p' value
	Normal	LSCS	Instrumental			
Group I	130	3	0	133	105.165	<0.001
	97.7 %	2.3 %	0.0 %	100.0 %		
Group II	29	4	7	40	100.0 %	
	72.5 %	10.0 %	17.5 %	100.0 %		
Group III	5	15	7	27	100.0 %	
	18.5 %	55.6 %	25.9 %	100.0 %		
Total	164	22	14	200	100.0 %	
	82.0 %	11.0 %	7.0 %	100.0 %		

The above graph shows mode of delivery in all three groups

In whole study group, 164 (82 %) women delivered vaginally, 22 (11 %) women delivered by vacuum or forceps and 14 (7 %) women delivered by LSCS

Table 3 Comparison of indication of Instrumental delivery/LSCS amongst groups

Group	Type of delivery	Indication for ID or LSCS			Total
		Fetal distress	Secondary arrest of descent	Secondary arrest of dilatation	
Group I	LSCS	3 100.0 %	–	–	3 100.0 %
	Total	3 100.0 %	–	–	3 100.0 %
Group II	LSCS	4 100.0 %	–	–	4 100.0 %
	Instrumental	7 100.0 %	–	–	7 100.0 %
	Total	11 100.0 %	–	–	11 100.0 %
Group III	LSCS	7 46.7 %	6 40.0 %	2 13.3 %	15 100.0 %
	Instrumental	2 28.6 %	5 71.4 %	0 0.0 %	7 100.0 %
	Total	9 40.9 %	11 50.0 %	2 9.1 %	22 100.0 %

In groups I and II, the main indicator for instrumental delivery/LSCS was fetal distress (100 %). In group III, indicator for instrumental delivery/LSCS was fetal distress in 7 (40.9 %), secondary arrest of descent in 6 (50 %) and secondary arrest of dilatation in 2 (9.1 %) of the cases

Table 4 Comparison of NICU admission amongst groups

Group	Admission to NICU		Total	χ^2 value	'p' value
	Yes (%)	No (%)			
Group I	1 (0.8)	132 (99.2)	133 (100.0)	37.289	<0.001
Group II	4 (10.0)	36 (90.0)	40 (100.0)		
Group III	9 (33.3)	18 (66.7)	27 (100.0)		
Total	14 (7.0)	186 (93.0)	200 (100.0)		

More babies in group III admitted to NICU, i.e. 9 (33 %) compared to 1 (0.8 %) in group I and 4 (10 %) in group II. There is statistically significant difference

group I, 35 (90 %) babies in group II and 18 (66.7 %) babies in group III. In group III, babies had lower APGAR score compared with groups I and II. ($p < 0.001$). In the present study, NICU admission was more in group III compared to groups I and II ($p < 0.001$). Admission to NICU seen in (0.8 %) baby in group I, 4 (10.0 %) babies in group II and 9 (33.3 %) babies in group III (Table 4).

Discussion

The WHO-modified partogram is used as an essential tool in the active management of labour. Use of partogram helps in early detection of any deviation from normal labour and its management. The use of partogram for the management of labour clearly differentiates normal and abnormal progresses of labour and identifies women who are likely to require interventions. Partogram is useful in making early decision to transfer the patient to higher

centre when labour is not progressing normally; therefore, it is used in peripheries. Thus, the WHO-modified partogram is a very useful tool for the management of labour in reducing incidences of maternal and neonatal morbidity and mortality.

In the present study, 200 primigravidae in labour were analysed by means of the WHO-modified partogram, and its effects on maternal and neonatal outcomes were measured as the curves fall more to the right side in the partogram.

Duration of the active phase of the labour is the main indicator of delayed progress of labour. The rate of cervical dilatation was the main factor affected as the curve was shifted to right side, and these rates are comparable to those of the study conducted by Daftary and Mhatre [3]. The mean duration of the second stage in our study is 53–57 min. In Zhang et al.'s study [4], the mean duration of the second stage of labour was 53 min. The mean duration of the third stage of labour in the present study is 12–15 min.

The acceleration of labour was carried out more in group III compared with groups I and II. The mode of delivery is also affected when there is delayed progress of labour; there were increases in the numbers of instrumental deliveries and LSCS as the progress of labour was delayed. The results are comparable to those of the studies by Impey et al. [5] (2000) and Javed et al. [6] (2002). However, there was an increase in the number of instrumental deliveries in comparison with LSCS observed in older studies. This may probably be because of decreasing number of instrumental deliveries in the present days, because there is an increased trend towards LSCS.

In groups I and II, the main indicator for LSCS and instrumental delivery was the fetal distress, but in group III along with fetal distress secondary arrest of descent, secondary arrest of dilatation also contributed to the indication of instrumental delivery and that of LSCS. Gifford et al. [7] in their study found that lack of progress of labour was the indicator for LSCS in 53 % of the women.

There was an increase in the number of babies with lower APGAR score at 5 min in group III compared to those in groups I and II. Increased number of babies in group III needed NICU admission compared to those in groups I and II.

Conclusion

Partographic analysis of labour provides valuable information on the progress of labour and helps us in predicting maternal and neonatal outcomes during the labour. Duration of the active phase of the labour is the main indicator of the delayed progress of labour. Those women in whom the active phase of labour increases are more likely to cross the action line in the partogram and need more of operative, vaginal deliveries, and LSCS, while those who have low APGAR scores at 5 min, need more NICU admission. There are no differences in the durations of the second and third stages of labour in the women for whom the partograms cross the right of alert line, and right of action line compared to those for whom the partograms fall to the left of alert line. As the partographic curve crosses to the right of alert line and to the right of action line, there are a higher number of instrumental deliveries and LSCS in those groups. Those women for whom partographic curves have

crossed the alert line and action line are more likely to require acceleration during the labour in the form of ARM and intravenous oxytocin. The main indicator for instrumental delivery and LSCS in the women for whom partographic curves have not crossed the action line is the fetal distress. Secondary arrest of dilatation and descent are the main indicators in women for whom partographic curves have crossed the action line. There are no differences in the colours of amniotic fluid, mean birth weights and APGAR scores at 1 min in the women for whom partographic curves have crossed to the left of alert line compared to those women for whom the curves have crossed the alert line and action line.

References

1. Dangal G. Preventing prolonged labour by using partogram. *Internet J Gynecol Obstet*. 2007;7(1)ISSN 1528–8439.
2. Lavender T, Hart A, Smyth RM. Effect of partogram use on outcomes for women in spontaneous labour at term. *Cochrane Database Syst Rev*. 2008;8(4):CD005461.
3. Daftary SN, Mhatre PN. Cervicograph in the management of labour in primigravidae. *J Obstet Gynecol*. 1977;27:687–91.
4. Zhang J, Troendle JF, Yancey MK. Reassessing the labour curves in nulliparous woman. *Mosby-Yearbook Inc*. 2002;187(4):824–8.
5. Impey L, Hobson J, O’Herlihy C. Graphic analysis of actively managed labor: prospective computation of labour progress in 500 consecutive nulliparous women in spontaneous labor at term. *Am J Obstet Gynecol*. 2000;183(2):438–43.
6. Javed I, Bhutta S, Shoaib T. Role of partogram in preventing prolonged labour. *J Pak Med Assoc*. 2007;57(8):408–11.
7. Gifford DS, Morton SC, Fiske Mary, et al. Lack of progress in labour as a reason for cesarean. *Am Coll Obstet Gynecol*. 2000; 95(4):589–95.