Original Research Article

Effect of partographic monitoring on outcomes for women in spontaneous labour at term

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Abstract

Background: Partogram is a graphic record of progress of labour and fetal condition during labour. The main parameter for recording progress of labour is the rate of cervical dilatation.

Aim and objectives: To determine if routine partographic monitoring of spontaneous labour will optimize the maternal and fetal outcome.

Materials and methods: This study involved a detailed prospective workup of 200 women all term gestation patients for vaginal delivery, from 37-42 weeks at term with vertex presentation, spontaneous onset of labour and those who had singleton pregnancy were included.

Results: This was a prospective study conducted on 200 patients. The WHO partogram was used which is similar to Philpott and Castle's original description, retaining the Action Line in the active phase drawn four hours to the right of, and parallel to the Alert Line. The central feature is the cervicograph in which cervical dilatation is plotted against time. The study divided the patients into three groups and the partogram into three zones: **Group A:** Safe zone: Patients who deliver before the alert line is reached. **Group B:** Observation Zone: Patients who deliver after the alert line but before the action line is reached. **Group C:** Intervention zone: Patients who deliver after the action line is crossed. In the present study, the mean age of the patients was 22.54 years. Most of the cases went into spontaneous onset of labour. Maximum numbers of deliveries were FTND, i.e., 67%, outlet forceps 18% and LSCS rate was 15%. Significant association was found in relation to station of head at admission and mode of delivery where majority of LSCS had -2 station. The majority of FTNDs had -I and 0 stations. The patients having a favorable partogram, i.e. group A, had a high incidence of FTND. The incidence of intervention was found to be more in Group B, while the majority of patients in group C were at risk and required operative intervention. Mean birth weight in the study was 2861g. Majority of babies were delivered at term. The number of babies having an APGAR

between 7-8 at one minute and 9-10 at five minutes was more. 96.5% of the patients had no complication. 12.5% of the babies had complication.

Conclusion: It is evident that the routine use of the partogram is helpful in detecting abnormalities in the progress of labour and permits early corrective therapy. The key to early diagnosis and detection of disorders in labour progression is by following the evolution of characteristic patterns of cervical dilatation and fetal descent.

Key words

Partogram, Cervicograph, Cervical dilatation.

Introduction

Partogram is a graphic record of progress of labour and fetal condition during labour. The main parameter for recording progress of labour is the rate of cervical dilatation. By studying the rate of cervical dilatation, one can detect at the earliest, a labour destined to be prolonged and the necessary action can be instituted early. It is well known that prolonged labour contributes to increased perinatal mortality and morbidity which can be prevented by early recognition of dystocia. This can be accomplished effectively by maintaining a partogram during labour. Prolonged labour in the developing world is mainly due to cephalopelvic disproportion (CPD) which may result in obstructed labour, maternal dehydration, exhaustion, uterine rupture and VVF. Early detection of abnormal progress of labour and prevention of prolonged labour would significantly reduce the risk of postpartum hemorrhage and sepsis and eliminate the obstructed labour, uterine rupture and sequelae. 'The partogram, a graphic recording of progress of labour and salient conditions of mother and fetus, has been used since 1970 to detect labour that is not progressing normally to indicate when augmentation of labour is appropriate and to recognize CPD long before labour becomes obstructed [1]. The partogram serves as an early warning system and assists in making an early decision on transfer, augmentation and termination of labour. Labour depends on the uterine contractions, cervical dilatation and effacement. It also depends upon the pelvic capacity and the weight of the fetus. The last two cannot be altered in any case. What we can monitor and can change are the uterine contractions and dilatation of the cervix.' Delay in referrals of intrapartum cases from rural health centers has remained to be an important factor resulting in a significant number of avoidable perinatal deaths and maternal morbidity. In a rural setting, after recognizing the abnormal labour, the intervention cannot be locally implemented for want of necessary expertise and the facilities and so referral to the apex hospital forms the main intervention. Executing such intra partum referrals involves problems of money, manpower and transport arrangements resulting in delay of around 2-4 hours until the patient seeks expert medical care at the apex hospital [2]. Under such circumstances, it becomes necessary to foresee the abnormal situation and refer the patients before it becomes too late for the mother and the baby [2]. In present age, the obstetrician as well as the women in labour would prefer the delivery to be accomplished in the shortest possible time, compatible with the safety of mother and the fetus. Hence, the hopeful expectancy is replaced by active management of labour. The partogram can be used as an effective aid for this purpose.

Materials and methods

This study involved a detailed prospective workup of 200 women admitted at Government Maternity Hospital, Kakatiya Medical College, Hanamkonda, Warangal, within a total span of 2 years, i.e., 1 September 2011 - 30 August 2013.

Inclusion criteria were all term gestation patients for vaginal delivery, from 37-42 weeks at term with vertex presentation, spontaneous onset of labour and those who had singleton pregnancy were included.

Exclusion criteria were that patients with PH, oligohydramnios, anemia, heart disease, diabetes, teenage pregnancy, hypertensive disorder of

pregnancy, renal disease, macrosomia, polyhydramnois, IUGR, placenta previa for vaginal delivery (type I and type II anterior), liver disease, malpresentation breech, multiple pregnancy, preterm labour, scarred uterus, accidental haemorrhage, HIV /HBsAg. After confirming that the patients fulfil the above criteria and on confirmatory evidence of labour, routine preparation of the patient was carried out.

Results

The age group in the present study was between 15-35 years.

Group A: Patients who delivered before the partogram touched the Alert line.

Group B: Patients who delivered when the partogram lies between Alert and Action Line,

Group C: Patients who delivered after the Action line was crossed.

The age group in the present study was between 15-35 years. In the age group of 21-25 years, there were maximum number of patients and as age increased the number of cases decreased serially. The patients had mean age of 22.535 years with standard deviation of 2.8. In the study group of 200 patients, maximum number of patients i.e. 134 (67%) had full term vaginal delivery, 30 patients i.e. 15% had LSCS and 36 patients i.e. 18% had forceps delivery (**Table – 1**).

Of patients with cervical dilatation of 2-3 cm at admission, 66.9% had FTNVD, while in patients admitted with a cervical dilatation of 4-5 cm and >5cm, FTNVD occurred in 65.8% and 100% respectively. Good number of patients admitted when the fetal head was at -2 station, i.e. 39% had LSCS, while in -1 and 0 station, few of the cases had LSCS. 100% patients admitted with the fetal head at the station of+1 had delivered normally, while 85.7%, 81.4% and 41.5% patients in the groups of fetal head station at 0, -1, -2 had delivered vaginally. Maximum patients, that is 58.5% delivered in 5-8 hours. The mean duration of I stage of labour is 7.6 hours with standard deviation of 2.76 while the mean duration of II stage labour is 27.28 minutes with standard deviation of 10.32 (**Table – 2**).

Table – 1: Age distribution and outcome of labour in the study group.

Age	**Number**	**Percentage**
15-20	58	29%
21-25	112	56%
26-30	28	14%
31-35	2	1%
Total	200	100%
Mode of Delivery		
FTNVD	134	67%
Forceps	36	18%
LSCS	30	15%
Total	200	100%
Duration of Labour (hour)		
0-4	13	6.5%
5-8	117	58.5%
9-12	53	26.5%
>12	17	8.5%
Total	200	100
Birth weight (gm)		
<2500	36	18
2501-3000	97	48.5
>3001	67	33.5
Total	200	100

It is observed that the maximum number of patients were in group A i.e. 43.5% and least in group C 16%. In group A- maximum number of patients i.e. 86.2% had FTND and none had LSCS in group B- maximum number of patients i.e. 70.4% had FTND and none had LSCS. While none had outlet forceps delivery in group C- maximum underwent LSCS i.e. 93.7% and few had FTND i.e. 6.3%. Maximum number of patients i.e. 48.5% had birth weight of 2501- 3000 g, while33.5% had birth weight of more than 3000g. Mean weight being 2861g with standard deviation of 335.73. With birth weight of < 2500 g, there was maximum number of FTNDs i.e. 88.9% and no LSCS. In those who delivered babies with birth weight more than 3000g, only 44.8% had FTNVD, while 37.3% required LSCS.

Maximum had APGAR at 1 minute > 7 i.e. 86.5%. And least babies had 0-3 i.e.3.5%. It is observed

that the relation between APGAR at 1 minute and Partogram pattern is highly significant (P<0.0001). Maximum cases i.e. 82.5% had 9-10 score. While 15.5% had a score of 7-8, 1% had score of 0-3 and 1% had 4-6 as the score. It is observed that the relation between APGAR at 5 minute and partogram pattern is highly significant (P<0.0001). Maximum number of babies had no complications i.e. 87.5%. 4.5% had birth asphyxia. 2.5% had septicemia. Both neonatal jaundice and SGA was seen in 2% cases. 1.5% had other complications. More complications were seen in group B. Maximum patients, i.e.; 96.5% were having no complications. 1.5% of the patients developed UTI and 1 % had puerperal fever. 0.5% of patients each had the complications of III degree perineal tear and retained placenta. Group B patient had more number of complications compared to the group A and group C (**Table – 3**).

Table - 2: Parameters in study.

Cervix Diameter (cm)	**FTNVD**	**Outlet Forceps**	**LSCS**	**Total**
2-3	107 (66.9%)	28 (17.5%)	25 (15.6%)	160
4-5	25 (65.8%)	8 (21%)	5 (13.2%)	38
>5	2 (100%)	-	-	2
Total	134 (67%)	36 (18%)	30 (15%)	200
Vertex				
-2	32 (41.5%)	15 (19.5%)	30 (39%)	77
-1	70 (81.4%)	16 (18.6%)	---	86
0	30 (85.7%)	5 (14.3%)	---	35
+1	2 (100%)	---	---	2
Total	134	36	30	200
Partogram group				
A	75 (86.2%)	12 (13.8%)	---	87
B	57 (70.4%)	24 (29.6%)	---	81
C	2 (6.3%)	-	30 (93.7%)	32
Total	134	36	30	200
Birth Weight (gm)				
<2500	32 (88.9%)	4 (11.1%)	---	36
2501-3000	72 (74.3%)	20 (20.6%)	5 (5.1%)	97
>3001	30 (44.8%)	12 (17.9%)	25 (37.3%)	67
Total	134	36	30	200

Discussion

In the present study, the age group was between 15-35 years. The mean age in the study was 22.54 years. In the Philpott and Castle study, 78.85% had FTND, 15.55% required Vacuum/ Forceps and 2.6% underwent LSCS [3]. In the Daftary and Mhatre study, 68% patients had FTND, 14% required Vacuum/ Forceps and 7.5% underwent LSCS [4]. In the WHO study, 78.3% had FTND, 4.2% required Vacuum and 10.5% Forceps and 5.4% underwent LSCS [5]. In the Laurence Impey, et al. study, 75.4% patients had FTND, 19.2% required Forceps/Vacuum and 5.4% underwent an LSCS [6]. The present study correlates with all the studies.

In the present study all the patients at admission were of cervical dilatation between 2 cm to 5 cm. In Paul Holmes study there were 63% of FTND's with 2-3 cm dilatation, 26.6% had outlet forceps / vacuum and 10.6 % underwent LSCS. In the present study at 2-3 cm cervical dilatation, 66.9% were FTND's, 17.5%had outlet forceps and 15.6% underwent LSCS. In Paul Holmes study at 4-5 cm

cervical dilatation, there was 70% FTNVD, 25% outlet forceps / vacuum application and 4.2% underwent LSCS. In the present study at 4-5 cm cervical dilatation there was 65.8% FTNDs, 21% outlet forceps and 13.2% underwent LSCS. There were 2 patients with cervical dilatation > 5 cm. and were delivered vaginally [7]. The present study correlates with Paul Holmes study. The mean duration of labour in the present study was 7.6 hours, compared to 6 hours for O'Driscoll.7 hours for Rogers et al, 6.2 hours for Frigoletto, et al. and 6.5 hours for Lopez-Zeno [8-10].

Table – 3: Relation between APGAR, neonatal and maternal complication in relation to partogram pattern.

APGAR Score at 1 min	**A**	**B**	**C**	**Total**
0-3	---	4 (57.1%)	3 (42.9%)	7
4-6	---	1 (5%)	19 (95%)	20
>7	87 (50.3%)	76 (43.9%)	10 (5.8%)	173
Total	87	81	32	200
APGAR Score at 5 min				
0-3	---	2 (100%)	---	2
4-6	---	2 (100%)	---	2
7-8	5 (16%)	9 (29%)	17 (55%)	31
9-10	82 (49.7%)	68 (41.2%)	15 (9.1%)	165
Total	87	81	32	200
Neonatal complications				
Nil	81 (46%)	65 (37%)	30 (17%)	176
Birth Asphyxia	2 (22.2%)	7 (77.8%)	---	9
Septicemia	1 (20%)	4 (80%)	---	5
Neonatal Jaundice	2 (50%)	2 (50%)	---	4
SGA	1 (33.3%)	2 (66.6%)	---	3
Others	---	1 (33.3%)	2 (66.6%)	3
Maternal complications				
Nil	86 (44.6%)	75 (38.9%)	32 (6.5%)	193
UTI	1 (33.3%)	2 (66.6%)	---	3
Retained Placenta	---	1 (100%)	---	1
Fever	---	2 (100%)	---	2
3rd degree perineal tear	---	1 (100%)	---	1
Total	87	81	32	200

The mean duration of first stage of labour in the present study was 7.6 hours, compared to 7.4 hours for John FR Barrett and 5.4 hours for PJ Steer, et al. [11]. The duration of second stage of labour in the present study was 27.28 minutes, compared to 32.4 minutes for John FR Barrett and 46 minutes for PJ Steer, et al. [11]. The duration of labor was less than 10 hours in 84.95%, 13.27% in 11-24 hours and 1.77% more than 24 hours for Diarra L, et al. [12]. The present study correlates with the John FR Barrett study. Upon comparison of the present study with the studies of Philpott and Castle and Daftary and Mhatre, the following was noted: According to Philpott and Castle series which was done in 1972, 78% of the patients were in group A, 11% of patients were in group B and 11% were in group C. In the Daftary and Mhatre series, which was done in 1977, 66% of the patients were in group A, 25.5% of the patients were in group B and 8.5% of patients were in group C. In the present study 43.5% of patients were in group A 40.5% percent of patients were in group B and 16% of patients were in group C. Present study is correlating with Philpott and Daftary studies.

It can be observed that in the Philpot and castle series, patients in Group A 89.76% had a FTND 9.8% required forceps/ vacuum and 0.4% required LSCS. In the group B, 79.41% had FTND, 20.95 % required forceps or vacuum delivery and no LSCS was necessary. In group C there was no FTND and all patients required operative interventions. In the Daftary and Mhatre series, in group A, 85.61 % patients had FTNVD, and 6.06% required forceps or vacuum and 2.27% required LSCS. In group B, 43.14% had FTNVD, 33.3% required forceps/vacuum and 2.27 % required LSCS. In group C, 5.88% had FIND while 76.48% required operative interventions. Upon studying the outcome of labour in relation to partogram pattern in the present study, it can be noted that a majority of the patients (86.2%) had an FTND, with no operative interventions required. In group B, 70.4% had FTNVD with active management of labour and none required an LSCS. In group C, a majority of the patients, i.e., 93.7% required an LSCS and only 6.3% had FTNVD. This shows that by plotting a partogram and following its progress graphically, it is possible, with reasonable accuracy, to predict the likely outcome of the labour. Thus a patient in group A had a high likelihood of spontaneous vaginal delivery. And although a patient in group B required intensive monitoring and active management of labour, the likelihood of FTNVD was still high and none required LSCS. Patients belonging to group C whose graphs have crossed the action line should be categorized as 'At risk' and clinical re-evaluation with active and often aggressive intervention should be called for. In the present study group, at 1 min 86.5% of babies had APGAR of more than 7-8. At 5 min, 98% of babies had APGAR of 7-10, compared to 94% by Behere, et al. and APGAR of 0-3 was observed in 1% compared to 1% by Behere, et al. [13].

Thus, upon comparison of the neonatal outcome of the present study with that of Behere, et al., it was observed that normal outcome was observed in 87.5%, as compared to 86.5% for Behere, et al. Birth asphyxia was observed in 4.5% in the present study as compared to 6% for Behere, et al. Neonatal jaundice was observed in 2% as compared to 5.5% for Behere, et al. Neonatal infection was observed in 2.56% as compared to 2% for Behere, et al. There was no neonatal death reported in either study. The present study correlates with the study of Behere, et al.

Conclusion

Although labour is a natural phenomenon leading to child birth and normally majority of labors do occur spontaneously, a few tend to become dystocic and go in for prolonged labour. Hence identifying the abnormality is essential. From this study and previous studies, it is evident that the routine use of the partogram is helpful in detecting abnormalities in the progress of labour and permits early corrective therapy. The key to early diagnosis and detection of disorders in labour progression is by following the evolution of characteristic patterns of cervical dilatation and fetal descent. Using the partogram has also helped in achieving the policy of active management of labour i.e., ensuring the delivery of the patient within twelve hours.

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