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Original Research Article

Evaluation of Partograph in Monitoring Progress of Labour and Feto-Maternal Outcome in First Stage of Labour in an Urban Teaching Hospital

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Abstract

Introduction: Partograph is a graphic composite representation of the events of labour. It allows critical delineation and appreciation of normal and abnormal parturitional state and pinpoints the patients who could benefit from intervention. It is appropriate for all labor.

Aims: To evaluate role of partograph in monitoring of labour.

Materials and Method: The present study was conducted from March 2022 to August 2023 for a period of 18 months in the department of Obstetrics and Gynecology at Chittaranjan seva sadan hospital. Total 3000 patients were included in this study.

Result: Chi-square test showed that there was significant association between maternal complications and the patients of the two groups ($p<0.0001$). Maternal complications were higher among the patients with abnormal partograph (11.7%) as compared to normal partograph (4.6%) but it was not significant ($Z=1.07$; $p=0.07$). Chi-square test showed that there was no significant association between period of gestation and the patients of the two groups ($p<0.001$). Postdated delivery thus the patients of the two groups were matched for their period of gestation. Post-dated deliveries were significantly higher among the patients with abnormal partograph (61.2%) as compared to normal partograph (16.3%) ($Z=6.53$; $p<0.0001$).

Conclusion: The partograph is highly effective in reducing both maternal and neonatal morbidity. It aids in assessing the progress of labour and to identify when intervention is necessary. It is effective in preventing prolonged labour, obstructed labour, reducing operative intervention and improving maternal outcome (PPH/need for BT/Trauma/puerperal sepsis) & neonatal outcome (APGAR score and NICU admission). In this study, mean duration of active phase of labour increased as the partographic curve fell to the right of alert line (abnormal partograph). Women with abnormal partograph required more augmentation of labor due to prolonged duration of active phase and of labor & abnormal labor like protracted dilatation, arrest of dilatation and arrest of descent.

Keywords: Partograph, Labour Monitoring, Feto-Maternal Outcome and First Stage of Labour.

Introduction

Partograph is a graphic composite representation of the events of labour. It allows critical delineation and appreciation of normal and abnormal parturitional state and pinpoints the patients who could benefit from intervention. It is appropriate for all labor.[1] About half a million women lose their lives because of complications of pregnancy and labor. 99% of these occur in developing countries.[2] In the developing world, 400 women die for every 1,00,000 live births. In West bengal, MMR is 101 per 1,00,000 live births.

Recognizing the unexpectedly high maternal mortality and morbidity (which is highly preventable) and the social consequences of the mother‘s death to her family and children, the SAFE MOTHERHOOD INITIATIVE [3] conference held at Nairobi in February 1987. The conference concluded with a ―CALL TO ACTION: to reduce MMR by 50% by the year 2000. Among the action called for, the most important one is, Monitoring the labor with Partograph.

To identify high risk cases and early referral to higher centers [4] WHO multicentic trial (1994) demonstrated that use of partograph reduced the

LSCS rate, prevent low APGAR scores, reduced need for augmentation and improved perinatal mortality. It was useful in reducing prolonged labour incidence from 6.4% to 3.4% and hence it encourages the widespread use of Partograph in institutions and PHCs.

Current modified World Health Organization (WHO) partograph is a graphical tool used to monitor the progress of the first stage of labour, thereby preventing prolonged labour to evaluate the progress of labour in nulliparas & multiparas using the modified World Health Organization (WHO) partograph.

Partograph is to assess the progress of labour and to identify when intervention is necessary. Partograph can be highly effective in reducing complications from prolonged labour, for both mother and the newborn. Prolonged labour in developing countries is commonly due to cephalopelvic disproportion when may result in obstructed labour, maternal dehydration, exhaustion, uterine rupture etc.

In some, abnormal progress of labour is often due to inefficient uterine contractions. Early detection of abnormal progress of labour and prevention of prolonged labour significantly reduces the maternal & perinatal complications. This study is undertaken to assess the efficacy of a first stage partograph in a state teaching urban hospital.

Materials and Methods

The study was conducted at Chittaranjan Seva Sadan College of Obstetrics, Gynaecology and Child Health, Kolkata. The study includes 3000 antenatal cases.

Study Population

- Total number of cases: 3000
- Primigravia : 1779
- Multigravida : 1221

Type of study: It is a prospective observational study, over a period of 18 months from March 2022 to August 2023.

Study Design: After approval from the ethics committee of the Institution, informed written consent was taken from all women recruited for and willing to participate in the research work. A total of 3000 cases was selected either from booked cases was regularly followed up in the antenatal clinic and the unbooked patients, who reported directly for labour, after following inclusion and exclusion criteria. A total of 3000 cases that fulfilled the selection criteria were enrolled in the study. A sample form of informed consent and patient information handout is annexed at the Appendix.

Inclusion Criteria

- Pregnant women in spontaneous or induced labour
- Cephalic presentation
- First stage of labour with cervical dilatation >4cm
- Singleton pregnancy more than 37weeks gestation

Exclusion Criteria

- labour less than 37weeks
- Malpresentation
- Multiple Preterm pregnancy
- 2nd Stage of labour
- Antepartum haemorrhage

Study Period: 1 ½ years (18 months).

Sample Size: 3000 cases.

Sample Design: 3000 cases were selected from mothers attending antenatal care and labour room in Chittaranjan Seva Sadan hospital. Following strict inclusion and exclusion criteria for safe confinement was provided in this institution. A total of 3000 women fulfilled these criteria and were willing to be part of the study. Participation rates were 1779 for nulliparous and 1221 for multiparas. Once labor was established, vaginal examination was performed as and when required throughout the first stage and were recorded on a standard partogram.

Result

Table 1: High risk pregnancy and HDP with patients of the two groups

Maternal Complication	Abnormal Partograph (n, Col %)	Normal Partograph (n, Col %)	Total (n, Col %)
Anemia	5 (1.7%)	37 (1.3%)	42 (1.4%)
GDM	12 (4.0%)	13 (0.5%)	25 (0.8%)
HDP	18 (6.0%)	74 (2.7%)	92 (3.1%)
Normal	264 (88.3%)	2577 (95.4%)	2841 (94.7%)
HDP (duplicate row)	0 (0.0%)	15 (0.6%)	15 (0.5%)
WNL	299 (100.0%)	2686 (99.4%)	2985 (99.5%)

Table 2: Period of gestation and the patients of the two groups

Variable / Category		Abnormal Partograph (n, Col %)	Normal Partograph (n, Col %)	Total (n, Col %)
Period of Gestation (weeks)	37.0 – 39.9	116 (38.8%)	2260 (83.7%)	2376 (79.2%)
	40.0 – 42.0	183 (61.2%)	441 (16.3%)	624 (20.8%)
	Total (POG)	299 (100%)	2701 (100%)	3000 (100%)
Bishop Score	<7	36 (12.0%)	355 (13.1%)	391 (13.0%)
	≥7	263 (88.0%)	2346 (86.9%)	2609 (87.0%)
Summary of Bishop Score	Mean ± SD	6.44 ± 1.80	6.16 ± 1.66	—
	Median	6	6	—
	Range	3 – 10	3 – 10	—

Table 3: Amniotic Fluid Index (AFI) and the patients of the two groups

Variable / Category		Abnormal Partograph (n, Col %)	Normal Partograph (n, Col %)	Total (n, Col %)
Amniotic Fluid Index (AFI)	Normal	287 (96.0%)	2646 (98.0%)	2933 (97.8%)
	Oligohydramnios	12 (4.0%)	53 (2.0%)	65 (2.2%)
	Total (AFI)	299 (100%)	2699 (100%)	2998 (100%)
Source of Induction (S/I)	PGE2 gel	97 (32.4%)	174 (6.4%)	271 (9.0%)
	Spontaneous	202 (67.6%)	2526 (93.6%)	2728 (91.0%)
	Total (S/I)	299 (100%)	2700 (100%)	2999 (100%)

Chi-square test showed that there was significant association between maternal complications and the patients of the two groups ($p<0.0001$). Maternal complications were higher among the patients with abnormal partograph (11.7%) as compared to normal partograph (4.6%) but it was not significant ($Z=1.07$; $p=0.07$). Since one of the cell frequencies Chi-square test could not be applied.

However, all the cases of HDP were among the patients with normal partograph ($Z=1.01$; $p=0.31$). Chi-square test showed that there was no significant association between period of gestation and the patients of the two groups ($p<0.001$). Postdated delivery thus the patients of the two groups were matched for their period of gestation. Chi-square test showed that there was no significant association between Bishop Score and the patients of the two groups ($p=0.59$). Thus Bishop score was more or less equally distributed among the patients of the two groups. Chi-square test showed that there was significant association between AFI and the patients of the two groups ($p=0.02$). Chi-square test showed that there was significant association between SI and the patients of the two groups ($p<0.0001$). PGE2gel (32.4%) was required in significantly higher proportion among the patients with abnormal partograph (32.4%) as compared to normal partograph (6.4%) ($Z=4.68$; $p<0.0001$).

Chi-square test showed that there was significant association between mode of delivery and the patients of the two groups ($p<0.0001$). Caesarian deliveries were in significantly higher proportion among the patients with abnormal partograph (65.8%) as compared to normal partograph (2.3%) ($Z=9.55$;$p<0.05$). Also instrumental vaginal deliveries were in significantly higher proportion among the patients with abnormal partograph (33.1%) as compared to normal partograph (2.3%) ($Z=5.76$; $p<0.05$).

Discussion

The role of partogram in the first stage of labor was established in 1954 first introduced by E.A Friedman [5]. In majority of cases, labour is a natural phenomenon occurring spontaneously; a few develop dystocia and result in prolonged labour.

Hence it is essential to detect them and deliver by appropriate intervention. Partograph is a simple and efficient method of preventing prolonged labour and its complications, especially in developing countries. The partograph initially introduced by Philpott and endorsed by WHO is a simple and accurate instrument for early recognition of abnormal labour. Active management of labour advocates early recognition of non-progressive labour. This can be done by using a partograph or graphical depiction of a labour curve.

Many factors influence progress in the first stage: the size and shape of pelvis, which may be related to the height of the mother, soft tissue resistance, maternal effort and degree of flexion, caput and moulding of the head. However, these factors may all be resolved into the end result of descent and rotation, which allows simplified assessment and the possibility of graphic representation.

The validity of this procedure is supported by the positive correlation found between the cervical dilatation and duration of labour i.e., short duration of the first stage and spontaneous vaginal delivery.

In our study most of the patients (86.7%) were delivered vaginally these patients partograph was normal which is significantly higher (table-1) in our study, Bogaert et al study shown (2008) that 92% of labours resulting in spontaneous vertex delivery with normal course of labour remain left of the alert line[6]. In our study 90.9% were spontaneous vertex delivery.

Khan et al (2018) study shown abnormal partograph was 11% [7] which is similar to our study showing abnormal partograph was 10%.

Godara et al in 2018 study shown, (80%) women had normal partograph patterns, (20%) had abnormal partograph patterns[8]. In this study they were taken only nulliparous but present study included both nulliparous and multipara.

Pneumadu study *et al* in 2017 [9] study shown normal partograph pattern 67.2% and abnormal partograph 22.8%. Sanyal study *et al* in 2014 [10] study shown normal partograph pattern 81% and abnormal partograph 19%.

Bishop score and the patients of the two groups Chi-square test showed that there was no significant association between Bishop score and the patients of the two groups ($p=0.59$). Thus Bishop score was more or less equally distributed among the patients of the two groups. Chi-square test showed that there was significant association between AFI and the patients of the two groups ($p<0.05$).

Prevalence of MSL was significantly higher among the patients with abnormal partograph (52.2%) as compared to normal partograph (6.4%) ($p<0.05$). Spontaneous, Induced and the patients of the two groups Chi-square test showed that there was significant association between the patients of the two groups ($p<0.05$).

Chouhan et al 2019 in a randomized comparative study of progress of labour & fetal outcome of delivery amongst spontaneous versus induced labour in term pregnancy primi gravida of using modified WHO partograph. They conclude from there study that though requirement of Augmentation for progress of Labour was more in induced group and Instrumentation rate of Caesarean section was also high in induced group. But the Neonatal outcome of Labour if monitored with modified WHO Partograph is less than Spontaneous group and also duration of labour is shorter in induced labour[11].

Patel et al (2017) in a comparative study of labour progress and delivery outcome among induced versus spontaneous labour in nulliparous women using modified WHO partograph. They conclude that induced labour can be a safe procedure among nulliparous women if labour is partographically monitored. Also, it was observed that oxytocin was a better inducing agent[12].

Mode of delivery and the patients of the two groups. Chi-square (χ^2) test showed that there was significant association between mode of delivery and the patients of the two groups ($p<0.05$).Caesarian deliveries were in significantly higher proportion among the patients with abnormal partograph (65.8%) as compared to normal partograph(2.3%) ($p<0.05$).Also instrumental vaginal deliveries were in significantly higher proportion among the patients with abnormal partograph (33.1%) as compared to normal partograph(2.3%) ($p<0.05$).In our study NVD 86%, Cesarean deliveries 8.6%, IVD(instrumental vaginal deliveries) 5.33%. Gupta et al in 2014 studied the rate of caesarean sections was 11.04%, women underwent spontaneous vaginal delivery 89%[13]. Compared with this study our study showing similarity.

The frequency of the occurrence of meconium staining of amniotic fluid in different studies have shown a range of 10-22%, in the studies done in India,

The range of incidence varies from 7.4% to 14.3%. In the present study incidence of meconium-stained liquor was 10% in our institution. Nulliparity itself may lead to an increased risk of obstetric complications. The duration of labour of a nulliparous woman is significantly longer than that of a multiparous woman[14].

Several investigators have demonstrated that prolonged duration of the active stage of labour is associated with a higher risk of the occurrence of MSAF37.In our study Prevalence of MSL was significantly higher among the patients with abnormal partograph (52.2%) as compared to normal partograph (6.4%) ($p<0.05$).

David et al in 2009 study was conducted to determine the incidence of meconium staining of the amniotic fluid (MSAF). The incidence of MSAF was 20.4% for 393 deliveries. The rate increased with gestational age. Primiparity, prolonged rupture of fetal membranes and obstructed labour were more often associated with MSAF. It is related to gestational maturity [15]. In our study most of the MSL patients rate increased with gestational age similar to above study.

Conclusion

The partograph is highly effective in reducing both maternal and neonatal morbidity. It aids in assessing the progress of labour and to identify when intervention is necessary. It is effective in preventing prolonged labour, obstructed labour, reducing operative intervention and improving maternal outcome (PPH/need for BT/Trauma/puerperal sepsis) & neonatal outcome

(APGAR score and NICU admission). In this study, mean duration of active phase of labour increased as the partographic curve fell to the right of alert line (abnormal partograph). Women with abnormal partograph required more augmentation of labor due to prolonged duration of active phase and of labor & abnormal labor like protracted dilatation, arrest of dilatation and arrest of descent. The incidence of maternal morbidities is more in women with abnormal partograph as compared to normal partograph. The incidence of poor neonatal outcome (low APGAR score and NICU admission) is also more in neonates with abnormal partograph as compared to neonates with normal partograph.

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