



RESEARCH ARTICLE

USE OF MODIFIED WHO PARTOGRAPH TO ASSESS THE PROGRESS OF LABOUR AND FETOMATERNAL OUTCOME: A PROSPECTIVE CASE-CONTROLLED STUDY

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ABSTRACT

Objective: To assess the normal or abnormal progress of the labour by the use of partograph.

Materials and Methods: The Prospective case-controlled study was conducted in obstetrics and gynaecology department of SMS Medical College hospital, Jaipur; Rajasthan. Antenatal cases of term pregnancies with labour pain and cephalic presentation recruited for study. The patients assigned randomly in two groups (1) control group, in which labour was not monitored with partograph and (2) study group, in which labour monitored with partograph. 100 cases enrolled in each group. The study group guided with use of Modified WHO partograph.

Results observed: Results Mean length of active phase of labour was significantly ($P=0.003$) shortened in study group (4.69 ± 2.50 hours) than in control group (6.15 ± 3.92 hours). Use of partograph was associated with statistically significant reduction in number of vaginal examinations (P value = 0.0001). Postpartum complications were reduced. There was significant reduction in neonatal asphyxia from 11% case in control group to 2% cases in study group (P value = 0.010). Other neonatal complications were also reduced.

Conclusion: Study has shown that using the partograph is highly effective in reducing fetomaternal complications of labour as it helps in early recognition of slow progress of labour, so early intervention can be taken. Implementations of partogram should be encouraged in all hospitals, at all levels as a part of standard labour management protocol.

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INTRODUCTION

Labour has been termed the most dangerous journey the human being ever undertakes. It is a natural process but complications can arise at any time during its course. In India, one of the common causes of maternal death is obstructed labour (8%) next to hemorrhage (25%), sepsis (15%), unsafe abortion (13%) and eclampsia (12%). In survivors, morbidity is significant due to complications like sepsis, postpartum haemorrhage, rupture uterus and urinary fistula. The partograph has been in use since 1970 in a number of countries (Leigh, 1986). It is a graphical record of cervical dilatation in centimeters against duration of labour in hours. The prevention of prolonged or obstructed labor chiefly depends on the early recognition of possible cephalopelvic disproportion (Orji, 2002)

World Health Organization (WHO) partographⁱⁱⁱ was designed to prevent prolonged labour; and this protocol, which prompts early decision regarding augmentation or termination of labour or patient transfer to a better-equipped facility, has proven effective as an early warning tool (Lennox et al., 1998; Petterson et al., 2000; Fahdhy and Chongsuvivatnong, 2005). It reduces the intrapartum complication and number of caesarean section (WHO, 1994).

MATERIALS AND METHODS

We conducted a Prospective case-controlled study in obstetrics & gynaecology department of SMS Medical College, Jaipur, Rajasthan. In this, 200 patients with singleton term pregnancy, cephalic presentation and with spontaneous labour studied. They randomly assigned in two groups. One control group, where labour monitored without partograph and the second study (case) group, where labour monitored with partograph. 100 cases enrolled in each group after taking informed consent

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from all participants. These two groups were differed only in the partogram usage, not in other labour interventions, such as psychological support, early amniotomy or use of analgesia. The study group guided with use of Modified WHO partograph. Relevant clinical histories were noted. Detailed general and systemic examinations were done. Basic routine investigations were done for every patient. Excluded were patients with cervical diameter >7 cm, with medical disorders, Ante partum hemorrhage, malpresentation, Abnormal lie, Multiple pregnancy, Preterm labour, PIH and Pre-eclampsia, Eclampsia, Induced labour and Previous caesarean section. Data analyzed using the SPSS statistical software package for personal computers. χ^2 test was applied.

Partograph was used to plot the following parameters

1) For the progress of labour

(a) Cervical dilatation: Cervical dilatation recorded with X on the alert line; at 4 cm. The dilatation of the cervical os measured in centimeters (cm), fingers. Regular assessments of maternal and fetal well-being and a record of all findings made, these not plotted on the partograph (using modified version) until labour entered in active phase. Vaginal examinations were carried out every 4 hourly. If progress of labour was satisfactory, recording of cervical dilatation remained on, or to the left, of the alert line. Augmentation was started at the first sign of deviation from normal pattern i.e. cervical dilation < 1 cm/hour or 2 hours beyond alert line.

(b) Descent of fetal head: Descent of the head assessed by abdominal examination immediately before doing a vaginal examination and recorded as a circle (O). The width of five fingers took as a guide to express the fifths of the head above the brim.

(c) Uterine contractions: Uterine contractions observed for frequency and duration and recorded on the partograph every 30 minutes. The number of uterine contractions in 10 minutes recorded.

2) For fetomaternal outcome

Fetal heart rate recorded half-hourly to monitor the condition of the fetus. Membranes and liquor observed and recorded. If the membranes did not ruptured, recorded "I" for intact. Moulding of fetal skull recorded. Maternal Pulse was recorded every 30 minutes, blood pressure was recorded every 4 hourly and temperature was recorded every 2 hourly. Urine output was recorded every time urine is passed. The woman was encouraged to pass urine every 2 hourly in labour and each specimen was tested for protein and ketones. Drugs, IV fluids, Drugs (Oxytocin) were recorded in the space provided.

Following outcome measures assessed in each group:

1. Length of labour (Time in hours) between active phase of labour (4 cm cervical dilatation) and delivery was assessed in each group. Length of active phase of labour >8 hours in primigravidae and >6 hour in multigravidae was consider as prolonged labour. Number of patients whose labour was augmented (Oxytocin or ARM), were recorded in each group.
2. Mode of delivery recorded in each patient as Spontaneous vaginal or Operative vaginal or Caesarean section.
3. Complications of labour recorded in each group like- Obstructed labour, uterine rupture, postpartum hemorrhage, Puerperal sepsis, maternal mortality and other.
4. Number of vaginal examinations between active phase and delivery assessed.
5. Neonatal outcome and Apgar score (at 1 and 5 min) assessed for each patient like- Live birth, Neonatal asphyxia, Neonatal sepsis, perinatal mortality and any other complication.

RESULTS

In this study maximum women i.e 74.5% were of 20-25 years age group and 63.5% were primigravidas. Mean length of active phase of labour was significantly less (4.69 ± 2.50 hours) in study group than 6.15 ± 3.92 hours in control group (highly significant $P=.003$). Prolonged labour was seen in 9% cases of study group than 25% of control group ($P=.003$ highly significant). Delay in rate of cervical dilatation was less (5%) in case group in compare to control group (16%). Spontaneous vaginal deliveries were more (95%) in study group than (91%) control group. Numbers of operative vaginal deliveries were 1% in study group V/S 2% in control group. Caesarean sections were 4% in study group v/s 7% in control group. Augmentation of labour was required less in study group 57% than control group 74% ($P = 0.011$ significant). Use of partograph shows statistically significant reduction in postpartum hemorrhage from 9% to 2% ($P = 0.030$), puerperal sepsis from 8% to 1% ($P = 0.017$) and obstructed labour from 4% to 0% ($P = 0.043$). There was no maternal and perinatal mortality observed. Number of vaginal examinations were 1-2 in 75% cases of study group as compare to 21% cases of control group, 3-4 in 72% cases as compare to 58% cases of control group and >5 in 3% cases of study group as compare to 30% cases of control group. So use of partograph was associated with significant reduction in number of vaginal examinations (P value = 0.0001). Mean Apgar score at 1 min improved, $8.75 \pm .716$ in study group as compare to 8.34 ± 1.365 in control group ($P = .011$ significant).

Table (i) Mean length of active phase of labour

Mean length of active phase of labour in hours	Primigravidae (n*= 63,n**=64)	Multigravidae (n*= 37,n**=36)	Primi+Multigravidae (n=200)
Mean \pm S.D (Study group)	5.09 \pm 2.88	3.88 \pm 1.24	4.69 \pm 2.50
Mean \pm S.D (Control group)	6.93 \pm 4.19	4.76 \pm 2.98	6.15 \pm 3.92
P value	P=.003	P=.080	P=.003

n= total number of cases in study and control group, n*= number of cases in study group, n**= number of cases in control group, S.D =Standard deviation.

Above table shows that mean length of active phase of labour in study group was 4.69 ± 2.50 hours and in control group was 6.15 ± 3.92 hours (Highly significant $p=0.003$)

Table (ii) Augmentation of labour: (n=200, 100-Study and 100-Control group)

Augmentation of labour	Control group (n=100) No. of cases	Study group (n=100) No. of cases
Required	74 (74%)	57 (57%)
Not required	26(26%)	43 (43%)

Augmentation of labour required in 74%cases of control group while in 57% cases of study group (P value .011 significantly high)

Table (iii) Complications of labour: (n=200, 100-Study and 100-Control group)

Complications of labour	Study group (No. of cases)	Control group (No. of cases)	χ^2 value	P value
Obstructed labour	0 (0%)	4(4%)	4.081	0.043*
Uterine rupture	0 (0%)	0 (0%)	-	-
PPH	2 (2%)	9 (9%)	4.7138	0.030*
Puerperal sepsis	1 (1%)	8 (8%)	5.7010	0.017*
MMR	0 (0%)	0 (0%)	-	-

*=Significant at 5% interval, n-number of cases.

Number of cases of obstructed labour were 0% in study group as compare to 4% in control group.

Number of cases of PPH were 2% in study group as compare to 9% in control group.

Number of cases of puerperal sepsis were 1% in study group as compare to 8% in control group.

It was observed that, use of partograph was associated with statistically significant reduction in postpartum hemorrhage (χ^2 value = 4.7138 and P value = 0.030) and puerperal sepsis (χ^2 value = 5.7010 and P value = 0.017) and obstructed labour (χ^2 value = 4.081 and P value = 0.043)

Table (iv) Number of vaginal examinations: (n=200, 100-case and 100-control)

No. of vaginal examinations	Study group (No. of cases)	Control group (No. of cases)
1-2	75 (75%)	12 (12%)
3-4	22 (22%)	58 (58%)
≥ 5	3 (3%)	30 (30%)

In control group, numbers of vaginal examinations were between 1-2 in 12% cases, 3-4 in 58% cases and ≥ 5 in 30% cases. While in study group, numbers of vaginal examinations were between 1-2 in 75% cases, 3-4 in 22% cases and ≥ 5 in 3% cases. (χ^2 value = 83.9116 and P value = 0.0001 Highly significantly reduced no. of vaginal examinations).

Table (v) Neonatal Apgar score at 1 min.: (n=200, 100- Study and 100-Control group)

Apgar score	Study group (No. of cases)	Control group (No. of cases)
0-6	2 (2%)	11 (11%)
7-10	98 (98%)	89 (89%)

In control group, Apgar score at 1 min. was 0-6 in 11% cases and 7-10 in 89% cases.

In study group, Apgar score at 1 min. was in between 0-6 in 2% cases and 7-10 in 98% cases.

Table (vi) Neonatal outcome: (n=200, 100-study and 100-control group)

Neonatal outcome	Study group (No. of case)	Control group (No. of case)	χ^2 value	P value
Live birth	100 (100%)	100 (100%)	-	-
Neonatal asphyxia	2 (2%)	11(11%)	6.6639	0.010*
Perinatal mortality	0 (0%)	0 (0%)	-	-
Neonatal sepsis	1(1%)	2 (2%)	0.3384	0.561
Jaundices	1(1%)	2 (2%)	0.3384	0.561
Cephalhematoma	0 (0%)	1 (1%)	1.0050	0.316
Convulsion	0 (0%)	1 (1%)	1.0050	0.316

*=Significant at 5% interval, n-number of cases,

Most common complication in newborns was neonatal asphyxia, in 2% cases of study group and 11%cases of control group.

The result shows that, use of partograph was associated with statistically significant reduction in neonatal asphyxia (χ^2 value = 6.6639 and P value = 0.010). While neonatal sepsis (χ^2 value = 0.3384 and P value = 0.561), neonatal jaundices (χ^2 value = 0.3384 and P value = 0.561), cephalhematoma (χ^2 value = 1.0050 and P value = 0.316) and convulsion (χ^2 value = 1.0050 and P value = 0.316) were reduced though not statistically significant.

Apgar score at 5 min was 7-10 in 99% cases of study group as compare to 95% cases of control group. With partograph use there was significant reduction in neonatal asphyxia from 11% case in control group to 2% cases in study group (P value = 0.010). Other complications like neonatal sepsis, neonatal jaundices, cephalhematoma and convulsion were also reduced.

DISCUSSION

The WHO partograph (WHO, 1993 and 1994) is an adaptation of Philpott's partograph which was designed to prevent prolonged labor. This protocol, which prompts early decision regarding augmentation or termination of labour or patient transfer to a better-equipped facility, has proven effective as an early warning tool (Lennox et al., 1998; Pettersson et al., 2000; Fahdhy and Chongsuvivatnong, 2005). WHO multicenter trial in Southeast Asia (WHO, 1994), reported that introduction of the partogram significantly reduce prolonged labour (from 6.4% to 3.4% $p=0.002$). Gupta et al. (1987) and Iffat Javed et al. (2007) has also reported the effectiveness of the use of partogram in reducing prolonged labour. Dangal (2007) reported that use of partograph was associated with significant reduction in complication of labour like postpartum hemorrhage, sepsis, uterine rupture, etc. Iffat Javed et al. (2007) and Fahdhy et al. (2005) reported significant reduction in number of vaginal examinations in labour, monitored with partograph ($p < 0.001$). Fahdhy et al. (2005) and Lavender et al. (2008) reported significant improvement in Apgar score at 1 minute after use of partograph. It is similar to present study's observations. Orji et al. (2007) said use of partograph was associated with improvement in Apgar score both at 1 and 5 minute, While WHO multicenter trails does not demonstrate any improvement in neonatal outcome. Orji et al. (2007) observed use of partograph was associated with reduction in rate of perinatal mortality ($p=0.004$) and two maternal deaths occurred before use of partograph but none after partograph introduction. WHO Maternal Health and Safe Motherhood Programme also reported that intrapartum stillbirths reduced from 0.5% to 0.3% after partograph use. Orji et al. (2007) observed that use of partograph was associated with significant reduction in neonatal asphyxia. Cahill et al. (1992) observed that neonatal asphyxial seizures were increased from 1.3/1000 to 2.3/1000 when labour augmented with oxytocin.

Conclusion

Partograph is a safe, simple and cost-effective tool of labour management. It can be easily learned and used even by paramedical staff at peripheral level for better labour management and early referrals, that will help in reduction of fetomaternal morbidity and mortality. It is recommended that implementations of partogram should be encouraged in all hospitals, at all levels as a part of standard labour management protocol.

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