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2 hour versus 4 hours action line on WHO modified partograph

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Abstract
Background: World health organization has promoted modified partograph with action line, 4 hours to left of alert line. While others have used various action line 2, 3, or 4 hours to initiate and guide ‘‘active management’’ decisions. Objectives of the study were to evaluate outcome of labour in terms of action line crossed and augmentation of labour and in whom labour has been managed with 4-hour vs 2-hour action line on WHO modified partograph.
Methods: Every 8th primigravida mother fulfilling the inclusion criteria was enrolled for the study alternatively for 2 hourly and 4 hourly partogram reading. Results were compared between Group A, with 100 cases, in whom labour has been managed with WHO modified Partograph with 4-hour action line and Group B, with 100 cases, in whom labour has been managed with that of 2-hour action line.
Results: The present study shows that more women in 2-hour arm crossed the action line, compared with the 4-hour arm, and therefore received more interventions to augment labour. Rate of caesarean section was more in group B than in group A (9%) which is statistically nonsignificant.
Conclusions: Neonatal outcome measured with APGAR score at 5 minutes, has shown no significant difference in both groups. Therefore, partograph with 2-hour action line did not show any superiority over that of 4-hour action line but to be associated with higher incidence of intervention. Further research is required in this field of active management.

Keywords: 2-Hour action line, 4-Hour action line, partograph, WHO modified partograph

Introduction
The partogram is considered a valuable tool in the improvement of maternity services by allowing midwives and obstetricians to display intrapartum details in a pictorial manner [1]. A number of common partogram designs follow the work of Philpott and Castle’ and most incorporate an action line. An action line allows unambiguous diagnosis of prolonged labour, enabling the timing of intervention to be based on the rate of cervical dilatation. It is conventionally placed a number of hours to the right of another line, the alert line[2], which describes the rate of cervical dilatation of the slowest 10% of primigravidae [3].
The timing of intrapartum interventions which may correct prolonged labour and include amniotomy, intravenous hydration, analgesia, oxytocic infusion and operative delivery4, has not been subjected to rigorous evaluation [4]. The Dublin group [5, 6] have proposed that an active management package which relies on early identification of prolonged labour with early correction by oxytocin reduces caesarean section rate. Despite inclusion of all the components of the National Maternity Hospital protocol for active management of labour, a more recent randomised study of 1934 nulliparous women [7] failed to provide evidence that such a protocol reduces the caesarean section rate. Most other studies of various forms of early intervention have shown reductions in duration of labour but not in caesarean section outcome [8].
Philpott and Castle [1], who were the first to provide specific guidelines on the timing of intervention for prolonged labour, recommended an action line 4 hours to the right of the alert line. This recommendation was to enable adequate time to transfer women from peripheral units to a central unit when labour became prolonged. This design has been adequately evaluated only recently, when the World Health Organization carried out a large multicentre trial of 35484 women in south east Asia [9]. They achieved caesarean section rates of 10% in primigravidae in labour and have therefore recommended the widespread use of a partogram with a 4-hour action line.

However, as the evidence to support either a 2- or 4-hour action line was inconclusive in 1992, a consensus was reached among senior medical and midwifery staff at the Liverpool Women's Hospital that the partogram in Liverpool would contain a 3-hour action line. This adaptation to the WHO partogram has been used by others [10] who believe that partograms have not been sufficiently evaluated.

A neglected aspect of the debate over timing of intrapartum intervention is the view of women themselves. Both early and late interventions may have many unwanted sequelae: limitation of maternal mobility, increased use of epidural analgesia, increased incidence of fetal heart rate abnormalities, uterine hypertonus and caesarean section.

The issue of timing of obstetric intervention during labour thus needs to be addressed and should include women's views. Therefore, we carried this study to compare and assess the effect of two different partograms on normal delivery and caesarean section and to evaluate the maternal and perinatal outcome in primigravidae by comparing their partograms in labor.

Subjects and Methods

The hospital-based observational study study was carried out in the Department of Obstetrics and Gynaecology at Dr. Rajendra Prasad Government Medical College, Kangra at Tanda, Dist. Kangra H.P. over a period of one year. Two hundred women, 100 each in 2 hourly and 4 hourly partograms recording. Every 8th primigravida mother fulfilling the inclusion criteria was enrolled for the study alternatively for 2 hourly and 4 hourly partogram reading. Inclusion criteria were pregnant women in spontaneous and induced labor, first stage of labor with cervical dilatation 4 cm, singleton pregnancy more than 37 weeks gestation, and/or cephalic presentation. The following subjects were excluded if antepartum hemorrhage, breech presentation, multiple pregnancy, cervical dilation >4 cms, and/or premature labor less than 36 weeks.

Methodology

All the laboring women were selected according to the inclusion criteria randomly and were studied by using a partogram 2 hourly and 4 hourly. On admission to the hospital, a detailed history to know the exact time of onset of labor pains, or leaking membranes along with a detailed menstrual and obstetrics history was elicited.

After an initial preparation of the patient, examination of the patient was carried out with reference to maternal conditions like height, stature and built. All the vital signs were noted and a detailed systemic evaluation was done. Local examination was directed to know the fetal lie, position, presentation and to know whether the head is floating, fixed or engaged. The rate, regularity and position of the fetal heart rate was noted. Pelvic examination under aseptic precautions was done to know the position, consistency, effacement and dilation of the cervix. The state of membranes, whether intact or ruptured and color of liquor was noted. The partogram was attached to the mother's case record when patient was admitted in the labor room.

Routine neonatal care was given to all newborns of enrolled mothers. APGAR score was noted at 1 minute and 5 minutes. Complete neonatal examination was carried out. All the neonates with perinatal asphyxia, meconium aspiration syndrome, RDS and admission in the NICU were followed up till discharge to note their outcome.

Definition

All the definitions of WHO modified partogram were used for the study purpose.

Statistical analysis

Data were expressed as frequency, percentages, mean, and/or standard deviation. Categorical variables were compared using Chi square test. Quantitative variables were compared using Student t-test. P value <0.05 was considered significant. Statistical analysis was performed using SPSS v21.0.

Results

Association between hourly line and maternal characteristics

Table 1 shows association between hourly line maternal characteristics. Mean age, booking status, medical illnesses, mode of labor, and mode of delivery were comparable between both groups (P>0.05).

Table 1: Association between hourly line maternal characteristics

	2-hour	4-hour	P value
Age (years)	26.04±3.17	25.49±2.72	0.190
Booking status, n	92	97	0.215
Medical illness, n			
Gestational diabetes	3	7	
Gestational hypertension	9	7	0.576
IHCP	5	2	
Pre-eclampsia	2	0	
Mode of labor, n			0.854
Spontaneous	81	83	
Augmentation, n	38	21	0.003
Mode of delivery, n			
FTND	85	90	0.299
Instrumental	7	7	
LSCS	8	3	
Neonatal birth weight (g)	27479.47±319.02	2802.40±429.94	0.669

Action line crossed and need for augmentation

In our study, 22% patients in 2 hourly group and 10% patients in 4-hourly group crossed action line and difference was statistically significant (P=0.003). Augmentation of labor was significantly higher in 2-hourly group in comparison to 4-hourly group (38% vs. 21%; P=0.008). In 2-hourly group, oxytocin was used in 18% patients while only ARM was used in 9% patients. In the remaining 13% subjects, both ARM and oxytocin were used. In 4-hourly group, 10% women used oxytocin, 7% used ARM while remaining used both ARM and oxytocin (Table 2).

Table 2: Action line crossed and need for augmentation

	2-hour	4-hour	P value
Action line crossed, n	22	10	0.039
Augmentation, n	38	21	0.003

Association between hourly line and neonatal characteristics

In this study, none of the neonatal characteristics such as type of liquor, Apgar at 5 min, IUGR, NICU admission, and birth weight was significantly associated with 2 or 4-hourly line (P>0.05) (Table 3).

Table 3: Association between hourly line neonatal characteristics

	2-hour	4-hour	P value
Meconium stained, n	0	0	-
Apgar at 5 min, n ≤7	13	9	0.498
IUGR, n	10	12	0.651
NICU admission, n	4	6	0.746
Birth weight (g)	2747.47±319.02	2802.40±429.94	0.669

Discussion

Although partograms are in widespread use, little research has been undertaken in the form of randomized studies to assess the efficacy of different placement of the action line. As there is little evidence of what makes a labour dysfunctional and no universal consensus for the best time to intervene dysfunctional labour, the debate between active and expectant management of prolonged labour continues.

In present study, 22% in 2-hourly group and 10% in 4-hourly group crossed line which is lower than reported by Sinha *et al*. [11] who observed 52% of women crossed action line in group B as compared to 38% in group A and also than study by Lavender *et al*. [12].

Caesarean section rate was found more in partograph with 2-hour action line than in partograph with 4-hour action line (however, no significant) which is comparable to previous studies: Lavender *et al*. [12] reported rate of caesarean section in partograph with 2-hours action line was 11.1% (CI 8%-15-2%) than 8.3% (CI 5.6%-12.2%) in 4-hour action line.12 Pilot study, done on 1500 women detected 3% difference (8% in 4-hour action line vs 11% in 2-hour action line), in caesarean section rate with 80% power (alpha 0.05). 13 All other outcomes showed no statistically significant differences among two groups of the present study.

In our study, method of augmentation was significantly higher in 2-hourly group. However, in the study by Sinha *et al*. [11] there was no significant difference in both groups.

Conclusion

From this study, we concluded that there were not many changes in 2-hour action line over 4-hour action line on partograph. The present study is unable to prove superiority of 2-hour action line over 4-hour action line on partograph. However, it is possible that partograms which favor earlier intervention are associated with higher caesarean section rate. As the evidence on which choices of partograms are based, remains inconclusive and further research is required.

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