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Labour outcome in primigravida who have crossed the alert and action lines on partogram

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Abstract
Background: The partograph serves as an early warning system and it has shown to be effective in preventing prolonged labour in reducing operative interventions and improving the maternal and neonatal outcome.
Aim: The current study was conducted to evaluate maternal and neonatal outcomes in primigravidas crossing the alert line and action line on the partogram.
Methods: A total of 200 inpatients admitted in obstetric wards satisfying the inclusion criteria were included after obtaining informed consent explaining them the details of the study in their native language. Patients were monitored for progress of labour, requirement for augmentation, any complications and were managed appropriately as per requirement.
Results: It was noted that 24% of the mothers (48) were between 18 to 21 years. 19.50% of mothers were found to have PIH, 1% of mothers had IHCP, chorioamnionitis, HCV positive and also oligohydramnios, 4% were seen with IUGR and 0.5% were found to have GDM. Induced labour was common in patients crossing the alert line and post crossing action line. There was a significantly higher incidence of LSCS in mothers crossing alert line with $P<0.001$. Meconium aspiration syndrone was noted in 4, 2 neonates born to mothers crossing the alert line and crossing the action line respectively. Most of the newborns had normal birth weight that is around 80.43% and 78.95% to mothers crossing the alert line and action line respectively. Significantly higher number of neonates needed NICU admission in mothers crossing alert line and action line.
Conclusion: It is prudent to monitor the labour on a partograph and avoid any delays for any intervention leading to a better maternal and neonatal outcome.

Keywords: Spontaneous labour, caesarean section, partogram, uterine contractions, fetal outcomes, vaginal delivery, apgar scores

Introduction

The management of spontaneous labour has become an important issue both in the developing and developed world. In the developing world, prolonged labour associated with high levels of morbidity and mortality is still common because of lack of adequate healthcare including availability and utilization of services, transport and communication and surgical facilities necessary for caesarean section.

The causes of death and morbidity include obstructed labour, sepsis, rupture of the uterus and PPH. Hence, the WHO embarked on trials of the use of partograms as a simple managerial tool for the early detection and appropriate management of poor prognosis of labour.

The increased incidence of caesarean birth in the developed world has prompted considerable concern. Although several factors have contributed to this increase, the largest single factor appears to be the increase in the use of the caesarean section to manage dystocia. This trend has made the obstetric profession to find ways and means of reducing caesarean section rate due to dystocia in spontaneous labour. This is because the caesarean section carries at least a fourfold increase in maternal mortality rate over that of vaginal birth and tenfold increase in maternal morbidity. Labor abnormalities due to unfavorable fetal pelvic dynamics lead to true dystocia requiring a cesarean delivery [1].

The safe motherhood Initiative (SMI) emphasizes that the monitoring of labour for early detection of dystocia is one of the most important approaches for reducing maternal and neonatal morbidity and mortality.

The Obstetric Partogram is a composite graphic record of s labor progress. Along with documentation of essential obstetric vital signs it is used in developing confluent areas to control intrapartum care. The World Health Organization (WHO) recognizes this status as useful labor management that adequately draws attention to excessively prolonged labors [2]. The use of partograph serves as an early warning system and it has shown to be effective in preventing prolonged labour in reducing operative interventions and improving the neonatal outcome. Moreover, evidence of efficacy of partograph is equivocal as suggested by a Cochrane review [3].

Freidman, Philpott, Castle, Studd and many others have suggested criteria for early recognition of abnormal labour evolved through their vast experiences. Philpott's partograph aids the recognition of abnormal labour and can indicate correct timing by intervention by the use of 'alert line' and 'action line' based on cervical dilatation. The initial partograms by Philpott and Castle[4] were constructed with an alert line representing a mean rate of cervical change slower than 10 percent of the population in the active phase of the first stage of labor [5].

Materials and Methods

This is a Prospective cohort study carried at Dr D.Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune with 200 IPD patients in the labour room from October 2018 to October 2020.

Single foetus gestation, registered patient, Primigravida and full term, ANC patients with well-maintained records were included in the study.

Multiple foetal gestation, Non registered patients, Patients reluctant for follow up, Lesser than 37 weeks gestation, Patients with history of any co morbid conditions like DM, HTN, asthma, TB, epilepsy, thyroid, Multipara patients were excluded from the study.

After inclusion detailed history was taken from the subjects, general and systemic examinations were conducted including height and weight of all ANC patients. The Ante-natal record check-up details were noted and any important details were made note of. Cervical dilatation on admission at 0 hours on cervicograph, was marked. The progress of labour by vaginal examination every two hourly was noted. Induction of labour was done when needed using misoprostol vaginally. Labour crossing alert line or action line was appropriately noted and needful intervention was performed whenever needed. Subsequent to the delivery, neonatal parameters were evaluated such as birth weight, APGAR score. Based on the medical condition of the neonates, neonatal resuscitation and admission to NICU was performed. All data will be collected and correlated and different statistical tests were applied to find the significance. The data was expressed as means with standard deviations and/or percentages wherever applicable in graphs and tables. Chi-square test was used to determine P value set at significant levels of <0.05 at 95% confidence intervals for qualitative variables.

Results

The age distribution was observed. It was noted that 24% of the mothers (48) were between 18 to 21 years, 44% were between 22 to 25 years (88), 22% were between 26 to 29 years (44) and 10% were between 30 to 33 years.

19.50% of mothers were found to have pregnancy-induced hypertension (PIH) which is one of the most occurring medical conditions. 1% of mothers had intrahepatic cholestasis of pregnancy (IHCP), chorioamnionitis, hepatitis C virus (HCV) positive and also oligohydramnios, 4% were seen with intrauterine growth restriction (IUGR), and 0.5% was found to have gestational diabetes mellitus (GDM).

Induced labour was a common post crossing the alert line. The percentage was 52.17% (24) for induced labour whereas spontaneous is around 47.83% (22). The difference was however non-significant at a P value of 0.67.

Most of the mothers who had induced labour had premature rupture of membranes (PROM) at 26.09% and postadism with 19.57% respectively. Pregnancy-induced hypertension (PIH) at 6.52% was the other reason for induction of labour.

Augmentation of labour was required in 31 mothers at 67.39% who crossed the alert line whereas it was needed in 12 mothers at 63.16% who crossed the action line. The difference between the groups was however comparable with a P value of 0.742.

Most of the mothers who crossed the alert line had lower segment caesarean section (LSCS) with 39.13% which is on the higher side when compared to normal spontaneous delivery which is found to be 47.83%. There was a significantly higher incidence of LSCS in mothers crossing alert line with $P<0.001$.

Indication for LSCS in mothers who crossed the alert line includes cephalopelvic disproportion (27.78%), fetal distress (27.78%), meconium stained liquor with prolonged labour (33.3%) were found to be the common reasons for LSCS in mothers who crossed alert line and non-progress of labour was noted in 11.11%.

The most common indication observed for LSCS in mothers who crossed the action line was meconium stained liquor with prolonged labour in 33.33%. Fetal distress and CPD was noted in 27.78% and non-progression of labour was observed in 11.11% of the mothers.

Meconium aspiration syndrome was noted in 4 neonates born to mothers crossing the alert line and in 2 neonates born to mothers crossing the action line. Respiratory distress syndrome was observed in 2 neonates born to mothers crossing the alert line.

25 neonates at 1 min and 32 neonates at 5 minutes had an APGAR score of 8 and above in mothers who crossed the alert line whereas below 8 was observed in 11 neonates at 1 minutes and 4 at 5 minutes. 9 neonates at 1 min and 10 neonates at 5 minutes had APGAR score of 8 and above in mothers who crossed the action line whereas below 8 was observed in 3 neonates at 1 minutes and 2 at 5 minutes.

The finding shows us birth weight in newborns of mothers who crossed the alert line. It was seen most of the newborns had normal birth weight that is around 80.43% whereas 19.57% had low birth weight born to mothers crossing the alert line. The above table shows around 21.05% of the newborns had low birth weight born to mothers who crossed the action line rest 78.95% newborns had normal birth weight. The difference was non-significant with a *P* value of 0.891.

13.04% of the newborns of mothers who crossed the alert line NICU admission was not required whereas most of the newborns were admitted to NICU that is 86.96% of the newborns. The newborns born to mothers crossing the action line were mostly seen getting admitted to neonatal intensive care unit that is almost 89.47% of the newborns, other 10.53% newborns did not require NICU admission.

Discussion

The current study was conducted to evaluate maternal and neonatal outcomes in mothers crossing the alert line and action line in the partogram. A total of 200 inpatients admitted in obstetric wards satisfying the inclusion criteria were included after obtaining informed consent explaining them the details of

the study in their native language. Patients were monitored for progress of labour, requirement for augmentation, any complications and were managed appropriately as per requirement.

Tolba SM *et al.* [6], aimed to compare maternal and neonatal outcomes of spontaneous term labor among primigravida who were monitored by the novel labor scale versus the World Health Organization (WHO) partograph. Women managed with labor scale had significantly lower rates of cesarean deliveries than women managed with the partograph arm (3.6% versus 18.2%, *P*=0.03). There was a significant reduction in the rate and duration of oxytocin administration for augmentation of labor (21.8% versus 69.1%, *P*<0.0001) and a significant increase in average 1-minute APGAR score in the labor scale group. Authors noted that, labor monitoring with the labor scale is associated with a lower rate of cesarean section, less and shorter use of oxytocin for augmentation of labor. Monitoring of labor progress starting at 5 cm or more is also associated with lower rate of cesarean delivery.

Singh R *et al.* [7]. Observed an incidence of 5% of obstetric cholestasis in their study conducted in 2019. In our study of 200 patients 1% had intrahepatic cholestasis of pregnancy signifying that was less than when compared to this study. Myles TD *et al.* [8] did a study of patients in prolonged second stage of labour and noted that maternal diabetes, fetal macrosomia, nulliparity and chorioamnionitis resulted in increased duration of labour leading to crossing of alert line and action line.

Coates D *et al.* [9]. In a systematic review noted that prolonged pregnancy, term pre-eclampsia, PROM, decreased foetal movements and oligohydramnios as valid indications for inducing a labour. The guidelines are unclear on other medical conditions such as elevated maternal BMI, foetal macrosomia, GDM and twin pregnancies. It should be noted that the underlying medical conditions such as intrahepatic cholestasis of pregnancy, intrauterine growth restriction [10], oligohydramnios and chorioamnionitis [11], can be associated with increased rate of LSCS.

Augmentation of labour was required in 31 mothers at 67.39% who crossed the alert line whereas it was needed in 12 mothers at 63.16% who crossed the action line. The difference between the groups was however comparable with a P value of 0.742.

Various pharmacological drugs are utilized in augmentation of labour. Of these the commonly used is intravenous oxytocin [12]. Various other drugs have been utilized by other workers such as Drotaverine hydrochloride and Valethamate bromide [13].

Cephalopelvic disproportion (27.78%), fetal distress (27.78%), meconium stained liquor with prolonged labour (33.3%) were found to be the common indication for LSCS in mothers who crossed alert line and non-progress of labour was noted in 11.11%. The most common indication observed for LSCS in mothers who crossed the action line was meconium stained liquor with prolonged labour in 33.33%. Fetal distress and CPD was noted in 27.78% and non-progression of labour was observed in 11.11% of the mothers.

In a study by Gupta R *et al.* [14], authors observed in 70 cases of prolonged labour that the most common cause of obstructions was cephalopelvic disproportion in 63% followed by malposition or malpresentation in 29.9%. All patients were taken for LSCS. The most common postoperative complication was sepsis in 27.1%. 55.7% of newborns were admitted in the NICU after LSCS because all had low first minute APGAR scores.

Van Bogaert LJ [15], in a study noted 28 adverse neonatal outcomes of 461 deliveries that crossed the alert line and 18 of 146 that did not cross the alert line. Uugc S *et al.*, [16] noted adverse foetal outcomes in 43 of 96 deliveries that crossed the alert line and 43 of 404 that did not cross the alert line.

Myles TD *et al.* [8]. In a study in patients with prolonged second stage of labour noted no effect on neonatal morbidity however observed increased maternal morbidity, increased episiotomy, and increased augmentation of labour with increasing duration of the labour.

Limitations of the study

The study sample was less to extrapolate to regional and national trends, as this is a tertiary care hospital, the general trend will be skewed towards complicated cases, long term maternal outcomes were not evaluated.

Conclusion

As observed from our study most of the mothers needed to undergo LSCS once after crossing the alert line and action line. Varied causes led to LSCS such as CPD, fetal distress and non-progress of labour in mothers crossing the alert line and action line. Poor neonatal outcomes in the form of a high rate of NICU admissions was noted once the mother crossed the alert line and action line on the partograph. Hence, it is prudent to monitor the labour on a partograph and avoid any delays for any intervention leading to a better maternal and neonatal outcome. In our study the primigravida crossing the alert line was 23% and those crossing the action line was 9.5%.

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