PARTOGRAM - TIME FOR NEW WORDS FOR THE NEW WORLD!
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Abstract
The partograph is a graphical record of cervical dilatation and provides a pictorial overview of progress of labour. It was invented as a tool for alerting midwives and birth attendants after studying normal labour in large number of women by Friedman. The WHO has recommended its universal usage based on its unmatched ability to detect abnormal labour. But it is still underutilized in developing countries, more so in primary health care centers, where it is needed the most. Various trials done in developed countries and resource rich settings have failed to show significant benefit of using partograph. Rather it was thought to limit the obstetrician’s individuality. Much has changed in labour management protocols since partograph came into existence in 1954. Latest ACOG guidelines have redefined onset of active stage of labour, abnormal labour and arrest of labour. It is a high time to incorporate the newer recommendations and update partogram in the light of current recommendations to retain its glory as a useful obstetric tool.

Keywords: Labour, Partograph, WHO, Guidelines, ACOG

Introduction
Labour is one the most difficult journey a woman undertakes. The partograph is a graphical record of cervical dilatation in centimetres against duration of labour in hours. The partograph is undoubtedly most important invention in obstetric care. Its aim is to provide a pictorial overview of progress of labour and to alert health professionals. Various partograph designs have come to existence since its origin in 1954.¹ Numerous studies have been done comparing outcome of pregnancies in partograph and non partograph usage groups. Most of the early work on partograph was done in developing countries, including the very origin of partograph. Partograph is said not to be influenced by race, cultural and socioeconomic differences. In recent years, various researchers have found no significant benefits of using partograph; hence creating controversies, whether a partogram is useful and which design of partogram is better.

Historical Background
Originally called the Friedman’s curve, the partograph was designed by E.A. Friedman in 1954 following a study on 100 African women (Figure 1).¹ Friedman divided labour functionally into two parts. The latent phase, which may last for 8-10 hours till cervix is 3 cm dilated. This was followed by an active phase, characterized by acceleration from about 3-10 cm at the end of which deceleration occurred. This work has formed the foundation on which others have built.

Figure 1. Friedman’s curve (cervicograph, 1954)
It was further improved by Philpott and Castle who in extensive studies of primigravidae in Central and Southern Africa, constructed a nomogram for cervical dilatation. They included other patient details in the graph so that it was easier for the midwives to use it wherever doctors were not available. They introduced the alert and action lines to identify deviation from normal and prevent prolonged labour (Figure 2).² Since, then several types of partographs have been developed in various countries to suit local needs but none of them have shown significant differences between ethnic groups.³

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World Health Organization (WHO) launched the partograph in 1987 as a safe motherhood initiative following a multi-centre trial in South Asia that involved 35,484 women. The modified composite WHO partograph currently being used was introduced in 2008. It does not have a latent phase and the active phase starts at 4 cm cervical dilatation (Figure 3). It has since been used to monitor labours in health facilities in the country.

Figure 2. Philpott and Castle partograph (1972).

The WHO model of the partograph is simplified and includes the best features of several partographs. The foetal condition, the progress of labour and the maternal condition are the three components of the partogram.

The progress of labour which includes 4 hourly monitoring of cervical dilatation, descent of the foetal head, abdominal palpation of fifths of head felt above the pelvic brim and half hourly uterine contractions. The foetal wellbeing includes half hourly foetal heart rate monitoring, 4 hourly checking of whether membranes are intact or ruptured and the state of liquor and moulding of the foetal skull; the maternal wellbeing which are pulse and blood pressure that are monitored and recorded hourly while temperature and urinalysis (volume, protein, ketones) are being monitored and recorded 4 hourly.

The action line is a parallel line plotted 4 hours to the right of the alert line. If the plotted graph of dilatation of the cervix moves to the right of the alert line and crosses the action line (after amniotomy and review) this denotes a prolonged labour which requires immediate referral to the obstetric registrar on call for obstetric review and active management.

Benefits

Global maternal mortality rate was 216 maternal deaths per every 100,000 live births in 2015 and developing regions accounted for 99% of global maternal deaths. Obstructed labour is one of the major causes of maternal mortality. Early detection of abnormal labour and its management can prevent prolonged labour and significantly reduce the risk of postpartum haemorrhage and sepsis, obstructed labour, uterine rupture and thereby reduce the maternal mortality. The partograph is widely accepted as one of the measures in decreasing maternal and neonatal mortality from obstructed labour.

World Health Organization's safe motherhood programme found that partograph use reduced prolonged labour by half, requirement of augmentation of labour decreased from 20.7% to 9.1%; emergency caesarean sections were also reduced from 9.9% to 8.3% and intrapartum stillbirths from 0.5% to 0.3%. A clinical audit of intrapartum care in Delek Tibetan Hospital in North India found 50% reduced incidence of postpartum haemorrhage following routine use of the partograph.

Studies have shown that using the partograph can be highly effective in reducing complications from prolonged labour for the mother (postpartum haemorrhage, sepsis, uterine rupture, etc.) and for the newborn (death, anoxia, infections, etc.) Partograph benefits better in the set ups where standard labour management protocols are followed along with routine use of partograph.

Figure 3. Modified Composite WHO Partograph (2008).
Labour management guidelines of various countries and WHO recommend universal usage of partograph. Partograph is not only a labour management tool but also an accepted legal proof of labour monitoring and management. It is still reported to be underutilized in developing countries, especially in primary health care centres where most of the deliveries take place.\textsuperscript{17-20} There have been number of studies finding out that even where partographs are used they were incomplete and inaccurate and thus unable to help in labour management.\textsuperscript{21} Various factors affect the underutilization of the partograph in monitoring labour such as non-availability of the partographs, shortage of staff, little or no knowledge in the use of partograph and that the partograph is time consuming.\textsuperscript{22} Most of the workers believe that it hinders in their work and it is filled retrograde after delivery. It is merely treated as record when it can be utilized as a management tool.

Relevance in Tertiary Care Setting

Partograph was introduced for midwives who have limited knowledge of obstetrics to streamline management of labour. As partograph is pictorial and easy to understand birth attendants can easily know when to take action and when to refer the patient. Centers where doctors are conducting delivery or are available round the clock, use of partograph is still questionable. In partograph it is assumed that all women in labour progress at the same rate, increased rates of artificial rupture of the membranes, oxytocin augmentation and use of analgesia are seen as its negative effects. Partograph also restricts autonomy of obstetrician and limit the flexibility to treat each woman as an individual and create unnecessary interference.\textsuperscript{22,23}

Windrim et al. conducted a randomized study in 2006 comparing results in partograph and no partograph group. They found that the partograph is used in developing countries to prevent maternal and foetal morbidity and mortality related to prolonged labour, in developed countries where maternal mortality is low early identification and management of dystocia is its only use.\textsuperscript{24} Their trial failed to show any differences in any caesarean section rate, duration of labour, oxytocin use, and number of amniotomies required, epidural use and use of antibiotics. Apgar scores and admissions to neonatal intensive care unit following introduction of the partograph were also same. An Indian study conducted on 400 high risk women at a tertiary care hospital also found no significant difference on duration of labour, rate of caesarean section and perinatal outcomes by using partograph.\textsuperscript{25} In the study carried out in low-resource settings of Mexico, Walss Rodriguez et al found that the caesarean section rate was lower in the partograph group.\textsuperscript{25} There were no statistically significant differences in any of the remaining maternal or neonatal outcomes.

Cochrane review on partograph 2012 concluded that there was no evidence from this review that using a partogram reduced or increased caesarean section rates or had any effect on other aspects of care in labour.\textsuperscript{26} The maximum number of trials in any of the comparison groups was two. None of these trials were multi-centred and all study units had different labour ward guidelines. Given the limitations of the studies included and the potential impact of organisational issues, a large cluster-randomised trial is recommended to compare partogram versus no partogram.

Newer Advances in Labour and Partograph

The United States saw rapid increase in caesarean rates from 1996 through 2011. In 2011, a survey done in United States found caesarean delivery rate of more than 30%, and the most common indication for the caesarean was dystocia.\textsuperscript{27} By definition, protracted active phase was cervical dilatation of <1.2 cm/h in the active phase for nulliparous women and <1.5 cm/h for multiparous women; these definitions were based on Friedman’s work.\textsuperscript{28} Active-phase arrest traditionally has been defined as no change in cervical dilatation for 2 hours with adequate uterine contractions after cervical dilatation of at least 4 cm.

The increased morbidities like haemorrhage, hysterectomy, transfusions, anaesthetic complications, assisted ventilation, venous thromboembolism, infections, hematoma and increased chances of repeat caesarean associated with primi-caesarean made them question the existing definitions of labour.\textsuperscript{29}

A retrospective study was conducted at 19 US hospitals, where the duration of labour was analyzed in 62,415 parturient women. The rate of active-phase dilatation was found to be much slower than the standard rate derived from Friedman’s work, varying from 0.5-0.7 cm/h for nulliparous women and from 0.5-1.3 cm/h for multiparous women. The Consortium on Safe Labour (ACOG Practice Bulletin 2014) data highlights two important features of contemporary labour progress (Figure 4). First, from 4-6 cm, nulliparous and multiparous women dilated at the same rate, and more slowly than historically described. Beyond 6 cm, multiparous women dilated more rapidly. Second, the maximal slope in the rate of change of cervical dilatation over time (i.e, the active phase) often did not start until at least 6 cm. The Consortium on Safe Labour data does not directly address an optimal duration for the diagnosis of active-phase protraction or labour arrest, but do suggest that neither should be diagnosed before 6 cm of dilatation. Because it is based on study done on larger population rather than the standards proposed by Friedman, it should form the basis of labour management.\textsuperscript{30} With these new developments in labour the role of partograph remains undecided.
Figure 4. Average labour curves by parity in singleton, term pregnancies with spontaneous onset of labour, vaginal delivery, and normal neonatal outcomes.

Conclusion

The partograph was introduced to help in rural settings. It can do a wonderful job in underprivileged settings. Partograph is still underutilized especially, where it is most needed. Its role in tertiary care centers and developed world remains under scrutiny. Considering its universal usage there is still not enough data to abandon its use. With upcoming newer definitions of labour, partograph also needs an updated model. Any future trials should group the participants according to parity, hospital services, perinatal mortality and management protocols should also be taken into account.

References

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