STUDY OF COURSE OF LABOUR BY MODIFIED WHO PARTOGRAPH

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Abstract

Background: The modified WHO partograph is an inexpensive but valuable tool that provides a continuous pictorial overview of progress of labor. It helps to detect the abnormal progress of labor. It guides the obstetrician to decide about the need for augmentation of labor and helps to recognize prolong labour before obstruction occurs.

Objectives: The objectives were to study the course of normal and abnormal labour, to study various types of abnormalities of active phase of labour and to evaluate the maternal and perinatal outcome in normal and abnormal labour.

Methods: A prospective hospital based observational study of 100 selected cases coming for delivery during January 2010 to Dec 2010 was done. Progress of Labor was assessed by the use of Modified WHO Partograph. Various parameters like duration of normal and abnormal labor, type of labor abnormalities, mode of delivery, need for augmentation etc. were studied.

Results: The average duration of active stage was 5.5 hours in normal labor. Protracted active phase and secondary arrest of labor were the commonest active phase abnormalities observed. Problems like prolonged and obstructed labor were avoided by timely intervention in the form of caesarean section and instrumental delivery .Perinatal outcome was satisfactory.

Conclusion: Routine use of partograph helps in early detection of abnormal course of labour. It assures the best possible maternal and perinatal outcome .It is suggested that every woman in labour must be benefitted by this scientific approach of labour management i.e. with the use of Modified WHO partograph.

Keywords: WHO Modified partograph , Labour abnormalities ,Maternal morbidity, Neonatal morbidity

1. Introduction

Partograph is an essential tool in monitoring the progress of labour. E. A. Friedman (1954)[1] from USA first popularized the graph, plotting the cervical dilatation against time. A practical method of managing labour called 'partograph' has been evolved over the years. Labour management with the use of partograph has now outdated the impression of normal labour management based upon palpation of uterine contractions and occasional vaginal examinations. Progress has now been strictly defined by graphical means based upon progressive cervical dilatation. Delay in labour can be detected at an early stage, by reference to these normal cervical dilatation curves. Dysfunctional labour can be corrected before the problems of prolonged labour like infection, both maternal and fetal, obstructed labour, fetal distress, still births, increased operative interventions are compounded. The present study was carried out with the following objectives 1.To study the course of normal and abnormal labour.2.To study various abnormalities of active phase of labour.3.To evaluate the maternal outcome in normal and abnormal labour.4.To evaluate the perinatal outcome in normal and abnormal labour.

2. Material and Methods

The prospective observational study was carried out in a teaching tertiary hospital over a period of 2 years i.e. from September 2009 to August 2011.Hundred cases admitted to labour room were randomly selected and monitored by using " Modified WHO Partograph."All 100 cases(50 primigravidae and 50 multigravidae) reporting to labour room with full term pregnancy with vertex presentation, without any obvious risk factors and those who were suitable for vaginal delivery, on initial examination were included in the study.

2.1-Case Selection criteria:

A. Inclusion Criterias: Pregnant women with uncomplicated full term pregnancies (37-40 weeks) with vertex presentation in labour.

B. Exclusion Criteria:

1. Women with medical complications like anemia, hypertension, diabetes and immune compromised status.
2. Women with obstetrical complications like preterm labour, previous LSCS, postdatism, multiple pregnancies, antepartum hemorrhage (APH), intrauterine growth restriction (IUGR), premature rupture of membranes (PROM), intrauterine fetal death (IUFD).

2.2-Study tool- The course of labour was monitored by using a modified WHO partogram. The cases showing abnormal labour course were re-evaluated by senior obstetrician. The decision of operative intervention (instrumental delivery/caesarean section) was taken by senior obstetrician. The newborn babies were managed by the neonatologist till their discharge from hospital. Individual partograph was studied to know the various aspects related to course and labour. Maternal outcome was analyzed by studying various parameters like mode and delivery, maternal morbidity, need for blood transfusion, maternal mortality, duration and stay in the hospital, etc. The perinatal outcome was analyzed by studying various parameters like condition of baby at birth (live birth/still birth), Apgar score, neonatal morbidity, neonatal mortality, need for admission in neonatal intensive care unit. Necessary data was collected in structured format. The data was transferred to the master chart.

2.3-Protocol for management of labour: Pregnant women reporting to labour room for delivery were given plain water enema. Selected women fulfilling the selection criteria were carefully monitored after they entered in active stage of labour. Women were kept in the first stage room till full dilatation of cervix. Careful maternal and fetal monitoring was done using 'Modified WHO Partograph' and continuous electronic fetal heart monitor. The need for augmentation of labour using oxytocin infusion was assessed in an individual case. The augmentation of labour was done with oxytocin infusion, whenever hypotonic uterine inertia was diagnosed as the cause for the delay in the progress of labour. The initial dose of oxytocin infusion was 2 milliunits per minute. It was slowly escalated maximum upto 32 milliunits per minute as per the need. As a policy of active management of labour, artificial rupture of membranes was done at or beyond5 cms dilatation of cervix, even when course of labour was normal. Intramuscular Inj. Buscopan (Hyoscine butyl bromide) was given to enhance the cervical dilatation in the active phase of labour. A maximum of 3 injections were given at an interval of half hour. Per vaginal examination was carried out at two hourly intervals and was repeated, if the progress of labour was not satisfactory or when operative intervention was necessary. All labour events were plotted on 'Modified WHO Partograph.' Cases showing abnormal course of labour were re-evaluated by senior obstetrician. Decision of operative intervention was taken after consultation with senior obstetrician. Broad spectrum antibiotics were given to those cases, which required operative intervention. Women, who delivered normally, were discharged on third or fourth postnatal day. Women, who had undergone caesarean section, were discharged on seventh or eighth postoperative day.

2.4-Data collection and Statistical analysis: important data of the individual case was collected on structured performa and was then transferred to master chart. Data analysis was done by using appropriate statistical methods (Z-test)

3. Results

It was observed that 90 % of women delivered vaginally without any operative intervention.(Table 1) The caesarean section rate was ten percent. Commonest indication for caesarean section was arrest of descent (40 %). Other indications being, protracted descent (20%), failure of descent (30 %) and arrest of dilatation (10%). Average duration of active phase of labour was 5.39 hours in primigravidae and 3.7 hours in multigravidae. (Table 2)The rate of cervical dilatation during active phase was 1.3 cm/hr. Fifteen percent of women had abnormal course of labour.(Table 3) Average duration of active phase in these cases was 7 hours with the use of partogram. Rate of cervical dilatation was 0.7cm/hr in these cases. Out of these fifteen cases having abnormal course, ten cases were delivered by caesarean section, 3 cases by ventouse application and one was outlet forceps delivery. (Table 4) Use of partogram helped in early detection of labour abnormality. Various abnormal labour patterns observed were, arrest of descent (46.66%), protracted descent (26.66%), failure of descent (20%) and secondary arrest of dilatation (6.66%). Sixty-six percent of women having abnormal labour

pattern required operative intervention and only remaining thirty-four percent delivered Fetal distress was diagnosed by intrapartum electronic fetal monitoring Alert line and action line in partogram help clinician to detect the abnormal course of labour at the earliest and also guide to take prompt action to avoid consequences of protracted labour. In the present study, we observed that there was increased need of operative intervention after the alert line was crossed. In the present study, 8% of babies had neonatal complications in the form of jaundice, aspiration pneumonitis, superficial skin infection and early septicaemia. (Table 5) All babies recovered completely before discharge from hospital. There was one neonatal mortality due to severe birth asphyxia following ventouse delivery in the present study. There was no significant maternal morbidity.(Table 6) This could be due to early detection of dystocia resulting in timely intervention, ultimately avoiding maternal complications of prolonged labour and its sequelae.

Table I: Mode of delivery in relation to alert and action lines

Mode of delivery	Group I	Group II	Group III	Total
Spontaneous Vaginal	78	07	01	84
Instrumental Vaginal	01	03	00	06
Caesarean section	02	02	06	10
Total	**81**	**12**	**07**	**100**

Majority of the cases (81%) delivered before alert line and additional 12% delivered in between alert and action

Table II: Duration of labour

Phase Of Labour	Duration with Normal Labour Pattern	Duration with Abnormal Labour Pattern
	Mean ± SD	**Mean ± SD**
Active Phase	4.02 hrs ± 0.98	7.16 hrs ± 1.03
Second stage	42.1 mins ± 11.42	91.6 mins ± 16.2

- The duration of active phase of normal labour was 4.02 hrs, while it was 7.16 hrs in multigravidae.
- Same was noted in the second stage, it was 42.1 mins in normal labour, while 91.6 mins in abnormal labour. [By applying Z-test of difference between two means; there is highly significant difference between mean duration of labour in active phase and second stage, when compared in between normal and abnormal labour pattern i.e. p <0.

Table III: Pattern of abnormal labour

Sr.No	Mode Of Delivery	No. of Cases	Percentage
1	Arrest of descent	07	46.66
2	Protracted descent	04	26.66
3	Failure of descent	03	20
4.	Arrest of dilatation	01	6.66
	Total	**15**	**100**

Arrest of descent was the most common (46.66 %) abnormal labour pattern observed; other being Protracted descent (26.66 %) and Failure of descent (20 %).

Table IV: Mode of delivery in relation to pattern of abnormal labour

Sr. No	Pattern of abnormal labour	No. of Cases	Mode Of Delivery		
			Spontaneous	Instrumental	LSCS
1	Arrest of descent	07	00	03	04
2	Protracted Descent	04	01	01	02
3	Failure of descent	03	00	00	03
4	Arrest of dilatation	01	00	00	01
	Total	**15**	**01**	**04**	**10**

- All of arrest of descent needed operative intervention; three had instrumental vaginal delivery and four underwent caesarean section..All cases of Failure of descent underwent caesarean section.
- Of the 4 cases of protracted descent, 1 delivered normally, 1 had instrumental delivery and 2 underwent caesarean section.

Table V: Neonatal morbidity in realtion to labour pattern

Sr. No.	Neonatal Morbidity	Normal Labour (n=85)	Abnormal Labour (n=15)
1.	**Birth Asphyxia**	03 (3.52 %)	03 (20 %)
2.	**RDS**	--	--
3.	**Neonatal sepsis**	01 (1.17 %)	02 (13.33 %)
4.	**Neonatal Hyperbilirubinemia**	01 (1.17 %)	--
5.	**Birth injuries**	--	--
6.	**Meconium Aspiration**	02 (2.32 %)	01 (6.66 %)
7.	**Hypoxic Ischemic Encephalopathy**	--	01 (6.66 %)
	Total	**07 (8.23 %)**	**07 (46.66 %)**

The neonatal morbidity was around 50% in abnormal labour.
[By applying Z-test of difference between two proportions, there is a highly significant difference in neonatal morbidity pattern between normal and abnormal labour (i.e. $p < 0.01$)]

Table VI: Maternal morbidity in relation to type of labour

Sr. No.	Maternal Morbidity	Normal Labour (n=85)	Abnormal Labour (n=15)
1.	**Postpartum Hemorrhage**	01	02
2.	**Need for blood transfusion**	01	02
3.	**Fever**	01	03
4.	**Puerperial Sepsis**	00	01
5.	**Wound complications**	00	01
6.	**Average hospital stay**	3.5 ± 0.39 Days	08 ± 1.26 Days

[By applying Z-test of difference between two means; there is highly significant difference between average duration of hospital stay in normal and abnormal labour pattern (i.e. $p < 0.01$)]

4. Discussion

Labour is a natural physiological phenomenon leading to childbirth. Many women have the rewarding experience of a safe vaginal birth of a healthy baby, while a small proportion continue to face the complications of prolonged labour and its squelae. In an attempt to minimize the risks of adverse outcome, use of partograph was introduced as scientific way of monitoring women in labour. Current study was carried out in a busy labour room of tertiary care hospital, where on an average 15 deliveries take place every day. Hundred women (50 primigravidas and 50 multigravidas) were selected for inclusion in the study to understand the value of partograph in management of labour. In the present study, it was observed that, 81 percent of women followed the normal course of labour and delivered before the alert line was crossed. Majority of them delivered normally (78%) without any operative intervention. Twelve percent women delivered after crossing the alert line but before reaching the action line. Only seven percent women crossed action line. Six out of seven women from this group required caesarean section, mostly for fetal descent abnormalities. Overall, 84% women had normal vaginal delivery and 10 % underwent caesarean section. It was observed that the need for operative intervention in the form of caesarean section increased after the alert or action line were crossed. In the present study, the caesarean section rates for group 1,2 and 3 were 2.46 %,16.66 % and 85.71 % respectively. The results of the present study match with the results of many other studies. The intervention reduced the incidence of prolonged labour and its sequelae .The graphic form introduced by Philpott and Castle (1972) showed that once the alert line is crossed, the attendant is alerted of the possibility of an abnormal situation and crossing of the action line effectively separates the dysfunctional or abnormal labour requiring immediate action. In his prospective study, it was observed that 92.30% cases who delivered before alert line, had spontaneous vaginal delivery and 6.1% had caesarean section. Ventouse was applied in 1.5% . Among those who crossed the alert line, 61.90% had normal vaginal delivery and 33.3% had caesarean section and ventouse was applied in 4.7%. Seventy eight percent of women, who crossed four hourly action line, required some

or the other kind of surgical intervention. After action line, 21.40% had normal vaginal delivery, 71.4% had caesarean section and ventouse was applied in 7.1%[2].

Philpott and Castle series (1972 B) showed that 89.8% of women who delivered before reaching the alert line, had spontaneous vaginal delivery[2]. Ten percent were delivered by vacuum extraction, 0.40% cases had caesarean section. In the same study, cases crossing the alert line and delivering before action line, it was observed that 79.4% had normal vaginal delivery, 20.5% had ventouse extraction and no case required caesarean section. They showed that 72.1% of cases crossing the four hourly action line required some interference (caesarean section rate 20.6% and vacuum extraction 51.6%)[2]. Drouin *et al* (1979)showed that only 1.3% of women delivered within the alert line required medical or operative interventions, while 26.7% of the women, delivered after crossing only the alert line and 72% of the women, delivered after action line had to be intervened before delivery[3].Vaidya P.R *et al* (1985) showed that 99% of the cases delivering before the alert line had normal vaginal delivery and only 1 % of them required forceps application. Of the cases falling outside the alert line 70% had normal vaginal delivery, 26% required forceps application and 4 % required vacuum extraction. 88% of cases with the labour curves crossing the four hourly action line required interference. Forceps application and vacuum extraction were done in 52% cases and caesarean sections were done in 36% cases[4].

Shortri A.N. *et al* (1991) in her study observed that 79.9% primigravidae delivered normal vaginally, 5.7% required caesarean section before alert line was crossed. The incidence of caesarean section was 26.7% in those cases whose alert line was crossed. The *observation* in all the above series show that the surgical operative interference is increased as the labour curve moves to the right of the alert line and it is significantly increased as the labour curve crosses the action time[5].

In the present study, abnormal labour pattern was observed in 15 % of cases. Arrest of descent (46.66 %), protracted descent (26.66 %) and failure of descent (20%) were the commonest abnormalities found. Majority of the women were nulliparas.The reasons for descent abnormalities were mild cephalopelvic disproportion or fetal malpositions. Incidence of arrest of descent was 5-6% in a study carried out by Friedman. These abnormalities were detected in time and women were delivered by caesarean section. The maternal and fetal outcome in these cases was good due to timely intervention. Out of 15 cases, who had abnormal labour pattern, 10 had undergone caesarean section, 4 were delivered by instrumental delivery and one had normal vaginal delivery. In his study 30.4% required caesarean section, 37.6% required mid forceps, 12.7% had forceps rotation and 5.1 % cases had failed forceps. Present study had only one case of labour abnormality related to cervical dilatation. Many authors have reported more protracted cervical dilatational abnormalities as more common than descent abnormalities[3,4,5]. Low incidence in the present study could be due to the active management policy of routine amniotomy done in late active phase of labour. We observed that the duration of first stage significantly got shortened due to amniotomy. The rate of cervical dilatation increased following amniotomy in the active phase of labour.

In the present study, the duration of active phase of labour was 4.02 hours and 7.16 hours in cases with normal and abnormal labour patterns respectively. The duration of second stage of labour was 42 minutes and 92 minutes in cases with normal and abnormal labour patterns respectively. The average duration of active phase of labour was 5.39 hours and 3.7 hours in primigravidas and multigravidas respectively. The total duration of labour was shorter than reported by other workers. It could be due to the routine amniotomy performed during active stage of labour as a protocol of active management of labour. The average first and second stage duration reported by various authors was 7hrs and 45 minutes respectively.[6,7,8,9,10]

In the present study, the rate of cervical dilatation was 1.3 cm per hour in primigravida and 1.7 cm per hour in multigravidas. The rate was slower in women with abnormal labour pattern. The rate of cervical dilatation was more in women, who reported in active phase of labour than women in latent phase of labour. It was more in women with engaged head than with unengaged head .The average rate of cervical dilatation in primigravidae reported by other authors was 1.7cm/hr.[6,11,12,13,14] The average rate of cervical dilatation in the active phase was 1.3 cm/hr.

In the present study, the maternal morbidity was evaluated in relation to the type of labour. The morbidity was 3.52 % in cases having normal labour pattern whereas, it was 53.33 % in cases with abnormal labour pattern. Morbidity was mainly related to infection, blood loss and wound sepsis. Thus, it was more in cases, who had undergone operative interventions. Maternal morbidity was responsible for increase in hospital stay by few days. The average hospital stay was 3.5 days and 8.0 days in women with normal and abnormal labour patterns respectively.

The neonatal morbidity was seen in 14 % of babies. Birth asphyxia was observed in 6 % babies. The incidence was more in women with abnormal course of labour than with normal course of labour. Women with normal labour course had mild form of asphyxia as compared to women with abnormal course. Babies of women with second stage or descent abnormalities had more likelihood of asphyxia. Neonatal sepsis and meconium aspiration were seen in three newborns each. They were seen mainly in women, who had longer duration of labour, multiple internal examinations and operative vaginal or abdominal deliveries. The neonatal morbidities were not serious in nature and all babies survived with routine management.

Conclusion

Graphic record of labour increases the quality of regularity of observations on the mother and fetus, provide early warning for the abnormal progress and assist in early decision for referral, interventions and termination of labour. The safe motherhood initiative emphasizes that the monitoring of labour for early detection of dystocia is one of the most important approaches for reducing maternal and neonatal mortality. Partogram based on WHO model has been used for many years in the peripheral maternity clinics and developing countries in African region.

From the observations of the present study, we conclude that routine use of partogram during labour management help in early detection of abnormal labour, guiding timely intervention, leading to avoidance of problems of prolonged labour and it's sequelae. It assures the best possible maternal and perinatal outcome .It is suggested that every woman in labour must be benefitted by this scientific approach of labour management i.e. with the use of Modified WHO partograph.

References

1. Friedman E. The Graphic analysis of labour. *Am J. Obstet Gynecol.* 1954; 68:1568-1575.
2. Philpott. R. H. and Castle W.M. Cervicographs in the management of labour in primigravidae. I) The alert line for detecting abnormal labour. II) The action line and treatment of abnormal labour. *J Obstet Gynecol Br Commonw*, 1972; 79:592-602.
3. Drouin P, Nasah BT,Nkounawa F.The value of the program in the management of labour. *Obstet Gynaecol* 1979; 53:741-745.
4. Vaidya PR and Patkar LV: Monitoring of labour by partogram. *J Obstet Gynecol India*, 1985: 83(5).
5. Shrotri A.N. Early recognition of abnormal labour in primigravidae. *J Obstet Gynecol India.* 1991:41(3).
6. Friedman E.A. Sachtleben M. R. Station of the fetal presenting part 2: Effect on the course of labour. *Am J Obstet Gynaecol* 1965; 93: 530-6.
7. Duigman N M, Studd JW, Hughes AO. Characteristics of normal labour in different racial groups. *Br J Obstet Gynecol*. 1975; 82:593-601.
8. Studd J.W.W.,Cleg D.R., Sanders R.R., Hughes A.O., *BMJ* 1975 (2): 345.
9. Drouin P, Nasah BT,Nkounawa F.The value of the program in the management of labour. *Obstet Gynaecol* 1979; 53:741-745.
10. Cardozo LD, Gibb DM ,Studd JW, Vasant RV, Cooper DJ: Predictive value of cervimetric labour patterns in primigravidae *Br J Obstet Gynaecol* 1982 ;89(1):33-8.
11. Hendricks CH., Brenner WE. and Kraus G: Normal cervical dilatation patterns in late pregnancy and labour. *Am J Obstet Gynaecol*. 1970;106: 1065-1082.
12. Philpott R.H. Graphic record in labour. *BMJ* .1972: 163-165.
13. Sizer AR, Evans J, Bailey SM, *et al*. A second stage partogram. *Obstet Gynecol*.2000; 96:678-683.
14. Impley L, Hobson J, O' Herlihy C: Graphic analysis of actively managed labour, *Am J Obstet Gynaecol*. 2000; 183(2):438-43.