

Maternal and Fetal Outcome after a Prolonged Latent Phase of Labour

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Abstract

Context: Prolonged latent phase of labour is reportedly associated with labour dystocia and neonatal morbidity. There are few published work on prolonged latent phase and none from this environment.

Objective: To determine if prior labour ward admission with prolonged latent is a predictor of labour dystocia and neonatal morbidity.

Methods: The course and outcome of active phase labour in One hundred and twenty-eight patients with a prior prolonged latent phase was compared with 896 patients who went into active phase labour without a prolonged latent phase. Relevant data was retrieved from the departmental obstetric data bank.

Outcome measures: Labour augmentation, Caesarean section and instrumental delivery rates, Apgar scores and neonatal hospital admission.

Results: Labour augmentation and Caesarean rates were higher and labour was longer among the cases than controls. (50.5 vs 36.4%: $P=0.0001$, 27.3 vs 7.0%: $P=0.0001$ and 7.6 vs 6.2 hrs: $P=0.0028$ respectively). Blood loss at delivery was more and neonatal hospital admission was more frequent among the cases than controls.

Conclusion: Prolonged latent phase of labour is a predictor of labour dystocia and neonatal morbidity.

Key Words: Outcome, Maternal, Fetal, Prolonged Latent Phase of Labour.

Introduction

The concept of labour as being composed of latent phase and active phase hit limelight following the cervical dilatation time curve by Friedman¹ who enunciated the characteristics of the latent and active phase. By the original Friedman's concept, latent phase is generally of low incidence and duration differ for nullipara and multipara and even in the active phase cervical dilatation rate is slower in the nullipara than multipara.² This concept introduced considerable variability and made studies of latent phase difficult to the extent that some workers viewed latent phase as nebulous and ineffectual in labour management and a recommendation that labour refers only to the active phase characterized by observable and measurable cervical os dilatation rate^{3, 4}. Similarly Friedman's concept of prolonged latent phase duration as differing in nullipara and multipara introduced other confounding variables which made published report on prolonged latent phase confusing^{5,6,7}.

The WHO finally recommended that latent phase was an actual entity with normal duration of 8 hours irrespective of age and parity while prolonged latent phase was a duration of over 8 hours in all parities⁸. With this WHO recommendation, what currently is still controversial in latent phase studies is the significant and causes of latent phase which would dictate the management. It is generally believed that normal latent phase implies nothing sinister with respect to later active phase course and outcome. However, several studies associate prolonged latent phase of labour aetiologically with uterine dysfunction that will manifest as ineffectual and uncoordinated contractions⁷ or fetopelvic disproportion and noncompliant cervix

manifesting as slow labour and higher intrauterine pressure which may impair placenta perfusion^{6,7}. Such studies advocate interventional treatment with amniotomy and oxytocin titration to correct the uterine dysfunction or early caesarean section to solve the foetopelvic disproportion and noncompliant cervix. Others who regard latent phase as nebulous advocate that it should be ignored but recommend intervention or reassessment only when active phase commences^{3, 4}. This later stand is supported by recent finding that cervical response to forces of labour when oxytocin is used in latent phase is different and less than optimal compared to its response in active phase labour^{9,10}. This is probably why the increased interventions for delivery in latent phase is associated with poor neonatal outcome¹¹.

WHO recommends that prolonged latent phase management in the absence of any other obstetrics or medical complications, should be either conservation till active phase transformation or intervention with amniotomy and oxytocin titration immediately in order to facilitate faster transformation to active phase¹². Previous studies have emphasized the increased intervention and poor neonatal outcome that can occur when prolonged latent phase is terminated with amniotomy and oxytocin titration^{12, 13, 14}. Some other workers have also reported increased intervention in the active phase of labour in patients who had had prior prolonged latent phase,^{11,15,16} but there has been no similar

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study from this environment even though common obstetrics practice document latent phase as common occurrence. This report present clinical data on the course and outcome of active phase labour in parturients with prior prolonged latent phase managed with observation until establishment in active phase. The aim of this study was to determine if prior labour ward admission with prolonged latent phase is a predictor of labour dystocia and neonatal morbidity.

Materials and Methods

Study definition

- (a) Normal Latent phase is the period from admission in labour to 3cm and 4cm cervical dilatation for nullipara and multipara respectively that is followed by a phase of more rapid cervical dilatation within 8 hours.
- (b) Prolonged latent phase is latent phase duration lasting more than 8 hours.

In our practice, latent phase of labour is managed conservatively with analgesia and sedation with the aim of achieving therapeutic rest. When a patient is diagnosed as being in the latent phase of labour she is given intramuscular Pentazocine hydrochloride 30mg statim with intramuscular Promethazine 25mg. She maybe re-examined in 4 hours with a repeat vaginal examination if uterine contraction persists or mandatory at 8 hours irrespective of the presence or absence of uterine contractions, in order to assess for transformation into active phase. The sedation helps to rest the patient on the journey to active phase. It also separates the parturients who would attain active phase from those who would end up as false labour because it is believed that labour would always progress irrespective of whatever measures are applied.

Methodology

This was a retrospective case controlled study carried out in the Labour Ward of the University of Benin Teaching Hospital, Benin City, between August 1st 1997 and 31st July 2001. All patients admitted into Labour Ward in active phase labour preceded by prolonged latent phase of labour at term were recruited as cases for this study while patients admitted consecutively into the Labour Ward and found to be in active labour de novo at term and patients in active phase with a preceding normal latent phase (duration less than or equal to 8 hrs) were recruited as controls. Excluded from the study were patients with known medical conditions such as diabetes mellitus, hypertensive disorders, heart diseases, multiple pregnancy, malpresentation and abnormal lie, intrauterine fetal death, premature rupture of membranes and previous caesarean section.

All parturients were managed in labour with the aid of the composite partograph on which the alert line was constructed with the woman's admitting cervical os

dilatation in the active phase on a slope of 1cm per hour. The action line on the partograph was constructed 2 hours to the right and parallel to the alert line. Augmentation of labour with oxytocin was carried out only when the cervical dilatation plotting on the partograph touched or crossed the action line and not only on the subjective assessment of the quality of contractions by the palpation method. Analgesia in the active phase was provided with intramuscular Pentazocine hydrochloride. Epidural anaesthesia was not used for any of the parturient. The patients were examined every 4 hours or more frequently when indicated to assess labour progress. The foetal heart rate was checked every fifteen minutes with the Pinard stethoscope and maternal vital signs were monitored every fifteen minutes except the blood pressure monitoring which was done hourly. Caesarean section was performed for maternal or foetal indications. An obstetrics data sheet is completed for all patients after delivery and this information is fed into the computerized obstetric data bank of the department.

For the purpose of this study, information pertaining to the age, parity, duration of oxytocin usage, duration of labour, mode of delivery, Apgar score, birth weight, blood loss and perinatal admissions of the cases and controls was extracted from the departmental obstetric data bank. Data analysis was performed using Instat statistical package. Specific outcome measures analysed were: need for oxytocin augmentation, duration of the active phase labour, vaginal delivery; instrumental delivery and caesarean section rates and neonatal outcome. Chi-Square test and Fisher Exact test were used where appropriate to test for significant difference between proportions in the outcome measures between the cases and controls. A 'P' value of ≤ 0.05 was considered significant.

Results

A total of 5920 patients were delivered in UBTH during the study period (August 1st 1998 to July 31st 2002). Six hundred and ten (10.3%) of these deliveries were preterm while 5310(89.7%) were term deliveries. Of the term deliveries, 1625 were nullipara while 4295 were multipara. During the study period 652 patients presented in latent phase of labour and 466(71.5%) of them had normal latent phase, 58(8.9%) had false labour while 128(19.6%) had prolonged latent phase (study group). Eight hundred and ninety six patients were selected as controls. Of the 896 controls, 430 were admitted in active phase labour while 466 were admitted in latent phase but achieved active phase within 8hours (i.e. had normal latent phase). Seventy (54.7%) of the parturients in the study group were nullipara while 58(45.3%) were multipara. In the control group 458 (51.1%) were nullipara while 438

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(48.9%) were multipara. The incidence of prolonged latent phase in this series was 2.4% of term deliveries with a significantly higher frequency among nullipara than multipara. (4.3 vs 1.4%: $P=0.0001$ OR=2.8) The incidence of false labour was 1.1% of term deliveries.

Table 1 shows the characteristics of the patients and labour outcome in both the study and control groups. The patients with prior prolonged latent phase labour (cases) were significantly younger ($P=0.0001$) and of lower parity ($P=0.0001$) than those without such history (controls). Both the cases and controls were similar with respect to their height. Oxytocin augmentation, augmentation beyond 8 hours and caesarean section following augmentation was more frequent amongst the cases than the controls (72.6% vs 48%: $P=0.0001$; 27.3 vs 21.6%: $P=0.0020$; and 50 vs 16%: $P=0.0001$

respectively). With respect to mode of delivery, the cases (prolonged latent phase) had a significantly lower spontaneous vaginal delivery rate ($P=0.0001$) with more caesarean deliveries ($P=0.0001$) than the control. The frequency of instrumental vaginal delivery was not different in both groups. Blood loss at delivery of 500mls or more was more frequent amongst the cases than control ($P=0.042$).

Table 2 shows the perinatal outcome: The babies of the study group (prolonged latent phase) were significantly bigger than those of the control group. ($P=0.0001$) There was no difference in the Apgar scores at both 1 and 5 minutes in both groups but the frequency of admission into SCBU was significantly higher amongst the cases than in the controls. ($P=0.0001$; OR=6.1)

Table 1:
Characteristics of patients, course and outcome of labour in both study and control.

Data	Study(128)	Control(896)	P value	OR	95%CI
Age*	28.4 (0.38)	31.1(0.37)	0.0001		1.7 - 3.7
Height*	164(0.53)	164(0.21)	0.9990		-1.3 -1.1
Parity*	0.5(0.04)	1.4 (06)	0.0001		0.8 - 1.1
Augmentation & outcome					
Aug	70(54.5%)	326(36.4%)	<0.0001	2.9	1.9 - 4.3
Hrs before *	2 (0.27)	2.4(0.6)	0.1435		-0.1 - 0.9
Duration *	7.6(0.44)	6.2(0.13)	0.0028		-2.3 - -0.5
≤8Hrs	58 (62.4%)	337(78.4%)			
>8Hrs	35(27.3%)	93(21.6%)	0.0020	2.2	1.4 - 3.5
CS rate	35 (50%)	52(16%)	0.0001	5.3	3.3 - 8.5
Overall Labour outcome					
Duration (hrs)	8.3(0.4)	5.9(0.1)	0.0001		-3.3 - -1.5
SVD	81(63.3%)	775(86.5%)	<0.0001	0.3	0.1 - 0.3
Instrumental	12 (9.1%)	58(6.5)	0.2584	1.5	0.8 - 2.9
CS	35(27.3%)	63(7.0%)	0.0001	3.6	2.3 - 5.7
Blood loss *	322.7(16.21)	211.5(5.21)	0.0001		-144.9 - -77.6
	<500	105	815	0.0042	0.3 - 0.8
	23 (18%)	81(9%)	0.0042	2.2	1.3 - 3.7

* mean (standard error of the mean) OR= odds ratio
95%CI= 95% confidence interval
CS=Caesarean section

Table 2:
Perinatal outcome

Neonatal outcome	Study(128)	Control(896)	P value	95% CI
Birth weight*	3.4,(0.04)	3.2,(0.02)	0.0001	-0.3 to 0.1
Apgar score *1	7.1(0.097)	7.1(0.043)	0.9999	-0.2 to 0.2
5	9.6 (0.062)	9.6(0.04)	0.9999	-0.2 to 0.2
Apgar score <=6				
1 minute	16(12.5%)	76(8.5%)	0.1383	0.9 to 2.7
5	4(3.1%)	15(1.7)	0.2824	0.6 to 5.8
SCBU	12 (9.4%)	15 (1.7%)	0.0001	2.8 to 13.3
Admission				OR=6.1

*=**mean (standard error of the mean)**SCBU=**Special care baby unit.****Discussion**

The incidence of prolonged latent phase in this study is 2.4% of all term deliveries, with a significantly higher rate amongst nullipara than multipara (4.3 vs 1.4%; P=0.0001; OR=2.8). Amongst these cases with prolonged latent phase, 54.5% had oxytocin augmentation of labour, 9.1% had instrumental deliveries, 27.3% had caesarean section and 9.4% of the neonates were admitted into special care baby unit. These figures are higher than the corresponding figures in the control group and this clearly shows that prolonged latent phase of labour is associated with increased risk of obstetric intervention in the active phase of labour and neonatal morbidity. Admittedly, this is a retrospective study but the indices evaluated in this study were recorded in the case notes and obstetric data sheet which is completed for all delivered women in the department and fed into the computer data bank of the department. The issue of missing information was therefore not encountered. We also recognize that it is a hospital based study and so the findings may not reveal the true community situation, however it provides sufficient ground to make deductions that may form a template for development in the management of these patients with prolonged latent phase of labour.

A prolonged latent phase incidence of 4.3% and 1.4% found amongst nullipara and multipara respectively in this study is higher than rates reported from previous studies. Cardozo and Studd reported an incidence of 3.5% amongst nullipara, while Friedman found an incidence of 2.3 and 0.44% amongst nullipara and multipara respectively^{2,11}. This difference is attributable to the different criteria used for defining prolonged latent phase of labour. While we considered duration of more than 8 hours as prolonged latent phase irrespective of parity, Cardozo and Studd considered 20 and 14 hours for nullipara and multipara respectively as diagnostic of prolonged latent phase. This study has however

confirmed previous report that prolonged latent phase is commoner among nullipara than multipara^{2,11}.

The frequency of augmentation was significantly higher among the study than the control. The greater need for augmentation in the study group is a manifestation of a contractile abnormality which probably caused the prolongation of the latent phase in such women in the first instance. Prolongation of latent phase may also be as a result of non compliance of the cervix which also has the potential of causing slow progress in active phase. Studd et al¹⁷ have earlier described prolonged latent phase as an aberrant labour pattern for which O'Driscoll and Meagher advocate correction with intravenous oxytocin¹⁸. However, emerging evidence from recent studies recommend therapeutic rest while awaiting spontaneous transformation into active phase as oxytocin use in latent phase causes abnormal cervical response¹⁰. The increased need for oxytocin by patients with prior prolonged latent phase in this study shows that the contractile abnormality associated with prolonged latent phase was not corrected with attainment of active phase of labour as was the situation in 54.5% of the cases in this series, in whom oxytocin was eventually required for treatment. This was significantly higher than the 36.45 augmentation rate recorded amongst the control arm of this study. This finding is similar to a previous report by Maghoma and Buchmann¹⁶ but contradicts a previous claim that the duration of latent phase has little bearing on subsequent course of labour¹⁹. The duration of labour was significantly longer in the cases than controls. This is related to the contractile problem of prolonged latent phase and possibly the noncompliant nature of the cervix. It is instructive to note that there were significantly more nullipara amongst the cases than the controls and inefficient uterine action is commoner in nullipara than multipara²⁰ and as a matter of fact the

most distinctive feature of labour in nullipara is its duration¹³.

Friedman and Sachtleben in 1961,¹⁴ Cardozo and Studd in 1985¹⁵ and recently in 2002, Maghoma and Buchmann¹⁶ reported higher rates of caesarean section and instrumental vaginal delivery amongst patients with prior prolonged latent phase. While our study confirmed the higher caesarean section rate among the women with prolonged latent phase (OR=3.6), we also observed that their babies were significantly bigger than babies of the control group and the commonest indication for caesarean section was cephalopelvic disproportion. It does appear that prolongation of latent phase apart from pointing to a contractile abnormality may forewarn on the possibility of cephalopelvic disproportion in such patients.

With respect to the immediate perinatal outcome as judged by the Apgar scores at one and five minutes,²¹ this study did not find any significant difference in the mean scores between the neonates of both the cases and the controls. However we observed a higher proportion of birth asphyxia at 1 and 5 minutes amongst the cases than in the controls (12.5 vs 8.5% and 3.12 vs 1.7% respectively). Similar findings have been reported^{11, 16}. The increased incidence of birth asphyxia found among the cases may be related to the increased intrauterine pressure that occurs with prolonged latent phase due to a non-compliant cervix²². Another factor of relevance is the duration of labour which was significantly longer in the cases than controls.

This study also revealed that prolonged latent phase increases the risk of neonatal admission into SCBU. About 9.4% of the infants of the study group were admitted into SCBU and this was significantly higher

than the 1.7% admission rate amongst the controls. The main reasons for these admissions were birth asphyxia and neonatal sepsis and these may be attributable to the less than optimal intrapartum environment that is associated with dysfunctional labour which these patients (study) had¹⁵.

The clinical implication of the findings of this study is that prolonged latent phase is not innocuous. It is an indicator for oxytocin augmentation, increased instrumental and caesarean deliveries, and increased neonatal morbidity. The scale of the problem can better be imagined when it is recognized that this was a hospital-based study, and targeted women who were motivated to access formal health services for care. Perhaps the results will be completely different and more revealing if the study was to focus on wider community coverage including those who use informal providers of maternity services. A prospective and community based study using a standardized definition of latent phase duration (WHO)⁸ is suggested. While this is awaited, patients in prolonged latent phase of labour should be identified early by maternity service providers for appropriate management or referral to appropriate facilities as the care may be.

Conclusion

This study has shown that prolonged latent phase of labour is a predictor of labour dystocia and neonatal morbidity. It is an early warning sign of impending difficult obstetric as manifested by a higher intervention rates (oxytocin augmentation and caesarean section) amongst the cases than controls in this study. The babies delivered following a prior prolonged latent phase required more neonatal attention than the controls. Women with prolonged latent phase of labour should therefore be managed in obstetric units with facilities for neonatal care.

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