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Research Article

THE PARTOGRAPH IN THE PHASE OF LATENCY: PREDICTIVE ROLE OF THE ADJACENT ANGLE TO THE HYPOTENUSE ON THE PROGNOSIS OF THE DELIVERY AT THE PRIMIPAROUS PARTURIENT

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ABSTRACT

Introduction: The partograph is used for identifying anomalies in the progression of the delivery labor and indicating the moment for accelerating it before the delivery labor is affected. The maternal and fetal prognosis remains reserved in our hospitals despite the correct use of the partograph. **Aim:** To establish a tool that can predict the outcome of the delivery labor at the end of the cervical latency phase.

Method: we carried out a case-control study for diagnosis at the General Referral Hospital of Oïcha. Inclusion criteria: primiparous parturient at the beginning of delivery labor, with mono fetal pregnancy at term, live fetus, cephalic top presentation. At the end of the latent phase of the cervix: calculation, using the protractor, of the adjacent angle to the hypotenuse formed by the time vector and the equipollent of the dilation vector. Distribution of subjects in 2 groups: those with angle $<45^\circ$ (n = 314) compared to those with angle 45° (n = 314).

The association between the different variables tested in bi-varied analysis by the Pearson chi-square; the association strength by multivariate analysis of significant independent variables (p <0.05) with conditional logistic regression.

Results: The angle $<45^\circ$ was associated with: velocity of dilation $<1\text{cm} / \text{hour}$ in the active dilation phase, delivery labor dragging, Caesarean section, low Apgar score in the 5th minute.

Conclusion: The latency phase has an impact on maternal and fetal prognosis. The calculation of the angle adjacent to the hypotenuse at the end of this phase is useful for early adjustment of work management.

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INTRODUCTION

The partograph is a graphic registration of the progress of delivery labor and the main data on the state of the mother and the fetus [1]. It allow to mark the anomalies in the progression of delivery labor and to indicate the moment for accelerating it a long time before delivery labor feels, that explains its use generalized since 1970 [2]. Early in 1954, Friedman [3] had established the diagram of a normal cervix dilation divided in 2 phases: the first, so-called phase of latency, of a length of 8 at 10 hours corresponds to the erasing of the cervix and its dilation until 3-4cm; the second, named active phase, goes from 4 at 10 cm and takes 5 hours \pm 3 to the primiparous. The importance of this functional subdivision of the cervix dilation does not make the unanimity however among authors. So for some authors [4, 5], a longer length of the latency phase did not have a morbid consequence on the ulterior evolution of delivery labor. On the other hand, others [6,7] had established a morbid correlation between a trailing latency phase and the intervening of a rate raised of the Caesareans, of low scores of

Apgar and prolonged delivery labor. This survey aimed to predict the outcome of delivery labor and the maternal and fetal prognosis according to the degree of opening of the adjacent angle to the hypotenuse calculated at the end of the phase of latency at the primiparous parturient at the General Referral Hospital of Oïcha (GRHO).

MATERIAL AND METHODS

This was a cross-sectional and case-control study which took place from April 1st to September 30, 2012 at the GRHO situated in the province of the North-Kivu, in the Northeast of the Democratic Republic of the Congo. We enrolled 686 primiparous counted among the 2.136 recorded childbirths. We included in this survey, all primiparous admitted in beginning of delivery labor on a mono-fetal pregnancy in term, of good vitality (beatings cardiac rate understood between 120 and 160 per minute), in cephalic presentation of summit and follow upon the partograph until the childbirth. The membranes had to be intact to the admission and the parturient had to not have antecedent of uterine scar and cervical anomalies.

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At the end of the phase of latency of cervix dilation (dilation at 4cm or 8 hours after the beginning of delivery labor), we calculated the adjacent angle to the hypotenuse formed by the vector time (abscissa) and the equipollent of the vector dilation (ordinate). The calculation of the angle made itself with the help of the reporter.

We had considered like “case”, primiparous whose angle was lower to 45° and as “control”, those whose angle was superior or equal to 45°. So for every retained case (n=314), we had kept a control who had given birth rightly after (n=314). If the medical file was not complete, we took the one who followed. Our variables were: the mean speed of dilation at the phase of fast dilation of the cervix, the duration of delivery labor, the mode of childbirth, the score of Apgar at the 5th minute and the perinatal death rate; the explanatory variable was the degree of opening of the adjacent angle to the hypotenuse.

The association between the different explained variables and the explanatory variables was studied and tested in bi-varied analysis, with the help of the Chi square of Pearson (*P* value). We had considered that the difference was meaningful when *P*<0.05 at 95%. To measure the strength of association between independent and dependent variable, we had achieved a multi-varied analysis of the meaningful independent variables (*P*<0.05) with conditional logistical regression. Thus, the adjusted Odds ratio (ORa) and their intervals of confidence (IC) at 95% were used to value the strength of the association at a significance *P*<0.05.

RESULTS

Evolution of delivery labor and the adjacent angle to the hypotenuse

The angle lower to 45° at the end of the phase of latency of the cervix is as factor of bad prognosis with regard to the mean velocity of cervix dilation at the active phase as to the duration of delivery labor and the mode of childbirth (Table 1).

Table 1 Evolution of delivery labor and the adjacent angle to the hypotenuse

	Angle <45° (N=314)		Angle 45° (N=314)		P-value	ORa (IC at 95%)
	n	%	n	%		
Velocity of dilatation						
<1cm/hour	209	66.7	121	38.5	0.0000	3.1749 (2.2904-4.4009)
1 cm/hour	105	33.3	193	61.5		
Duration of the delivery labor						
Normal	181	57.6	274	87.2	0.0000	5.0334 (3.3733-7.5106)
Prolonged	133	42.4	40	12.8		
Mode of delivery						
Normal	200	63.6	282	89.7	0.0000	5.0231 (3.2612-7.7369)
Caesarean section	114	36.4	32	10.3		

Perinatal prognosis and adjacent angle to the hypotenuse

The weak score of Apgar observed at the 5th minute was more frequent in the group of the parturient with an angle <45°. We did not have, however, found a meaningful difference as for the perinatal death rate between the two groups.

DISCUSSION

Evolution of delivery labor and the adjacent angle to the hypotenuse

In our set, we had noted a meaningful correlation between the parturient at whom the adjacent angle to the hypotenuse was

<45° and a velocity of dilation <1 cm/hour at the active phase of cervix dilation. Also the duration of delivery labor was prolonged in the same category.

Table 2 Perinatal prognosis and adjacent angle to the hypotenuse

	Angle <45° (N=314)		Angle 45° (N=314)		P-value	ORa (IC at 95%)
	n	%	n	%		
Apgar at 5th minute						
7	219	69.7	282	89.7	0.0000	3.8228(2.4675-5.9225)
<7	95	30.3	32	10.3		
Perinatal death						
Perinatal death	9	3.0	8	2.6	0.8057	
No death	305	97.0	306	97.4		

These results are comparable to those found by other authors such as Chelmon *et al.* [8] Who had noted, that the weak velocity of dilation prolonging the phase of latency was associated to the dystocies more in the second phase. Maghoma *et al.* [7] had noted also that an overtime of the latency phase was associated to a strong use of ocytocine for increasing of delivery labor for dystocies. Other authors [7-12] had also established a correlation between a trailing delivery labor and the tendency to the caesarean.

These results as ours, contrary to the assumptions of Friedman [13] underline the impact of a bad evolution of the first phase of dilation on the progress of the second and sit the preparatory character of the first [8].

We had also noted, during our survey, a meaningful correlation between an adjacent angle to the hypotenuse <45° at the end of the phase of latency and a frequency raised of childbirth by caesarean.

Cheng *et al.* [14] had found a strong association between a prolonged latency phase and the intervening of the caesareans [(OR = 2.28 (1.92-2.72)].

Many authors had also noticed a correlation between the overtime of delivery labor and the tendency to the caesarean [8, 7, 11,15].

On the other hand, the authors Sandra [4], Gurewitsch *et al.* [16], Leah [5], in their different works, had not found any morbid consequence on the ulterior evolution of delivery labor when the phase of latency lasted longer.

It can be explained by the particular management of this kind of problem in each maternity permitting this management of the risk in relation with the trailing latency phase.

Perinatal prognosis and adjacent angle to the hypotenuse

We had observed that the weak score of Apgar (<7) of the newborns at the 5th minute was raised more in the group of the parturient that had an adjacent angle to the hypotenuse <45° at the end of the phase of latency.

Allen *et al.* had noticed also that the risk of perinatal morbidity, expressed by low scores of Apgar, was raised appreciably when the active phase of cervix dilation was prolonged.

Ayangade [12] in Nigeria had found a meaningful correlation between a trailing latency phase and a weak score of Apgar at the 5th minute ($P < 0.05$). Cheng [14], in California had found the same type of association also with a P -value of 0.02.

The hypoxie, during delivery labor, had been made responsible, by some authors, of neonatal depression [7, 18, 19] of a raised number of neonatal deaths yearly [7, 20, 21, 22,23] but also of the survivors susceptible to develop neurological troubles as the cerebral motor infirmities, the mental delay, behavior troubles, blindness [8, 16, 22, 24].

For Fournié *et al.*, a prolonged delivery labor exhausting the reserve in oxygen of the room intervillous comes with ventilation trouble, hypocapnia and a major respiratory alkalosis that decrease the placental debit and driven to fetal suffering.

Batungwanayo *et al.*, in Rwanda, had found that parturient whom the duration of delivery labor varied between 11 hours and 24 hours had given 52% of newborns with low score of Apgar against 1.23% when this duration was lower than 10 hours. In its set, none of the women not having made more than 24 hours of delivery labor had given some newborns with good score of Apgar.

CONCLUSION

The adjacent angle to the hypotenuse, lower than 45° at the end of the phase of latency of the cervix dilatation, is a predictive factor determining bad maternal prognosis and fetal because independent of the caesarean, of low score of Apgar and trailing delivery labor. Its management during the surveillance of delivery labor would permit to anticipate the complications and to improve the maternal and fetal prognosis.

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