

Effect of labor duration on fetal fibrinolysis

A pilot study

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ABSTRACT

Objective: Activation of neonatal and maternal fibrinolysis at birth has been shown earlier. To evaluate further on the effect of labor duration on the fetal fibrinolysis, we conducted this preliminary study.

Method: An indirect assessment of activation of fetal fibrinolysis was carried out, by measuring the cord blood D-dimer. The cord blood samples were obtained randomly from 11 women undergoing vaginal delivery at term. Specimens were analyzed within 2 hours by using latex agglutination test. Pregnancy details were obtained from the delivery ward register.

Results: The mean duration of labor was noted to be 5.4 hours (3.5- 9.46). The mean maternal age was 25.5 years

(21-34). The mean gravidity was 2.4 (1-5) and the mean parity was 1.4 (1-4). No effect of duration of labor on the cord blood D-dimer concentration was observed.

Conclusions: Our findings suggested that it is not the time or duration of labor process that is involved in the activation of fetal fibrinolysis. The role of uterotropins and uterotonins (oxytocin, prostaglandins and endothelin-1), in activation of fetal fibrinolysis, should be evaluated in further studies.

Keywords: Labor duration, fetal fibrinolysis, cord blood, D-dimer.

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Activation of neonatal and maternal fibrinolysis at birth has been shown earlier.¹ In a recent study, Murtha et al² studied the effect of labor on the fetal fibrinolytic activity by measuring umbilical venous D-dimer concentrations. They found elevated levels of cord blood D-dimer concentration in laboring women, concluding that the labor process activates the fetal fibrinolytic activity. A possible explanation offered, by them, was some degree of trauma, asphyxia or acidosis associated with the process of labor and delivery. To further evaluate the relationship between fetal fibrinolysis and the duration of labor, we conducted this preliminary study. An indirect assessment of activation of fetal

fibrinolysis was carried out by measuring the cord blood D-dimer, as described earlier.² The proof that the cord D-dimer is of fetal origin comes from its larger size and that it cannot cross the placenta.² Hudson et al,³ also reported variable D-dimer concentration in neonates born to women with low D-dimers, confirming trans-placental passage to be unlikely.

Methods. Details of labor were collected from the Register of the labor and delivery unit. The cord blood samples were obtained randomly from 11 women undergoing vaginal delivery at term. Term

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Table 1 - Sub-division of cases according to the agglutination response.

Number of cases (Total = 11)	D-dimer (ug/ml)	Total duration of labor (mean)
7	< 0.5	7.17 hours
1	0.5 - 1	5.15 hours
1	2 - 4	6.30 hours
2	> 8	4.02 hours
No cases for 1-2 and 4-8 agglutination response		

labor was defined as at least 37 completed weeks of gestation. Women were excluded from study if there was evidence of pre-eclampsia, abruptio placenta, fetal growth retardation or having cesarean section. Immediately after the delivery of the infant, the umbilical cord was doubled clamped near the umbilicus. Following delivery of the placenta, a 3rd clamp was placed close to the site of the umbilical insertion. Cord blood was aspirated and placed into tubes containing sodium citrate. Specimens were analyzed within 2 hours by using latex agglutination test (D-Di Test, Diagnostica Stago, France), as described.⁴

Results. Table 1 shows the values for D-dimer and duration of labor subdivided according to the agglutination response. The mean duration of labor was noted to be 5.4 hours (3.5- 9.46). The mean maternal age was 25.5 years (21-34). The mean gravidity was 2.4 (1-5) and the mean parity was 1.4 (1-4). All neonates were born at term with good Apgar scores and with the mean birth weight of 3295 grams (2670-3940). Male to female ratio was 6:5. We noted that duration of labor had no effect on the

cord blood D-dimer concentration (Table 1). Statistical tests were not applied due to the small sample size.

Discussion. Our study confirmed the findings of Murtha et al² with respect to labor activating the fetal fibrinolysis. However, we noted no relationship between duration of labor and cord D-dimer (Table 1). This suggests that it is not the time or duration of the labor process that is involved in the activation of fetal fibrinolysis. The role of uterotropins and uterotonins (oxytocin, prostaglandins and endothelin-1), in activation of fetal fibrinolysis, should be evaluated in further studies, as these factors are shown to be responsible in initiation of labor.⁵ Another interesting question that needs further evaluation is: Is the activation of fetal fibrinolysis during labor a physiological response or a pathological consequence?

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