

THE ONSET TIME OF LACTATION AFTER DELIVERY

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ABSTRACT

Background: As any delay in the onset of milk production and ejection in the first few days after delivery can cause breast-feeding failure, this study has been done to determine factors that may affect the onset time of lactation in vaginal and cesarean section deliveries with and without labor pain (elective).

Methods: 300 parturient mothers selected from two private and university hospitals were divided in three separate groups (each consisted of 100 cases) according to their delivery type [vaginal and cesarean section with and without pain (elective)], interfering factors like mothers' or newborns' illnesses were omitted, the needed information about filling of breasts and milk ejection was given to mothers before parturition, then a questionnaire was provided and offered to them, data collected and statistical analysis carried out.

Results: There was a meaningful difference between average time of milk-ejection in groups with different types of delivery ($p=0.001$), but no difference was found between elective cesarean section and cesarean section with labor pain ($p=0.741$).

We found that milk-ejection time has a strong correlation with type of delivery ($r=0.510$) and also the time of taking the neonate back to mother ($r=0.256$), and this correlation is statistically meaningful ($p=0.000$).

Conclusion: Any kind of stress including cesarean section may postpone milk ejection by hormonal inhibition for a few days after delivery and this will result in newborn weight loss and failure of nursing by the mother. So, to support breast feeding in our country, the rate of cesarean section must be wisely diminished, vaginal delivery encouraged, and after delivery every newborn taken back to his or her mother as soon as possible for nursing.

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INTRODUCTION

Breast milk is generally known as the best form of feeding for neonates and infants. Human milk has

bioactive properties that facilitate the transition of life from in-utero to ex-utero.^{1,2}

The first postpartum week is a critical period for establishment of breast feeding. Normally, during the first two days after parturition a minimal amount of milk is produced, but it will increase significantly after the 2nd to 3rd postpartum day when lactogenesis II occurs in response to the falling progesterone level.³

Sociocultural factors are strongly associated with the initiation of breast feeding; therefore lactation problems are common even among mothers who are highly moti-

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vated to breastfeed. Problems such as delayed onset of lactation and suboptimal behavior of newborns to accept breastfeeding, especially in those exposed to labor medication during delivery, are frequently reported.⁴

Lactation difficulties during the first postpartum week are associated with greater risk for early termination of breastfeeding.^{5,6}

Several risk factors have been associated with delayed onset of milk production, including primiparity,^{6,7,8} cesarean section delivery, stress during labor and delivery,^{4,7,9} maternal diabetes¹¹ and high maternal body mass index (BMI).^{4,12}

Lactogenesis has been divided into two stages:^{3,13}

Stage I (late pregnancy): Alveolar cells are differentiated from secretory cells.

Stage II (from the 2nd or 3rd to 8th day after birth): the tight junction in the alveolar cells closes. Copious amounts of milk are secreted under supply-demand control.

During the second stage of lactogenesis, breasts gain the capability of milk production. For the ongoing synthesis and secretion of human milk, hormonal signals must be continuously received by mammary glands. These signals are generated directly in response to stimulation of nipple and areola, and then relayed to the central nervous system. This cyclic process of milk synthesis and secretion is termed lactation. There are two hormones that assist lactation; prolactin and oxytocin.¹³

Animal studies indicate that various types of stressful stimuli can suppress lactation, but there is much less information in humans. Experimental studies in nursing mothers have showed that acute physical or emotional stress can impair the milk ejection reflex by reducing the oxytocin release during a feed. If this occurs repeatedly, it can reduce milk production by preventing complete emptying of breasts at each feed.^{8,10} Prospective observational studies indicate that both maternal and fetal stresses during labor and delivery (e.g. urgent cesarean section or prolonged labor in vaginal deliveries) are associated with delayed onset of lactation.^{4,7,9,10}

The weighing test is the gold standard for documenting lactogenesis stage II. However, this method is practically useless in population studies, but maternal perception of the onset time of lactation is a useful proxy method for lactogenesis stage II.¹⁴

Because cesarean section is frequently used in our community as the major method of parturition, it may play an important role in delayed onset of lactation.

The main purpose of this study is to determine

the onset time of lactation after vaginal and cesarean section (with and without labor pain) deliveries.

PATIENTS AND METHODS

This case-control prospective study has been carried out in one private and one university hospital during September 2003 to September 2004. Three-hundred parturient mothers were selected and categorized upon their method of delivery in three equal groups of one hundred cases (vaginal, cesarean section with labor pain and elective cesarean section deliveries).

All following conditions were excluded:

1. Mothers with diabetes mellitus, cardiovascular disorders and other acute or chronic diseases.
2. Mothers who had a BMI greater than 27.
3. Mothers with puerperal complications or who needed postpartum care, because of any problematic parturition.
4. Prolonged labor in vaginal delivery.
5. Mothers with surgical or non-surgical breast disorders.
6. Smoker mothers or illegal drug abusers.
7. Mothers whose newborns had been separated from them for any reason.
8. Mothers with newborns suffering from any type of malformation, including: cardiac, pulmonary, neuromuscular and skeletal anomalies, cleft lip or palate and who were suspicious to have chromosomal abnormality or sucking disability.
9. Mothers with low birth weight infants (less than 2500 grams at birth).
10. Mothers with premature infants born before 36 weeks of gestation (according to Ballard score) whose sucking reflex might be weak.¹⁵
11. Mothers whose newborns had been roomed in one hour or more after vaginal delivery and five hours or more after Cesarean delivery.
12. Newborns fed with dextrose solution or formula after birth.

A questionnaire containing needed variables and data was offered to parturient mothers after being taught and given necessary information. All cases have been followed up at their homes and questionnaires recollected within 10 days.

After data collection we analyzed them by SPSS software and evaluated the meaningfulness of the difference between qualitative variables by chi-square test and between the average of quantitative variables by independent-test for two groups and by ANOVA test for three groups.

RESULTS

This study covers three groups (including: vaginal

Table I. The first milk ejection time.

Milk ejection time (hours)	No.	Percent	Milk ejection time (hours)	No.	Percent
-24	1	0.3	14	5	1.7
0	4	1.3	15	12	4
0.5	1	0.3	16	4	1.3
1	14	4.7	17	8	2.7
1.5	5	1.7	18	12	4
2	29	9.7	19	2	0.7
2.5	1	0.3	20	2	0.7
3	18	6	21	1	0.3
4	27	9	22	1	0.3
5	22	7.3	24	4	1.3
6	10	3.3	30	1	0.3
7	32	10.7	31	1	0.3
8	20	6.7	35	1	0.3
9	15	5	36	1	0.3
10	12	4	38	1	0.3
11	11	3.7	48	3	1
12	16	5.3	Total	300	100
13	3	1			

delivery and Cesarean section, with pain and elective) each consist of 100 parturient mothers. The results are as follows:

Mothers' age

The age average of all cases was 26.2 years; it was 25.93 years for vaginal delivery, 26.02 for cesarean section with pain and 26.64 for elective Cesarean section cases, which showed no meaningful difference between these three groups ($p = 0.555$).

Mothers' parity

The average number of parity for all mothers was 1.56; it was 1.83 parturition for vaginal delivery group, 1.52 for cesarean section with pain and 1.35 for elective cesarean section group. There were 182 primipara mothers among all groups. The difference in number of parity is statistically meaningful ($p < 0.0001$).

Feeding of previous child(-ren)

108 mothers (36% of all cases) had breastfed their previous child, 9(0.3%) cases used formula and one mother had used both breast and bottle-feeding. This shows that breastfeeding is highly preferred ($p < 0.0001$).

Duration of breastfeeding in previous infant

The average duration of breastfeeding in 109 mothers of all groups was 21.4 months; it was 21.5 months for vaginal delivery, 19.3 months for cesarean section with

pain and 23.3 for elective Cesarean section cases. Their meaningful difference was shown by statistical analysis ($p < 0.009$). Mothers with vaginal delivery have breastfed their previous infants at least for 10 and at most for 36 months, these periods are respectively 3 and 24 months for mothers who have undergone cesarean section with pain and 12 and 24 months for mothers with elective cesarean section.

Gestational age and type of delivery

Among all 300 studied cases, there were 272(90.6 %) term and 28(9.4 %) premature deliveries. The term and preterm deliveries in each type of parturition are as follows, respectively: in the vaginal delivery group 90(90%) and 10 (10%); in cesarean section with pain 82(82%) and 18(18%). In the elective cesarean section group all (100%) cases were term deliveries. The differences of maturity and prematurity rates between studied delivery groups are statistically meaningful ($p < 0.001$).

Interval between delivery and onset of breastfeeding

The average time between delivery and onset of breastfeeding in vaginal delivery group was "35 minutes", it was "4 hours and 39 minutes" for all cesarean section cases. This difference is statistically meaningful ($p < 0.0001$).

Time of milk ejection

The average time needed for first milk ejection in 300

Table II. The average time of first milk ejection in different types of delivery.

Parturition method	Average time of first milk ejection (hours)	CI 95	P-value
Vaginal	2.02	2.89 - 6.93	<0.001
Cesarean section with pain	10.61	8.74 - 12.49	
Elective cesarean section	10.99	9.75 - 12.23	

Table III. Correlation between different variables in mothers and lactation onset.

Lactation onset time	Mothers age	Gestational age	Months of breastfeeding in nursing of previous child	Interval between delivery and breastfeeding	Number of parity	Type of delivery	Feeding method of previous child
R	0.012	0.040	0.046	0.256	-114	0.510	0.181
P	0.419	0.247	0.316	0.000	0.024	0.000	0.025

studied cases was “7 hours and 54 minutes” after delivery. The least interval was 240 hours before and the latest recorded interval was 48 hours after delivery.

Table I shows the variations in milk-ejection time.

The average time of first milk-ejection in each type of delivery is shown in Table II.

Statistical analysis revealed that difference in average time of first milk-ejection between vaginal and Cesarean section delivery groups is meaningful ($p=0.001$), but it has no meaning between the two studied cesarean section delivery groups ($p=0.741$).

Relation and correlation between studied variables and onset time of lactation are shown in Table III.

According to Table III, there is a correlation between lactation-onset time and delivery method and time of delivering the newborn to the mother, and this relation is meaningful. Lactation-onset time has a reverse correlation with the number of parturitions, but despite its meaningfulness, this correlation is not strong.

The correlation between lactation-onset time and months of breastfeeding and nursing of a previous child, mother's age and child's gestational age are too weak and statistically meaningless. The correlation between lactation-onset time and feeding method of a previous child, in spite of its meaningfulness, is weak.

DISCUSSION

Breastfeeding plays an important role in reducing the neonatal mortality rate, therefore it should be strongly encouraged by programs attempting to reduce neonatal mortality, especially in developing countries.¹⁶

Lactation difficulties during the first postpartum week are associated with greater risk for early termination of breastfeeding.^{5,6}

Cesarean section delivery was a risk factor for sub-optimal infant breastfeeding behavior on day 0 and delayed onset of lactation.^{4,17} Other researchers have also reported that cesarean section is linked with delayed onset of lactation^{4,8,9} and excessive infant weight loss,¹⁸ although not all studies have shown an association with difficulties in initiation of lactation.¹⁷ In multivariable models, both modes of delivery (particularly an urgent cesarean section) and duration of labor were linked to delayed onset of breast fullness. Both of these are strongly related to the amount of stress experienced by both the mother and the infant during parturition.^{7,10} In a study by Vestermark et al, infants delivered by vacuum extraction or cesarean section started suckling somewhat later, they were more often fed with formula, and less often breastfed during nights, and their mothers started lactation later.⁹ In another study done in Mexico, cesarean section was a risk factor for not initiating breast feeding or shortening of breastfeeding to a period of less than one month. It was unrelated to breastfeeding duration among women who nursed their child for one month or more. It is advisable to provide additional support for nursing mothers who have delivered via cesarean section, during the early postpartum period.¹⁹

The time of first breastfeeding and its frequency in the second postpartum day positively correlated with milk volume in the 5th postpartum day.⁷ This suggests that earlier milk removal after birth, can increase the efficiency of milk secretion.²⁰ Generally, all stresses to the

mother and neonate during labor and delivery are risk factors for delayed lactogenesis because they impair the milk-ejection reflex by affecting oxytocin release.^{3,21} Our study showed that the average time needed for first milk ejection has a meaningful correlation with vaginal delivery and the time interval between delivery and taking the neonate back to its mother. In this type of delivery breast milk will be secreted sooner. The earlier every neonate is taken back to his or her mother, the sooner he/she will start sucking the nipples, thus providing more stimulation for milk production and ejection and resulting in continuation of nursing. Whereas in cesarean section delivery, with or without labor pain (elective), the onset of milk ejection will be delayed. There is no significant difference in the onset of milk ejection between the two types of Cesarean section. This shows that despite oxytocin secretion during labor pain, the stress of surgery will postpone the milk ejection by blocking the oxytocin effect. On the other hand, these mothers will start breastfeeding lately because of postoperative adverse effects, which in turn decrease lactation. This study showed that the time of first milk ejection has no relation with mother's age, duration of gestation and kind and length of previous child's feeding. In multipara mothers who had a great experience of child nursing, the time of first milk ejection has an inverse correlation with number of parity, but although this relation is statistically meaningful, it is not strong. Our study like similar studies in other countries, shows that cesarean section is a risk factor for postponing maternal lactation and because this delay may cease milk production, we advise to reduce the frequency of cesarean section, which is done at a high percentage in our society, and to teach breastfeeding techniques to mothers who are candidates of cesarean section, before parturition. It is advisable to obstetrical hospitals to apply rooming in and take the neonates back to their mothers as soon after delivery as possible, as this can play a major role in initiation and continuation of lactation.

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