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Colostrum Total Protein Content in Iranian Boy and Girl-Delivered Mothers

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ABSTRACT

Purpose: To evaluate colostrum total protein differences between left and right breasts and between mothers of boy and girl infants.

Materials and Methods: A cross sectional study for delivery was carried out on 30 boy-delivered and 30 girl-delivered mothers aged 16 to 36 years, conducted at the Izadi and Al-Zahra Hospitals in Qom city, Iran. Colostrum was collected from both breasts by manual milking within the first day of delivery. Total protein concentration was assessed by Biuret method using affiliated kits. The data was analyzed through the student's t-test using the SPSS program.

Results: Colostrum total protein was significantly higher in the left (166.9±13.1 mg/ml) and right (165.3±14.7 mg/ml) breasts of the boy-delivered mothers than in the left (144.8±4.1 mg/ml) and right (122.7.3±7.4 mg/ml) breasts of the girl-delivered ones. It was also significantly higher in the left breast than the right breast in the girl-delivered mothers. However, there was no significant difference between the two breast colostrum total protein levels in the boy-delivered mothers.

Conclusion: The results of the present study suggest that total protein of colostrum in the boy-delivered mothers is greater than the girl-delivered mothers.

Keywords: humans; peptides; isolation & purification; colostrum/physiology; milk proteins.

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INTRODUCTION

Colostrum (also known as first milk or "immune milk") is a form of milk produced by the mammary glands of mammals in late pregnancy and few days after giving birth. Colostrum is thick lemon yellow and lasts for 2-4 days after the start of lactation.[1] Newborns have very small digestive systems, and colostrum delivers its nutrients in a very concentrated low-volume form. Colostrum is important for the nutrition, growth, and development of newborn infants and contributes to the immunologic defense of neonates. The composition of breast milk changes in order to meet the specific needs of the growing infant. Colostrum and milk contain many factors that can influence cell growth, differentiation, and function.[2,3] Colostrum is high in carbohydrates, protein, micronutrients in the form of vitamins and minerals and other bioactive molecules, including growth factors according to the needs of neonates and low in fat (as human newborns may find fat difficult to digest).[1,3,4]

Mothers may not breast-feed for numerous reasons,[5] such as previous difficulty with breast-feeding, knowing someone who had difficulties, perceived nipple anomalies (inverted nipples), or previous breast reduction or augmentation surgery. Even the mother who intends to breast-feed may be dissuaded by incidents such as embarrassment during early attempts or lack of the milk ejection (let-down) reflex. This reflex, which moves milk to the areolae, is inhibited by pain, anxiety, stress or smoking and may cause the mother to abandon her efforts to breast-feed. So alternate safe colostrum or milk is required. Infant

formulas have a difficult gap to fill. They must mimic breast milk as closely as possible. Yet it is difficult to produce a formula equal in all respects to breast milk for boy and girl infants, because its exact chemical composition is not yet known.[6,7] There were a few reports about colostrum and milk differences between boy-delivered and girl-delivered mothers. It was shown that milk production in boy-delivered mothers is greater than in girl-delivered ones.[8] So in the first step we want to determine whether colostrum total protein for boy-delivered mothers differs from those for girl-delivered ones.

MATERIALS AND METHODS

Study Subjects

This cross sectional study involved thirty healthy boy-delivered mothers (average age 25.4, ranging from 16 to 35 years) and thirty healthy girl-delivered mothers (average age 25.1, ranging from 17 to 36 years) admitted to Izadi and Al-Zahra Hospitals in Qom city, Iran, for delivery in summer 2011. All subjects had delivered healthy full term infants more than 2.5 kg, had less than two pregnancy precedents and did not experience any complication during pregnancy and at delivery. The nutritional condition of each subject was judged to be good, based on clinical observations.

Informed consent was obtained from the mothers and the Ethics Committee of Qom University of Medical Sciences, Qom, Iran, approved the study protocol.

Colostrum Collection and Analysis

After washing the hands with water and soap, the colostrum was collected from both breasts by manual milking within the first day of delivery. Approximately 0.5 mL from each breast was obtained directly into clean polyethylene bottles. Immediately after collection of colostrum the specimens were stored at -70°C for later determination of total protein concentration. It was assessed colorimetrically by Biuret method using affiliated kits (Ziest Chem Diagnostics, Tehran, Iran).[9]

Statistical Analysis

For statistical analysis, the data are presented as mean ± SEM. The 2-tailed Student paired and unpaired *t*-test was used. *P* less than .05 was considered statistically significant.

RESULTS

The mean left and right breasts colostrum total protein levels in boy and girl delivered mothers are shown in Figure 1. According to student's unpaired t-test, the right breast total protein of the boy-delivered mothers (165.3±14.7 mg/ml) was significantly higher than the right breast total protein of the girl-delivered mothers (122.7.3±7.4 mg/ml). The left breast total protein of the boy-delivered mothers (166.9±13.1 mg/ml) was also significantly higher than the left breast total protein of the girl-delivered mothers (144.8±4.1 mg/ml). There was a significant difference between the mean left (144.8±4.1 mg/ml) and right (122.7.3±7.4 mg/ml) breasts colostrum total protein levels in the girl-delivered mother according to student's paired *t-test*. However, there was no significant difference between the two breast colostrum total protein levels in the boy-delivered mothers.

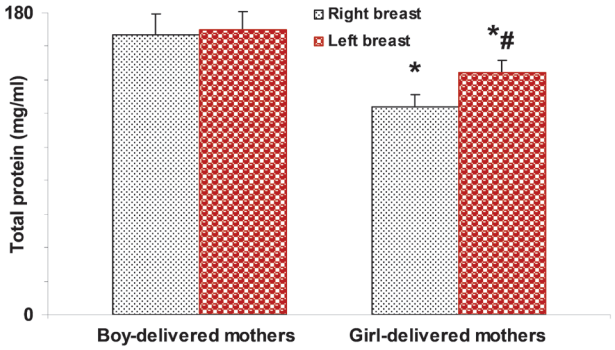

Figure 1. The left and right breast colostrum total protein of boy and girl- delivered mothers. Data are expressed as means ± SEM. *Different from boy-delivered mothers in the same side and # different from right breast of the same mothers, *P* = .05.

DISCUSSION

Colostrum is universally acknowledged as the perfect first food for infants.[10] Human colostrum is an important source of protective, nutritional and developmental factors for the newborn. The aim of this study was to compare the colostrum total protein levels in the mothers of boy with mothers of girl infants. We found that, on average, colostrum total protein in mothers of girl infants was lower than in mothers of boy newborns, and in the left breast was higher than in the right breast in the mothers of girl infants.

Differences in milk production of right and left breasts have been noted previously.[11-13] It has been shown that there was a significant difference between breasts, with the right breast being more productive.[11,12,14] We have found that total protein of the left breast colostrum is greater than the right breast which is consistent with Weaver and colleagues,[15] who reported the concentration of IgA milk obtained from the left breast was significantly higher than those obtained from the right breast.

There are many reports about colostrum composition. Colostrum is relatively low in folate,[16] calcium and phosphorous,[2] fat,[17] but high in Zinc, Fe, K and Na,[2,18]

vitamin E,[17] and Immunoglobulin A,[19] compared to mature milk. To the best of our knowledge there had been no report about differences of colostrum composition between mothers of boy and girl infants and this study has provided the first analyzed survey of the colostrum total protein of Iranian mothers. Our data indicate that colostrum total protein in boy-delivered mothers is significantly higher than in girl-delivered mothers. Kent and colleagues showed a significant difference between the total breast storage capacity and milk production for mothers who were breastfeeding boys compared with those who were breastfeeding girls.[8] They were greater in boy-delivered mothers. The results suggest that the composition of colostrum seems to be different in the boy and girl-delivered mothers and the addition of different substances may be beneficial in designing milk formulas for girl and boy infants.

Our research had not planned for day-to-day collection of colostrum and milk, because we anticipated and experienced resistance from the study participants, so we took only one sample of colostrum. There were other limitations to this study, e.g., we did not study the other components of colostrum such as lipids. Further studies are needed to clarify the composition of colostrum or milk in mothers of boy and girl infants.

CONCLUSIONS

The results of the present study suggest that the composition of colostrum seems to be different in the boy and girl-delivered mothers and the left breast colostrum total protein is greater than the right and it is higher in boy-delivered mothers.

CONFLICT OF INTEREST

None declared.

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