EVALUATION OF SOME ANTI-INFECTIVE FACTORS IN PRETERM AND FULLTERM HUMAN COLOSTRUM

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INTRODUCTION

Many studies have found that enteric and respiratory infections are less common among breast fed infants (Cunningham, 1981). This protection has been attributed to the wide spectrum of immunologic agents in human milk. While many studies had investigated these agents in breast milk of mothers delivering full-term, the information about these factors in colostrum from both term and preterm mothers is scanty (Gross et al., 1981 and Suzuki et al., 1983).

In this study we measured concentrations of Ig G, Ig M and Ig A, the total cells, macrophage, lymphocyte and neutrophil counts in colostrum samples collected during the first 4 days postpartum from mothers giving birth prematurely and compared them to those obtained from mothers of full-term infants.

MATERIALS AND METHODS

This study was restricted to 40 women 20 to 36 years of age (mean age, 28 years) who elected to breast feed. They were recruited into one of two groups depending upon the progress of pregnancy :

1st group : 20 mothers giving birth between 32 and 36 weeks gestation (mean 34.8 weeks).

2nd group : mothers giving birth between 38 and 42 weeks gestation (mean 40.2 weeks).

Mothers in both groups were of the same socioeconomic background and did not differ with respect to race, age pariety or nutritional status. All of them were without any evidence of systemic disease.

Complete manual emptying of breast was done at same time (10-12 am) to avoid error due to diurenal variations on the 2nd post partum day.

Immediately after expression, 10 c.c. of colostrum was centrifuged. The supernant whey was sucked out and stored at deep freeze for later estimation of immuno globulins.

Pellet found at bottom of tube was resuspended in WBC diluting fluid. The differential cell count was performed after staining. Quantitation of Ig A,G and M was done by radial immuno diffusion method.

RESULTS

In pre-term colostrum, the concentration of Ig A was found to be significantly higher than that of term colostrum ($P<0.001$). These values are shown in table 1 pre-term colostrum shows significantly higher counts for total cells, macrophages, lymphocytes and neutrophils as compared to those of fullterm colostrum (table 2).

DISCUSSION

In this study, Ig A concentration in colostrum of preterm women was found to be significantly higher than that of term woman. Such difference was not found in either Ig G or Ig M concentration. Gross et al. (1981) were the first to demonstrate on elevated Ig A concentration in colostrum and milk produced by mothers delivering pre-term babies.

However Brooke et al. (1980) analysed pre-term & fullterm milk and found no significant difference in levels of Ig A. Milk Ig A appears to be produced in mammary glands by B-lymphocytes derived from gut associated lymphoid tissue, therefore, many antibodies formed in milk are directed against enterobacterial antigen (Hanson et al., 1980 and Ahlstedt et al., 1975).

Such passive immunity provided to the infant by secretory antibody in colostrum is important during the early neonatal period, when local intestinal immunity is incompletely developed. Terms infants are unable to produce intestinal Ig A for 2-3 weeks after birth (Selner et al., 1968). Pre-term have even greater limitation of gastrointestinal funciton and of immunologic status and are particularly susceptible to: diseases of altered intestinal host defences such as necrotizing enterocolitis (Walker, 1976).

The pre-term infant fed on early "pre-term colostrum" would receive significantly more Ig A antibodies than those supplied by milk from mothers of term infants. Thus the mothers of pre-term infants are the preferred source of human milk for their infants.

Total cell count in colostrum ranged widely from 500-10000/mm^3 in various studies (Lawton & Shortridge, 1977 and Ogra & Ogra, 1978). All cell counts were significantly higher in pre-term colostrum as compared to full-term with macrophages forming the main bulk (59.32%) followed by lymphocytes (26.66%) and neutrophils (14%). Macrophages in colostrum are the active phagocytic cells. They synthesize complement factors, lysozyme and lactoferrin. B-lymphocytes produce Ig A in mammary glands. Neutrophils are phagocytic cells and contain lactorferrin which inhibits growth of various organisms (Mathur et al., 1990).

In this study the concentration of certain components of immunologic system in human colostrum were found to be altered in pre-term colostrum. It has been suggested that pre-term colostrum is better adapted to protect the premature infant because of its higher concentration of Ig A and various anti-infective cells. The cause of such enhanced immunologic composition is not known but, Goldman et al. (1982) suggested that the entero-mammary gland pathway of Ig A production is active in woman who deliver prematurely and that the conditions that initiate premature delivery cause these alterations in immunologic system seen in pre-term milk.

SUMMARY AND CONCLUSIONS

Colostrum was collected and analysed from 20 mothers delivering prematurely and 20 delivering at term. Concentrations of immuno globulins G,M, and A were measured by radial immuno diffusion method. Total cell, macrophage, lymphocyte and neutrophil countrs were performed. The mean concentration of Ig A of pre-term colostrum was significantly higher than in full-term colostrum. Ig G and Ig M were found to be similar in both groups. Total cells, macrophages, lymphocytes and neutrophils counts were significantly higher in preterm colostrum than full-term colostrum.

Table (1) : Concentration of immnoglobulins in pre-term and full-term colostrum.

	Preterm			Fullterm		
	IgA	IgG	IgM	IgA	IgG	IgM
Range	8.7-17.6	0.16-0.64	0.7-.27	3.9-6.1	0.18-0.39	0.3-2.1
Mean	12.86	0.31	1.71	5.16	0.26	1.20
S. D.	±2.81	±0.11	±0.65	±0.68	±0.06	±0.53

Table (2) : Cell counts in preterm and fullterm colostrum.

	Preterm				Fullterm			
	Total	Macrop-hages	Lymph-ocytes	Neutro-phils	Total	Macrop-hages	Lymph-ocytes	Neutro-phils
Range	4.150-9.510	2490-49.20	1080-2663	580-1750	2650-3850	1490-1965	830-1270	385-930
Mean	6588.5	3908.4	1756.4	924.7	3090.75	1613.3	981.75	517.45
S. D.	1243.81	736.85	361.45	265.78	272.92	144.86	106.32	107.38

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تقييم بعض العوامل المضادة للعدوى فى لبأ البشر مكتملى مدة الحمل وغير مكتملى مدة الحمل

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قد تم جمع وتحليل لبأ عشرين أم ولدت قبل موعدها الطبيعى وعشرين أم أخرى ولدت فى موعدها الطبيعى. وتم قياس تركيز كل من الأجسام المناعية ج و م و أ بطريقة الانتشار المناعى القطرى، وتم أخذ عدات كل من خلية الدم الكلى والخلية الأكولة والخلية الليمفاوية والخلية المتعادلة.

وقد وجد أن متوسط التركيز فى الجسم المناعى أ فى لبأ الأم التى ولدت قبل نهاية مدة الحمل أعلى بكثير عن قيمته فى لبأ الأم مكتملة مدة الحمل . ووجد أن متوسط التركيز فى الجسم المناعى ج والجسم المناعى م متساويان فى كلا المجموعتين. كما أن عدات خلايا الدم الكلى والخلايا الأكلولة والخلايا الليمفاوية والخلايا المتعادلة أعلى بكثير فى حالة لبأ الولادة غير مكتملة المده عن قيمها فى حالة لبأ الولادة مكتملة المدة.