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Research Article

Study of breast milk sodium levels and its correlation with neonatal hyperbilirubinemia

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ABSTRACT

Objective: To detect correlation between breast milk sodium levels and neonatal hyperbilirubinemia in term mothers.

Materials and Methods: Total 101 full term mothers with normal delivery or with c-section admitted with RHC were selected from December 2017 to May 2018 over the period of 6 months. 5ml of breast milk was taken with in 72 hours of delivery either vaginal or c-section and send to laboratory for sodium levels. Transcutaneous bilirubin levels of each neonate were tested using Drager Jaundice Meter JM-103[7] between 48 to 72 hours of birth.

Results Mean age was 25 ± 3.8 years. Out of 101 cases, 55 (54.46%) cases were primary paras and 46 (45.54%) cases were multiparas. Total 64 (63.37%) cases were found with normal delivery and c-section was performed in 37 (36.63%) cases. The mean birth weight of the new born was 2.91±0.44 kg, mean sodium levels of mother milk was 2.73 ± 2.10 mEq/dl. A positive correlation was found between BMNa and TcB, but it was not statistically significant.

Conclusion: Findings of present study showed a positive correlation between mother milk sodium levels and neonatal hyperbilirubinemia. Most of the mothers were primary paras.

Key words – Breast milk sodium, term neonates, physiologic jaundice.

INTRODUCTION

It is a well-known fact today that there is no better nutrition for infants than the breast milk of mothers. Breastfeeding has many advantages. It is microbiologically clean, natural and confers lot of benefits, many of which science is yet to discover. Allergic reactions are unlikely. Mother's milk is always at the right temperature. It has anti-infective components like immunoglobulins, lactoferrin, lysozyme, complements, oligosaccharides, growth factors and modulators. Breastfeeding fosters mother-child relationship[3]. Of late, many studies have highlighted the importance of sodium in breast milk in both term and preterm mothers. Physiologically, sodium is an important extracellular cation which plays a pivotal role in maintaining osmolarity of the extracellular fluid [4]. The data regarding normal breast milk sodium levels in various stages of lactation in Pakistani mothers is lacking although it is known that colostrum is rich in sodium. Therefore, an attempt has been made to establish normative data for breast milk sodium levels in healthy, term Pakistani mothers.

Recently it has been found that there is an increase in the number of hospital admissions

of exclusively breastfed term infants in the first week of life[5]. Many of these infants had high serum sodium levels and had presented with varying degrees of dehydration and jaundice. Since these symptoms were found in exclusively breastfed term infants, attention was drawn towards its causation. Some authors have attributed them to a high maternal breast milk sodium levels due to lactation failure and subsequently decreased feeding by the infant leading to hypernatremic dehydration[6]. Physiological jaundice is found to be exaggerated in most of the infants with hypernatremic dehydration[7].Unconjugated bilirubin is found to be increased in such infants. These infants showed no improvement with phototherapy but became better upon improving hydration by giving intravenous fluids. If not treated properly these infants could end up in hyperbilirubinemia and its complications like kernicterus [5].So it becomes very important to identify the cause of hyperbilirubinemia and treat the same.

The present study was aimed at exploring the correlation between breast milk sodium levels of term mothers and bilirubin levels of their exclusively breast fed babies during the first week of their life.

MATERIAL AND METHODS

Total 101 full term mothers with normal delivery or with c-section admitted with RHC were selected from December 2017 to May 2018 over the period of 6 months. An approval was taken from institutional review committee and written consent was taken from every mother.

Mothers refusing to give consent, mothers with breastfeeding feeding problems due to mastitis, breast abscess and other inflammatory or infectious conditions, mothers with severe pregnancy induced hypertension, mothers on intravenous fluids beyond 24 hours, mothers on antihypertensives, diuretics, cardiac glycosides, antipsychotics, antidiabetic agents, neonates with pathological jaundice, neonates on IV fluids or formula feeds, neonates with cephalhaematoma and subgalealhaematoma were excluded from the study.

Detailed history of mother and neonate was taken.

Breast milk sodium (BMNa): A breast milk sample of 5ml volume was obtained from all mothers by manual expression from a single breast between 48 to 72 hours of delivery. The time of collection was from 3.00 to 4.00 PM, to minimize the effects of diurnal variations.

The breast milk samples were collected in sterile plastic bullets and stored at -200C. Breast milk sodium levels were analyzed using a flame photometer and results were expressed as mEq/dl.

Transcutaneous Bilirubin (TcB) : Transcutaneous bilirubin levels of eachneonate was tested using Drager Jaundice Meter JM-103 at the same sitting. It was measured on the forehead as it is the most frequent site of TcB measurement in clinical practice and research studies.[8]

All the collected was entered in SPSS version 16 and analyzed. Mean and standard deviation was calculated for numerical data. Frequencies and percentages was calculated was calculated for categorical data. Pearson Correlation(r) was applied to see the association between BMNA and Tcb. P. value ≤ 0.05 was considered as significant.

RESULTS

Mean age of the mothers was 25.05±3.86 years. There were 55 (54.46%)primipara and 46 (45.54%) multipara. Among them 64 (63.37%) had full term normal delivery and the rest 37 (36.63) delivered by caesarian section. (Table No.1)

All the infants were delivered at term. The mean birth weight was 2.91±0.44 kg.

Mean BMNa levels was 2.73±2.10 mEq/dl and mean transcutaneous bilirubin levels (Tcb levels) was 11.20 ±3.35 mg/dl. A positive correlation was established between BMNa and TcB by Pearson's correlation. However it was not statistically significant ($p<0.05$). (Table No.2, Fig. No.1)

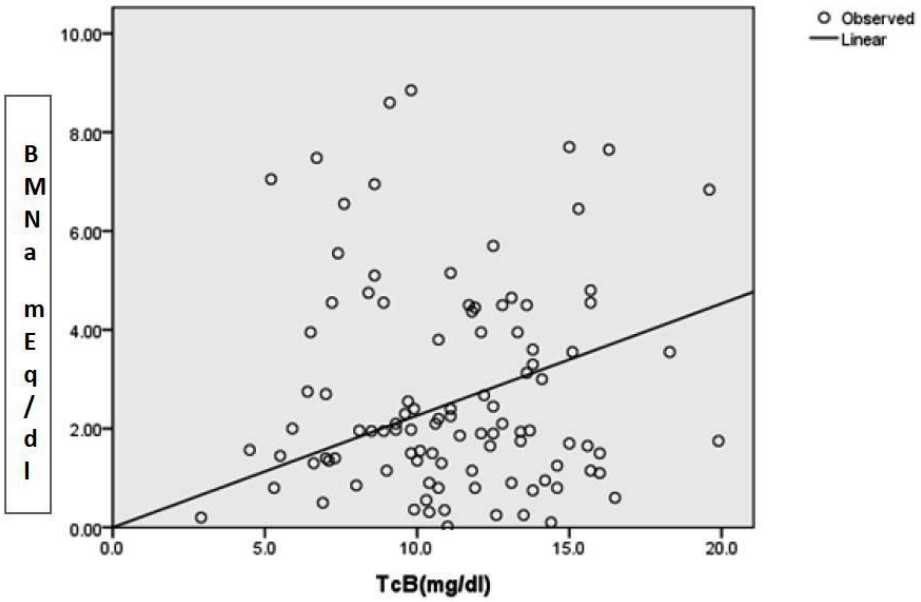
Table No.1: General Characteristics of Mothers

Parameter	Frequency
Primipara	55
Multipara	46
Mode of delivery	
Normal delivery	64
Caesarian section	37

Table No.2 Correlation between BMNa and Bilirubin Levels

		log_TcB
BMNa(mEq/dl)	Pearson Correlation(r)	0.04
	Sig. (2□tailed)	0.69
	N	101

Fig. No.1: Correlation Between BMNa AND TcB



DISCUSSION

Breastfeeding has a fundamental impact on the short term and long term health ofinfants and has an important impact on women's health too. In the present study, the objectives were 1) to establish normative data for breastmilk sodium levels in mothers with term gestation and 2) to find the correlationbetween breast milk sodium levels and hyperbilirubinemia in their exclusivelybreast fed term infants .

There are not many studies on the pattern of BMNa levels in the first postpartummonth in Pakistan. As it is known that BMNa remains high immediately after deliveryand falls precipitously by 3rdday,[9] breast milk samples were collected from all themothers on the 3rd postpartum day. It was found that BMNa levels vary over a widerange i.e from 0.02 to 8.85 mEq/dl . These values are comparable to the valuesobtained in the study conducted by Koo WW.[9]

In this study , the level of bilirubin was assessed by estimating TcB. The TcBlevels were found to be 11.20 ±3.35 mg/dl (mean ± sd). According to AmericanAcademy of Pediatrics' hour specific bilirubin normogram serum bilirubin in termneonates on 3rdday of life is 11 mg/dl.[10]

The BMNa levels correlated positively with TcB, though not to a significant extent.Estimation of BMNa could be used as a simple test in the assessment of thepossible risk

of development of hypernatremia and its complications in theneonates.

Increased BMNa in mothers coupled with other factors like inadequate fluid intake,active fluid loss in the form of diuresis, electrolyte and acid imbalances orincreased metabolic rate in the neonates might have resulted in hypovolemia andhemoconcentration leading to exaggerated physiologic jaundice which wasreflected as increased TcB.

In the present study, the BMNa sample was not centrifuged but was analyzed directly post storage. The presence of lipid layer in the breast milk might have influenced the measurement of BMNa in our study. Manganaro.Ret al[5] centrifuged the breast milk sample immediately after collection to remove the lipid layer to eliminate false low BMNa values.

To conclude, exclusive breastfeeding is vital for the infants but adequate supplementation and augmentation of feeds should be considered when the fluid and caloric needs of the infants are not met with breastfeeding alone despite all the efforts to enhance breastfeeding so as to prevent complications like hypernatremic dehydration and exaggerated physiologic jaundice.

CONCLUSION

Findings of present study showed a positive correlation between mother milk sodium levels and neonatal hyperbilirubinemia. Most of the mothers were primary paras.

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