Ain Shams University
Institute of postgraduate
Childhood studies

Calcium and phosphorus homeostasis In breast fed and formula fed infants

Thesis
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The medical department
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DISCUSSION AND JUDGMENT COMMITTEE

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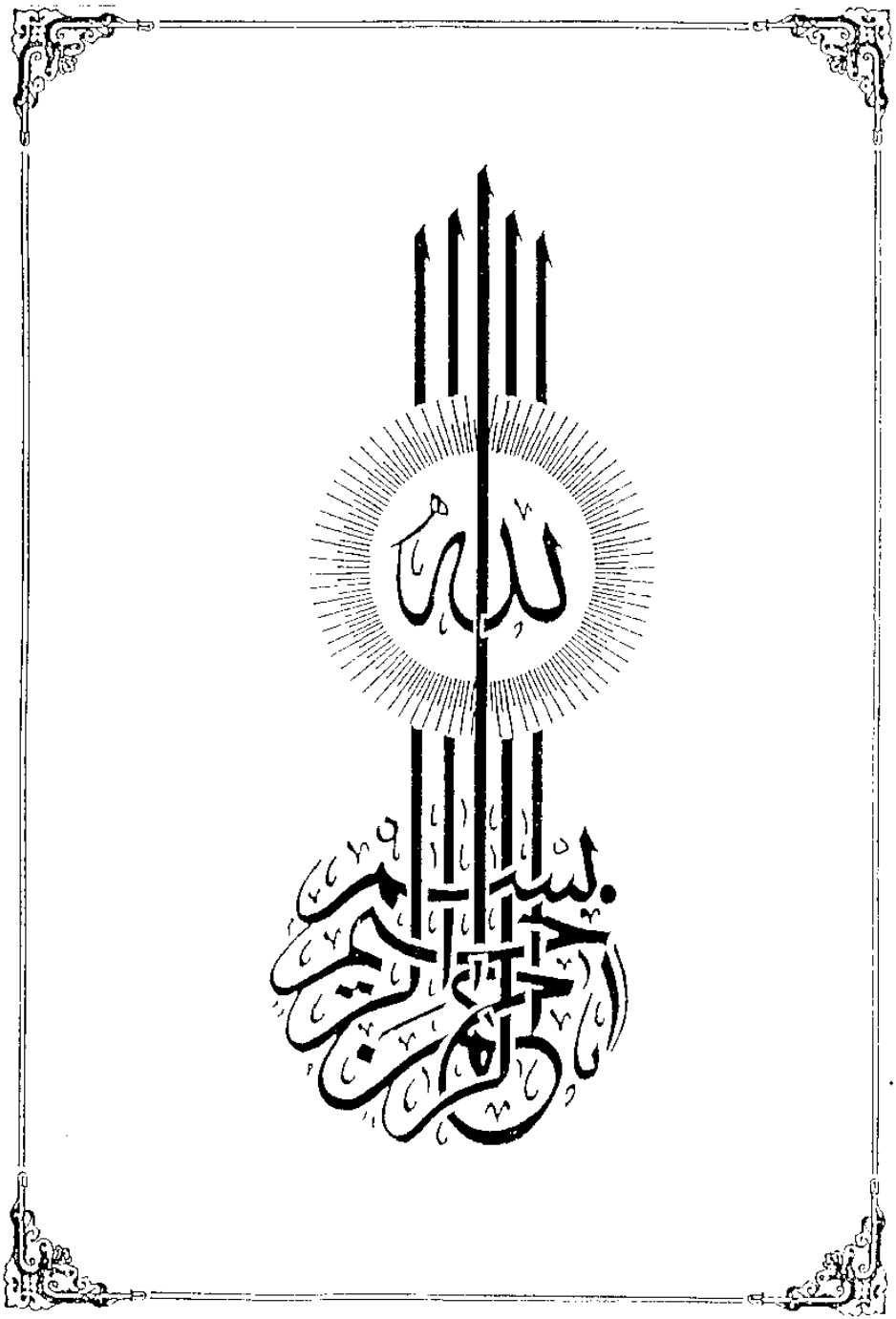

Summary

Calcium is the most prevalent electrolyte in the body . The content of calcium in the plasma is approximately 9.4 mg /dl and it normally varies between 9.0-10.9 mg /dl.

Calcium and phosphorus homeostasis is regulated by a complex system of endocrine and non-endocrine factors . However, the predominant endocrine control of calcium metabolism is mediated by P. T .H. calcitonin, and active vit - D metabolites .

In this study, two groups of infants aged between 6-18 months. were studied for different factors controlling calcium phosphorus homeostasis . The first group was breast fed infants while the second group was formula fed infants .

Assessment of serum calcium level showed that calcium levels were significantly higher in breast fed infants than formula fed infants inspite of the fact that calcium content of breast milk is lower than that of cow's milk and other formula. This was attributed to the high bioavailabilty and the more appropriate Ca/Ph. ratio in breast milk than in cow's milk .

Also, calcium and phosphorus were significantly positively correlated which denotes that vitamin - D mediated intestinal absorption is the most important regulator of calcium and phosphorus homeostasis in those normal infants.

Breast fed infants showed higher serum levels of P.T.H & Ca compared to that of formula fed infants. This significant difference can be interpreted as a primary increase of P.T.H in breast fed infants .

Also, there was a positive correlation between calcium and magnesium which can be explained by the effect of magnesium on P.T.H synthesis, release and action. This should be considered seriously in tetanic patients in whom calcium therapy alone might not be sufficient without magnesium supplementation . In addition, there was a positive correlation between magnesium and parathormone .

On the other hand, there was a negative correlation between magnesium and phosphorus and this can be explained by the fact that elevated P.T.H. constantly decrease serum phosphorus .

Alkaline phosphatase levels were lower in breast fed infants than the formula fed infants and this can be explained by the fact that the action of P.T.H to elevate serum calcium is intestinal rather than osseous .

To conclude, breast milk inspite of its low calcium content, is characterized by higher bio- availability which keeps it the optimal infant diet even for this micronutrient .

All the most recent and technologic advances just aim to establish an adequate formula for infant feeding to parallel this God given feed for infants .

Mother's milk is an important resource for a nation, not only from the biological part of view but also from the economic angle . Breast feeding is easy, this is a great advantage especially where mothers of restricted education and intelligence are concerned, where health education for the mother is poor, where hygiene is of low standard and where milk supplies are delivered irregularly, or can't be adequately stored .

This is particularly applies to Egypt and other developing countries where maintainance of breast feeding is critical for survival and for adequate nutrition. So, encouragement of breast feeding is required .

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﴿وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ لِمَنْ أَرَادَ أَنْ يُتِمَّ الرَّضَاعَةَ﴾

صدق الله العظيم

(سورة البقرة آية ٢٣٣)

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Ca	=	calcium
PO	=	phosphorous
Mg.	=	magnesium
P.T.H	=	parathyroid hormone
CT.	=	calcitonin
A.T.P	=	Adenosine Triphosphate
F.S.H	=	Follicle stimulating hormone
A.D.H	=	Anti diuretic hormone
C.A.M.P	=	Cyclic adenosine mono phosphate
E.C.F	=	Extra cellular fluid
I.G.F	=	Insulin - like Growth Factor
T.S.H	=	Thyroid stimulating hormone
$1.25(OH)_2D$	=	1.25 , di-hydroxy Cholecalciferol
Ig. A	=	Immuno globulin A.

E.G.F = Epidermal Growth factor.

B.M.I = Body Mass Index.

S.D = Standard deviation.

C.D.U = Coefficient of digestive utilization.

K.A.Ps = Knowledge Attitude and practice.

G.I.T = Gastro Intestinal Tract.