

Vitamin E Supplementation in Exclusively Breastfed VLBW Infants

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We conducted this study to evaluate the adequacy of breastmilk as a source of vitamin E in exclusively breastfed VLBW infants. Such infants ($n=44$) were randomly allotted to receive vitamin E supplementation ($n=23$); the rest ($n=21$) did not receive vitamin E. After 21 days, the vitamin E level in the supplemented group was 0.78 ± 0.26 mg/dL as compared to 0.77 ± 0.25 mg/dL in the unsupplemented group ($P=0.69$). The ratio of Vitamin E to lipids was also comparable in the two groups, ($P=0.65$). We concluded that vitamin E supplementation is not routinely needed in VLBW infants.

Key words: India, Breastmilk, Very low birth weight, Vitamin E.

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Preterm infants, that constitute majority of very low birth weight infant population, are born with disproportionately lesser body stores of vitamin E than term infants [1]. Milk produced during the early weeks post partum by mothers of preterm infants (preterm milk) more closely approximates the nutritional requirement of preterm infant than does mature human milk [2]. Breastmilk, especially colostrum, is a very rich source of vitamin E. However, adequacy of breastmilk as a sole source of vitamin E to premature infant is controversial and supplementation of 5 IU has been recommended for low birth weight neonates [3]. The present study aims at comparing vitamin E status of exclusively breastfed preterm neonates with or without vitamin E supplementation.

METHODS

Participants included 75 infants over a period of 1 year, admitted consecutively to the referral neonatal unit with following inclusion criteria (i) weight less than 1500 grams; (ii) gestational age less than 37

weeks; and (iii) mothers willing to exclusively breastfeed the neonate. Infants admitted to referral neonatal unit after 48 hours of life; those where enteral feed was withheld for more than 6 consecutive days; and those having any major congenital malformation or chromosomal anomaly, were excluded. The protocol of the study was approved by the Institutional Ethical Committee. Sample size calculations were not done as no similar studies in the past could be identified. Infants enrolled in the study were randomized using computer generated random number sequence and allocated numbers in the order in which they got admitted in the neonatal unit. All infants, irrespective of their groups, were exclusively given their own mothers milk. Expressed breastmilk was fed by intermittent tube feeds 2 hourly till the infant started suckling. Ryle's tube feeds were started by a maximum volume of 24 mL/kg/day between 1 and 6 days of life. It was increased by 24 mL/kg/day with the aim of attaining 180 mL/kg/day by day 8 of starting the enteral feeds, as per protocol followed in the unit [4]. After attaining maximum volume feeds

by nasogastric tube, feeds were gradually replaced by exclusive breastfeed every 2 hours. Infants received dextrose and electrolytes intravenously until an enteral feed volume of 100 mL/kg/day was achieved. Infants did not receive any other form of intravenous nutrition. Infants randomized to Group 1 received vitamin E supplementation in form of drops (Evion Pediatric drops, 50 mg/mL; 2 drops once a day *i.e.* 5 IU/day), which was started as soon as the neonate could tolerate certain amount of enteral feed (6-8 mL/kg body weight/feed) through ryles tube. Group 2 infants served as controls. No placebo was given. The infants were not put on iron supplementation during the study period. A follow up of 21 days was chosen as it is the average time the neonate is kept in the neonatal unit after which the infants are shifted to the wards, and following stabilization are sent home. Blood samples of 2 mL were obtained from all study infants on day 21 of admission. It was centrifuged, serum separated and stored at -20°C in deep freeze till further analysis. Estimation of serum α -tocopherol was done using a fluorometric micromethod [5]. Estimation of serum cholesterol and serum triglycerides was done using enzymatic method [6] and enzymatic colorimetric GPO (glycerol phosphate oxidase) method [7], respectively. Statistical comparison for means was done using student's *t* test, paired or unpaired as applicable. Excel Epi 6 stat and Epistat (software packages) were used for analyzing the data.

RESULTS

Out of 75 infants that entered the study, 30 expired and one patient left against medical advice. A total of

44 babies could complete the study and were followed up for a period of 21 days (**Table I**).

Table II presents the biochemical status of the two groups. Vitamin E levels in 39 out of 44 infants were more than 0.5 mg/dL, which is chosen for defining deficiency state [3], leaving only 5 infants with low values (3 from Group 1 and 2 from Group 2). Both groups were comparable with regards to vitamin E status at 21 days. These results are applicable to neonates above 28 weeks gestation age and 900 grams body weight.

DISCUSSION

Adequacy of breast milk as a wholesome nutrient in a newborns diet is an established fact. Human milk content of tocopherol ranges between 0.29-0.54 mg/dL [3]. In this study, all the mothers could provide sufficient volume of milk and were able to breastfeed exclusively. There is ample evidence of large quantities of tocopherol crossing mammary barrier in colostrum and early breastmilk [8-10]. The supplemented and non supplemented group of exclusively breast fed VLBW infants had adequate and comparable vitamin E levels even with respect to lipids.

There were a few limitations in our study. No blinding was done. A larger number of subjects would have been better, but due to high mortality in referred VLBW infants, 30 subjects were excluded from the study before randomization. Breastmilk vitamin E status was not analyzed separately in mothers of preterm and term infants.

We conclude that breastmilk is an adequate source of vitamin E for exclusively breast fed VLBW infants and vitamin E supplementation during the first 3 weeks does not improve the vitamin

TABLE I CHARACTERISTICS OF STUDY POPULATION

	Group 1 (n=23) (Supplemented)	Group 2 (n=21) (Controls)
Age at admission (h)	14.52	19.55
Females	10	10
*Mean neonatal weight (g)		
Day 1	1283.6 ± 196.2	1310 ± 150.6
Day 21	1334.5 ± 194.2	1401 ± 154.5
*Mean gestational age (wk)	31.5 ± 2.5	32.1 ± 2.6
Gestational age <32 wks	14	9

* $P < 0.05$ for difference in two groups.

TABLE II BIOCHEMICAL STATUS OF THE STUDY POPULATION

Serum levels	Group 1	Group 2
Tocopherol (mg/dL)	0.78 ± 0.26	0.77 ± 0.25
Cholesterol (mg/dL)	138.8 ± 44	133.9 ± 35
Triglycerides (mg/dL)	110.4 ± 51	104.4 ± 56
Tocopherol/lipid ratio	3.4 ± 1.6	3.3 ± 0.7
Tocopherol/cholesterol ratio	6.2 ± 3.8	6.2 ± 3.8

WHAT THIS STUDY ADDS?

- Breastmilk is an adequate source of vitamin E in preterm very low birth weight infants.

E status of the neonate. There is scope for a study with larger sample size to further study the long term implication of vitamin E supplementation in VLBW infants.

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