

Serum Vitamin E in Cord Blood and Early Neonatal Period

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Vitamin E is an effective lipid membrane antioxidant. It is also essential in maintaining integrity and functional ability of plasma membrane in a role distinct from the anti-oxidant properties(1). No original work is available in the literature about Indian neonates. The present study was, therefore, undertaken to study the vitamin E status in cord blood and early neonatal period of preterm and term babies.

Subjects and Methods

The present study was carried out on 106 normal newborns delivered at Queen Mary's Hospital, Lucknow and where gestational ages were correctly known. All babies were breast fed *ad lib*. The cord blood sample was collected in all the cases. The subsequent blood samples at the age of 3 and 6 days were collected, wherever

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possible. The serum vitamin E level was estimated fluorometrically by the method of Hansen and Warwick(2).

Statistical analysis was done using Student's Y test for significance of differences observed between two groups. Pearson's product—moment' correlation coefficient was calculated for assessing the degree of relation of cord serum vitamin E level with the gestation and birth weight of the babies.

Results

The cord serum vitamin E levels were not significantly different in preterm and term babies (*Table I*), though in preterm with gestational age of 33 weeks or less, the levels were significantly low (0.30 ± 0.10 mg/dl) compared to preterms with higher gestation (0.47 ± 0.10 mg/dl). The cord serum vitamin E levels were not related to gestation ($r = 0.07$, $p > 0.05$).

It was observed that cord serum vitamin E concentration increased as the birth weight increased (*Table II*). All babies upto 1500 g were preterms (31-35 wks gestation) and had vitamin E levels significantly lower than babies with greater weight. A positive correlation was observed between serum vitamin E levels and weight at birth ($r = 0.46$, $p = 0.001$). In preterms, the cord serum vitamin E level was significantly higher in appropriate for gestation age (AGA) babies (0.45 ± 0.12 mg/dl) compared to small for gestation age (SGA) babies (0.39 ± 0.11 mg/dl). Similarly, the level in term AGA (0.49 ± 0.12 mg/dl) was significantly higher than in term SGAs (0.32 ± 0.16 mg/dl).

Table III shows the mean cord serum vitamin E levels obtained during the first week of life. The levels were significantly higher at 3 days compared to cord blood, and a further significant rise was noted at

TABLE I- Gestation and Cord Blood Vitamin E Levels

Gestation	n	Cord vitamin E		Birth weight (g)	n	Cord vitamin E	
		(mg/dl)	(Mean ±SD)			(mg/dl)	(Mean ± SD)
Upto 33 wks	11	0.30± 0.10		<1500	14	0.34± 0.11*	
34- 36 wks	56	0.47 ± 0.10*		1501 - 2000	22	0.42± 0.12	
All preterms	67	0.44± 0.13		2001 - 2500	38	0.47 ± 0.13	
37-41 wks	39	0.46± 0.15		2501 - 3000	26	0.47 ± 0.11*	
(terms)				>3000	6	0.60± 0.13	

* P value <0.001.

TABLE II - Birth Weight and Cord Blood Vitamin E Levels.

* P value <0.05 as compared to next adjacent group.

TABLE III-Serum Vitamin E in the First Week of Life.

Age	Serum vitamin E (mg/dl)					
	All		Preterm		Term	
	n	Mean ± SD	n	Mean ± SD	n	Mean ± SD
At birth	106	0.45 ± 0.14*	67	0.44± 0.13*	39	0.46± 0.15*
3 days	49	0.52± 0.12**	31	0.50± 0.12**	18	0.56± 0.11**
6 days	46	0.69 ± 0.12	30	0.65 ± 0.11	16	0.76± 0.10

p value as compared to next estimation in the same group* = <0.05; ** = <0.001.

6 days of age, both in preterm and term babies.

Discussion

In the present study, mean cord serum vitamin E level was 0.45 ± 0.14 mg/dl. A wide variation in cord blood vitamin E level is reported in the literature. Whereas, Abrams *et al.*(3) observed it to be as low as 0.21 mg/dl, a higher value of 0.61 ± 0.03 mg/dl has been observed by others(4). The observations of Mino and Nishino(5) are in accordance with our results. Vitamin E in

cord serum was insignificantly higher in male babies. The same was observed by Leonard *et al.* (6).

The cord blood vitamin E levels were not related to gestation in the present study. Some workers(6,7) have also noticed a similar pattern, while higher values of vitamin E in blood with increasing gestational age have been observed by others(8). The positive relationship between birth weight and cord vitamin E levels as observed in the present study has been observed by others

also(7-9). Moyer(10) on the other hand, did not find any relationship between these two parameters. However, the significantly higher cord serum vitamin E levels observed in AGA babies as compared to SGA ones by us has not been observed by others(7). Zipursky *et al.* (11) had observed a rise in serum vitamin E levels during the first 7 days of life. Moyer(10) observed one and a half times increase in serum vitamin E levels at fifth postnatal day when compared to birth levels in term babies. While these are similar to the present study results, Melborn and Gross(9) observed a gradual fall in serum vitamin E levels during the first four weeks of life. We feel there is a need to standardize cord vitamin E levels for our newborns at varying weights and gestations using a large study population.

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