Vitamin E Status in Pregnancy and Newborn Infants with Respect to Red Blood Cell Tocopherol

M. Mino

Department of Pediatrics, Osaka Medical College, Takatsuki, 569 Japan

Although the assessment of human vitamin E status has, from a clinical standpoint, generally relied on serum or plasma tocopherol concentrations, this study deals with erythrocyte [red blood cell (RBC)] tocopherol concentrations.

First, tocopherol changes in plasma and RBCs during pregnancy were investigated. Plasma tocopherol levels increased during gestation and were dependent on changes in plasma lipids. The tocopherol/lipid ratio in plasma remained unchanged, whereas RBC tocopherol levels decreased, especially during the last trimester.

A survey in Japan was then undertaken with respect to vitamin E status, including premature infants at 24 hr of life before any feeding and again after 7 days of life. Plasma tocopherol concentrations increased with age, whereas RBC tocopherol concentrations were almost constant throughout life. Therefore, the nutritional status of vitamin E may be estimated on the RBC tocopherol concentration unrelated to age differences. The lowest normal range of RBC tocopherol is most likely 115 μg/dl packed RBC volume, which corresponds to the fifth percentile on the cumulative percentage frequency in the survey. Thus, on the basis of RBC tocopherol concentrations, no deficiency exists, even in premature infants who had no problems and were of relatively large birthweight.

Further examination was undertaken on very low birthweight infants. The RBC tocopherol levels at birth were within a normal range, although plasma tocopherol levels were usually below 500 μg/dl. However, the RBC tocopherol levels in the group having less than 1,000 g birthweight decreased below the lowest normal level during 4 to 6 weeks of life. This suggests that
no deficiency exists, even in very low birthweight infants immediately after birth, but that deficiency may develop during the neonatal period, probably due to poor fat absorption. Vitamin E deficiency should be thus considered a possibility in nursing such very low birthweight premature infants until their absorption mechanism develops.