

Effects of vitamin D and calcium intake on serum bone markers at delivery

Sabour H. (M.D.)¹, Hossein-Nezhad A. (M.D.)¹, Maghbooli Zh. (M.Sc.)¹, Larijani B. (M.D.)¹

1- Endocrinology & Metabolism Research Center, Tehran University/ Medical Sciences, Tehran, Iran.

Abstract

Introduction: Metabolisms of vitamin D, calcium and parathormone change during normal pregnancies. Evaluating these changes and factors affecting them, especially consumption of vitamin D containing foods by mothers and its bioavailability to the fetus, are essential. The primary aim of this study was to determine the relationship between bone turnover and maternal nutritional status of vitamin D during normal pregnancies.

Materials & Methods: This cross-sectional study was done on 449 healthy pregnant women and their newborns who had attended educational hospitals of Tehran University of Medical Sciences in 2003. Average intakes of vitamin D and calcium were studied by a food frequency questionnaire and measurements of serum calcium, vitamin D, PTH, cross-laps and osteocalcin of the mothers and their infants through cord vein. Statistical analysis was done by SPSS software, version 11.5 and $p < 0.05$ was considered significant.

Results: Serum concentrations of vitamin D in cord blood samples from newborns, whose mothers had adequate vitamin D intake (200IU/Day of vitamin D for pregnant women), were higher. There was a positive correlation between maternal serum calcium and calcium in the cord blood of the newborns ($r=0.35$). There were significant differences in concentration between PTH, osteocalcin and cross-laps of the mothers and their newborns ($p < 0.001$). The serum concentrations of vitamin D and calcium in the cases and their infants had a correlation with adequate intake of the two ($p < 0.05$). There was a reverse association between bone turnover markers and calcium with vitamin D intake in mothers.

Conclusion: The nutritional status of vitamin D in human fetus and neonates is completely dependent on vitamin D stores of their mothers and adequate intakes of these elements can influence bone metabolism in mothers and newborns. Therefore, programs aimed at improving vitamin D and calcium intake through educational materials and classes, which focus on the consumption of rich sources of vitamin D, should be considered. Fortification and supplementation of these elements to those at risk has to be nationally regarded.

Key Words: Vitamin D, Bone turnover, Pregnancy, Nutrition, Calcium, Neonate, Osteocalcin, Cross-laps, Parathormone and PTH.

Corresponding Author: Dr. Bagher Larijani, 5th Floor, Endocrinology & Metabolism Research Center, Dr. Shariati Hospital, North Kargar Street, Tehran, Iran. P.O.Box: 14114.

E-mail: emrc@sina.tums.ac.ir