

BONE METABOLISM DURING PREGNANCY AND LACTATION

Bone mineral density and biochemical markers of bone turnover are reliable indices for measuring changes in bone formation and bone resorption. We performed a prospective study of bone mineral density (BMD) in women during their first full term pregnancy until 12 months postpartum. BMD measurements at lumbar spine (L₂-L₄ [LS]) and forearm (distal 33% [RD] and ultra-distal [RUD] region of the radius) were made within 3 months before conception, after delivery, 6 and 12 months postpartum. In mid pregnancy the DXA examination was carried out only at the forearm. Patients were grouped according to duration of lactation as Group I, II, III (0-1; 1-6; 6-12 months). Morning blood and urine samples were obtained for laboratory tests: within 3 months before conception (baseline); between the 22nd and 24th gestational weeks; after delivery; and 6 and 12 months postpartum. Serum 25-hydroxyvitamin D (25-OH-D), parathyroid hormone (PTH), bone specific alkaline phosphatase, osteocalcin, procollagen I carboxypeptides, calcium, phosphate and creatinine in addition to urine deoxypyridinoline crosslinks and calcium were measured. During pregnancy, there was a significant difference between baseline and delivery ($p < 0.001$) in the LS, RUD and RD BMD values. In Group I, there was no statistically significant difference in LS BMD between visits following pregnancy. The RUD BMD loss was recovered by 6 months postpartum (PP6). Group II showed continuous bone loss from delivery until PP6 at LS and RUD. In Group III, the LS BMD loss continued throughout the lactation period. The RUD BMD dropped (4.9%) till 6 months postpartum then increased by 3.0% as measured at 12 months postpartum (PP12). There was no significant change in RD BMD in any of three groups during lactation. At LS bone loss between delivery and PP12 correlated well with the duration of lactation ($r = -0.727$; $p < 0.001$). There was no significant difference in the values of urinary calcium/creatinine and serum calcium, phosphate and 25-OH-D between the different visits during the study. In our patients there was a significant increase in PTH levels at 12 months postpartum as compared to baseline, although the mean values remained in the PTH reference range. All bone turnover markers increased during pregnancy and failed to reach baseline level even 12 months postpartum. The high maternal bone turnover may suggest that the calcium needed for infant growth during pregnancy and lactation may be drawn at least in part from the maternal skeleton.