Cross Sectional Study of Bone Mineral Density (BMD) in Children Exposed to Chronic Corticosteroid Therapy

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Purpose: Bone disease leading to fracture and increased morbidity has been recognized as a significant problem in adults. Peak bone mass, which is attained by age 20 in women and before age 30 in men, also serves as a risk determining factor in developing osteoporosis later in life. It is therefore important that pediatricians optimize bone accretion in children to ensure that their patients reach their optimal peak bone mass. Although most clinicians would agree that reduced bone mass is a significant problem with patients who have been chronically exposed to glucocorticoids, there have been no systematic studies to assess whether this exposure in childhood is the basis for reduced bone mass. **Methods:** Subjects were recruited from various clinics of the Children's Hospital, having all in common a dosage regimen of at least 5 mg per day of the corticosteroid, Prednisone, or its equivalent. Blood samples were collected to measure for 25-OH vitamin D levels and DEXA scans of the lumbar spine (LS) were taken to assess bone mineral density (BMD). The DEXA scan corrected for age-, sex- matched norms by calculating the Z-scores (Z-score = mean +/- S.D. from the mean). Corticosteroid exposure was calculated, activity questionnaires were used to assess the activity levels of the study participants and a 24-hour dietary recall was used for determining nutrient intake. **Results:** Forty-three (43) subjects were enrolled (ages 5 to 18, mean age of 11.6 years, with 24 females and 19 males). Diagnoses included rheumatoid arthritis (n = 6), dermatomyositis (n = 8), inflammatory bowel disease (n = 8), renal glomerular diseases (n = 8), Duchenne Muscular Dystrophy (n = 4) and Renal Transplant patients (n = 9). The mean LS-BMD Z-score was -0.4 ± 1.29 (normal = 0), with a range of -2.93 (severe osteoporosis) to +2.76. Twenty-three percent had BMD scores indicative of osteopenia (Z-scores ranging from -1 to -2), while 7% of the study participants had BMD Z-score values that would be considered osteoporotic (Z-score <-2). Correlations between BMD and cumulative dose of corticosteroids, activity, dietary Ca intake, and serum 25-OH vitamin D will be presented. **Conclusions:** In this cross-sectional study, there is a small reduction in BMD compared to age-matched norms in children with chronic corticosteroid exposure. This study suggests that routine screening for osteoporosis in all children treated with corticosteroids is not warranted without evidence of fractures or very prolonged exposure. However, with a prevalence of osteopenia and osteoporosis of 30%, some intervention might be required for such patients.