EVIDENCE OF AN ASSOCIATION BETWEEN SEASONAL CYCLING OF 25(OH)D AND MARKERS OF BONE HEALTH IN UK SOUTH ASIAN BUT NOT CAUCASIAN WOMEN LIVING AT 51°N

A. L. Darling 1, J. L. Berry 2, F. Gossiel 3, R. Hannon 3, R. Eastell 3, S. A. Lanham-New 1

1Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK 2Vitamin D Research Group, University of Manchester, Manchester, UK 3Department of Human Metabolism, University of Sheffield, Sheffield, UK

INTRODUCTION

• Individuals receiving moderate levels of sun exposure show a clear seasonal variation in 25(OH)D with highest levels in the summer and lowest levels in the winter.
• There is however a debate as to whether this 25(OH)D seasonal fluctuation or ‘cycling’ is detrimental to health outcomes.
• Vieth (2004) suggests that increased risk of some cancers with high 25(OH)D could be due to slow adaption of the 25(OH)D-1-hydroxylase and the 25(OH)D-24-hydroxylase enzymes in prostate cells to fluctuating 25(OH)D levels(1).
• This begs the question however as to whether seasonal cycling of 25(OH)D could be detrimental in other organs, for example in bone cells.

AIMS

This study aimed to assess whether seasonal cycling of 25(OH)D (25-dihydroxy vitamin D) is associated with bone health.

METHODS

• A subgroup of 65 South Asian and Caucasian women who took part in the 2006-2007 D-FINES study was analysed.
• During this study they had blood drawn in four seasons for determination of 25(OH)D and serum c-telopeptide (sCTX) and in autumn and spring they had a DEXA scan (Hologic).
• Cycling of 25(OH)D was assessed by calculating the difference between the winter (nadir) and summer (peak) 25(OH)D and for ease of interpretation, expressing all change as positive values.
• Cycling was assessed within ethnicity due to the large differences in cycling between Caucasians and South Asian individuals.
• Dependent variables analysed were absolute values for autumn femoral neck and lumbar spine BMD, BMC and bone area, and absolute sCTX in each season.
• Also, change in sCTX from summer to winter and change in the DEXA bone indices from autumn to spring were analysed.

RESULTS

• ANCOVA, controlling for summer and winter 25(OH)D status, age, BMI, socioeconomic status, physical activity, and dietary calcium showed no statistically significant association (p>0.05) between quartile of cycling of 25(OH)D and any bone measurement in either ethnic group except in the Asians for absolute autumn CTX (F=5.925, p=0.01 figure 1) and change in femoral Neck BMC (F=3.111, p=0.05, see figure 2).
• Also, in Asians only, absolute autumn lumbar spine BMD approached significance (F =2.780, p=0.07 figure 3).
• No statistically significant results were found for any outcome in Caucasians although there was a non significant trend for an inverse relationship between serum CTX and degree of cycling in all seasons (see figure 4 for autumn data).

DISCUSSION

• The findings here do not support the view that seasonal cycling of 25(OH)D could be detrimental to bone for most bone indices.
• However, in Asians only, the significant loss of femoral neck BMC during the year in the top and bottom quartiles but gain in the 3rd quartile, and the increased autumn sCTX in the third quartile warrants further investigation.
• There was a non significant trend in Caucasians for an inverse relationship between autumn CTX and degree of cycling, despite adjustment for important confounders. With a larger sample size this finding may reach statistical significance.

REFERENCES


The D-FINES study was funded by the Food Standards Agency (N05064). The views expressed are those of the authors alone.